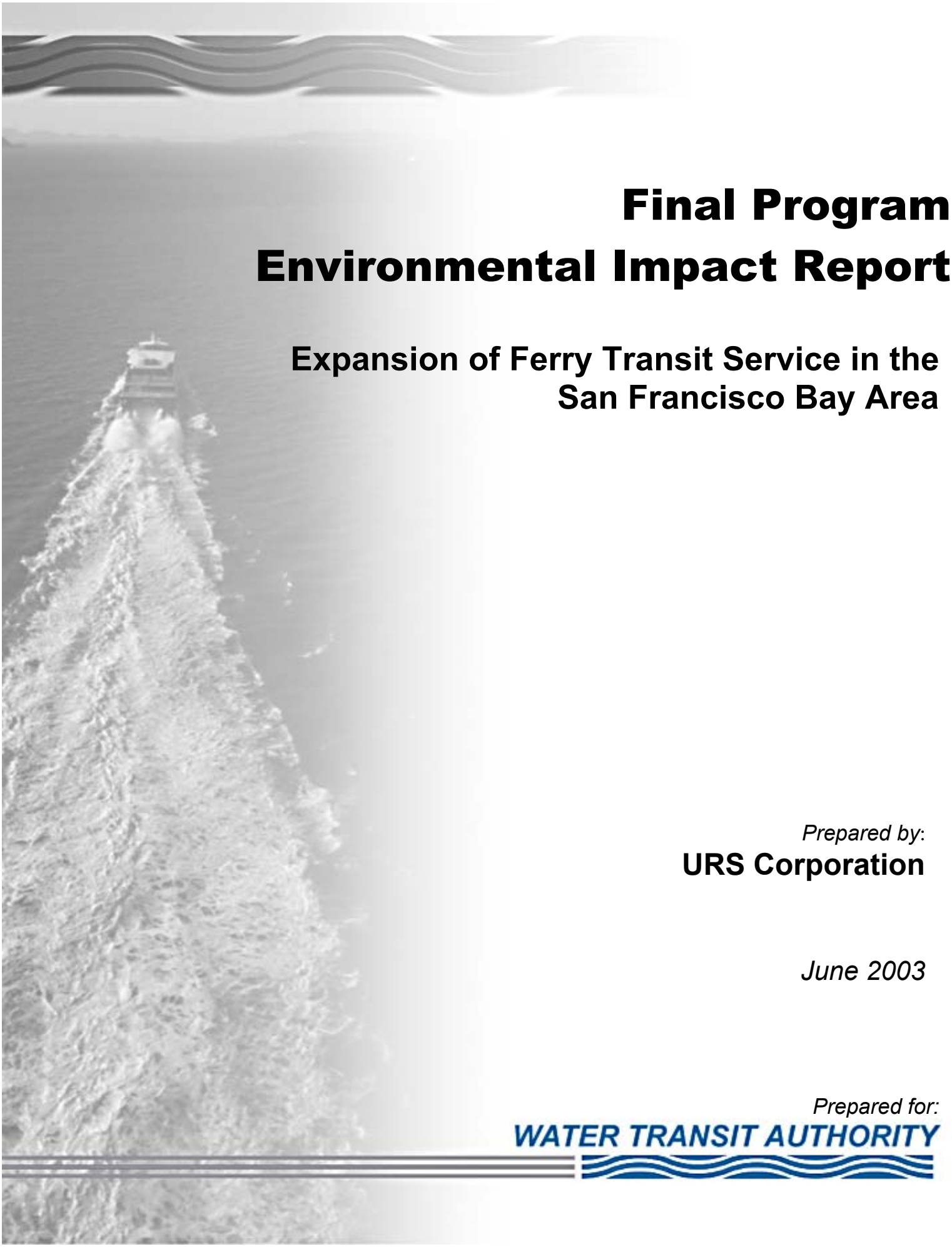

Final Program Environmental Impact Report

Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:

URS Corporation

June 2003

Prepared for:

WATER TRANSIT AUTHORITY

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Executive Summary
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Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:
URS Corporation

June 2003

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WATER TRANSIT AUTHORITY

ES.1 INTRODUCTION

This document is a Program Environmental Impact Report (EIR) addressing the San Francisco Water Transit Authority's (WTA) Proposed Project to implement expanded ferry service in the Bay Area. The WTA began operation as a new regional agency in 2000, with the directive of evaluating options to improve and expand Bay Area ferry service and to report back to the California Legislature with a recommended plan of action. As a result, the preparation of WTA's Implementation and Operations Plan (IOP) initiated a wide range of studies, consultation, and public outreach that provided input to the decision-making process of developing the plan. From August 2002 through January 2003, the WTA circulated a Draft Program EIR for public review and comment. That EIR did not identify a proposed project or preferred alternative; rather, it addressed a range of alternatives for expanding ferry service in the Bay Area. In March 2003, the WTA recirculated the Draft EIR in order to include analysis of the IOP Alternative, which is now identified as the Proposed Project, in accordance with CEQA Guidelines.

ES.2 PURPOSE AND OBJECTIVES/NEED

ES.2.1 Purpose and Objectives

The primary purpose of the WTA system IOP is to increase Bay Area regional mobility and transportation options by providing new and expanded water transit services and related ground transportation terminal access in the Bay Area.

ES.2.2 Need

The Bay Area is home to a highly diverse population and historically strong economy that is served by a complex transportation network. It is frequently overwhelmed at many locations, especially those routes and systems that cross the Bay. Several transportation factors can be partially addressed by an expanded ferry system:

- **Highway System Unable to Meet Current and Future Demand**. Economic expansion and increased population have steadily increased the demand for greater transportation efficiency and capacity. Bay Area travel delays have increased with congestion and are forecasted to worsen steadily over time.
- **Transbay BART and Bridges Are at Capacity**. Several of the worst congestion points involve approaches to Bay Area bridges, and transbay bridge trips are expected to substantially increase.
- **Accidents and Natural Disasters**. The failure of existing transbay crossings, such as shutdowns of BART and the temporary collapse of a segment of the Bay Bridge, have created significant transportation and economic problems in the Bay Area.
- **Increasing Transportation Options**. The existing ferry service provides a valuable transportation option for regional commuters, served by the current system of routes. Ferry transit can be a cost-effective mode that increases the range of options available to Bay Area travelers.

ES.3 ALTERNATIVES

The WTA is evaluating the implementation of a plan, as opposed to a specific project. The Proposed Project and three other system alternatives, each consisting of a set of ferry transit routes and terminals, were analyzed in the WTA's DEIR issued in August 2002. A fourth "No Project" Alternative was also analyzed. Together, the alternatives represent a range of investment in water transit service expansion. In the initial DEIR, Alternatives 1, 2, and 3 were all considered to be feasible alternatives. However, extensive public comments and other input provided to the WTA have made clear that Alternatives 1 and 2 as described in the initial DEIR could not be determined to be feasible without undertaking extensive further studies pertaining to their potential significant environmental impacts.

As a result of this public input, the WTA developed a reduced version of Alternative 2 that would essentially mitigate or avoid many of the potential environmental impacts identified for Alternative 2. This mitigated version of Alternative 2 became the Proposed Project described in the December 2002 IOP. The Proposed Project and the other four ferry alternatives are summarized below:

- **Proposed Project.** The Proposed Project consists of eight existing ferry terminals, with new service to nine planned or existing terminals that currently do not have operating ferry service. The terminals and routes represent ferry service that already successfully exists and could be expanded and improved, plus new terminals and service that show promise of cost-effective implementation. The proposed routes are shown in Figure 2.1.
- **Alternative 1 – Augmented Blue Ribbon System (Comprehensive) Alternative**. This alternative is the largest and most ambitious, representing potential buildout of a ferry transit service as envisioned in prior planning studies.
- **Alternative 2 – Expanded System Alternative**. This alternative represents promising routes that emerged from the Water Transit Initiative and Metropolitan Transportation Commission (MTC) ferry studies that could be implemented in a 10-year horizon.
- **Alternative 3 – Enhanced Existing Service Alternative**. This alternative focuses on limited expansion of the existing system. It would increase and improve service along existing routes by adding or substituting new vessels to increase the number of trips and decrease the time (headways) between trips. Routes with more than one destination may be split to provide direct connections.
- **Alternative 4 – No Project Alternative**. This alternative would involve minimal service improvements. Ferry service would continue to operate on existing routes at about the same frequency, as determined by each service provider.

ES.4 AREAS OF CONTROVERSY

Based on comments received during the public scoping meetings, areas of controversy for the Proposed Project include the following:

- Air Quality Impacts
- Biological Impacts

  - Impacts to special status aquatic sites (wetlands, eelgrass, other sensitive habitat)
  - Impacts to rafting birds
- Energy Impacts
- Localized Traffic Impacts

ES.5 IMPACT SUMMARY

Based on the California Environmental Quality Act (CEQA) Guidelines (Section 15125), assessment of potential impacts should be conducted against a baseline consisting of the existing environmental conditions. The purpose of this comparison is to isolate and identify specific impacts that could occur as a result of the Proposed Project. For this EIR, the alternatives included a "No Project" Alternative that reflects future conditions if none of the other alternatives were implemented. For this alternative, although the WTA project would not be implemented, other ferry service expansion would continue, as well as increases in other vessel traffic and vehicular traffic.

For the majority of the technical sections presented in Section 3.0 of this EIR, potential impacts are evaluated against the existing environmental conditions. For Air Quality (Section 3.6), Transportation (3.12), and Energy (Section 3.13), however, the analyses include projections for both the Proposed Project and the No Project Alternative. For these three issue areas, comparison of future (year 2025) levels of travel against existing conditions is not a useful evaluation as it would not show whether the project improves or impacts regional travel patterns, and consequently regional air quality emissions and energy consumption. Therefore, these sections include analysis of potential impacts compared to the No Project Alternative for the same study year.

Table ES.1 provides a complete listing of all impacts and mitigation measures addressed in this report. The table provides a summary of each impact, its significance by alternative, mitigation measures, and the impact's significance after all potential mitigation has been applied. The following sections present a brief summary of each potential impact area for the Proposed Project.

ES.5.1 Dredging

The Proposed Project includes new dredging for terminal construction and new access channels for one new terminal (Hercules/Rodeo). The construction dredging volume would be approximately 49,830 cy. New maintenance dredging would also occur only at Hercules/Rodeo as all other new terminal sites are located in areas with existing channels.

All dredging would be performed in accordance to Dredged Material Management Office (DMMO) and Regional Water Quality Control Board (RWQCB) directives and would include Best Management Practices (BMPs), such as silt curtains, and appropriate dredging techniques in accordance with DMMO recommendations. No dredging is anticipated near known toxic hot spots.

Dredging is not anticipated to adversely impact threatened, endangered, or protected species. Hercules/Rodeo is not included as an area requiring restricted dredging for species of special

concern. However, consultation with the California Department of Fish and Game (CDFG) and/or site specific studies could be required as verification. If potential impacts to such species are identified during site specific studies, dredging plans would be developed in consultation with resource agencies to identify suitable practices such as use of physical barriers and/or restriction of dredging in shallow waters to certain seasonal periods. No dredging would be conducted in areas of identified herring spawning.

Dredging for the Proposed Project is not anticipated to impact wetlands. Hercules/Rodeo has not been identified as an area of wetland habitat.

ES.5.2 Navigation

With any expansion of water transit service there is a potential for an increase in incidents between vessels, such as collisions, allisions, and groundings. A comparison of recorded navigational incidents and vessel traffic statistics in the Bay and other heavily used harbor areas in the U.S. does not appear to associate an increase in trips with an increase in the probability of incidents. This suggests that other factors likely affect the occurrence of navigational incidents for any given volume of harbor transits. Possible factors include condition of equipment, navigational aids, safety procedures, and pilot training and experience. Implementation of best practices as recommended by the preliminary risk assessment prepared by ABS (2002) will serve to minimize navigation-related risk. Among others, these practices include design of terminals to facilitate docking under many conditions, licensed master familiarization training for routes, extensive preventive maintenance, backup radar, and assignment of a second person to the bridge watch under certain weather conditions.

Appropriate training of ferry crew in new terminals located near existing windsurfing launch sites could reduce the risk of incidents involving ferries and windsurfers. In addition, designation of specific ferry employees to stand watch on the bridge of ferries at select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) could reduce the risk of incidents involving ferries and windsurfers.

ES.5.3 Wake Wash

The Proposed Project would increase the frequency of ferry trips across the Bay and could increase the wake energy at some shorelines, causing increased erosion. Service to new areas of the Bay could lead to shoreline impacts from increased wave heights. For the Proposed Project, potentially impacted areas in the North Bay include the shorelines from Antioch to Martinez in New York Slough and Suisun Bay, areas in the Carquinez Strait near Martinez and Vallejo, and south of Point Pinole. In the Central Bay, potentially sensitive areas include shorelines near the terminal locations (Larkspur, Richmond, and Harbor Bay Isle). In the South Bay, the shoreline along the approach to Redwood City could potentially be impacted by wake wash. This is a potentially significant impact.

One or more of the following mitigation measures are proposed for potentially sensitive areas: 1) Maintain route alignments more than 1,500 m from sensitive shorelines; 2) Operate vessels to maintain maximum wake wave heights at 16 cm; 3) Operate vessels to maintain wake waves at shorelines at 50% of average sustained wind wave height; 4) Modify ferry routes to redirect

wave energy away from sensitive habitats; 5) Slow vessels near sensitive habitat; and 6) Use low-wake vessel technology, such as existing lighter-weight vessels. Successful implementation of the above mitigations (and/or other mitigations that may be identified during site specific study) would reduce impacts to less than significant levels.

Wake wash impacts from increased ferry service are not anticipated to impact surrounding marinas or interfere with recreational users.

Wake wash impacts from increased ferry service could have adverse effects on California clapper rail, a listed species, by inundating nests or degrading potential clapper rail nesting habitat. Habitat surveys would be conducted for marshland areas of shoreline within 1,500 m of proposed routes. If habitat is determined to be nesting habitat or potential nesting habitat, site specific measurements of wake attenuation would be performed. If required, operational changes such as adjusting routes or slowing vessels could be necessary. However, impacts to clapper rail, clapper rail nesting habitat and potential habitat, and other sensitive habitat could remain significant. This would have to be determined in site specific studies.

Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites. When possible, routes would remain at least 300 m from marine mammal areas, which exceeds recommended National Marine Fisheries Service guidelines. Potential impacts to marine mammals are discussed in more detail in the Biology section below.

ES.5.4 Water Quality

Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface area, causing increased storm water runoff. If runoff contained pollutants or eroded disturbed soil, discharge could impact receiving water quality. New terminals would be designed to control storm water runoff and discharge. During construction, BMPs would be adopted to prevent, minimize, and clean up spills and leaks. These measures would reduce potential impacts to less than significant levels. No terminals for the Proposed Project are located within 100-year floodplain; therefore, flooding is not anticipated to be an issue.

Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay. Although the probability of a spill is low, it still has the potential to occur. Safety issues identified by the Harbor Safety Committee would be incorporated into the annual review of the Harbor Safety Plan to minimize this potential. In addition, project proponents would assist or prompt ferry operators to update contingency plans and review emergency response services, review contingency plans, conduct drill exercises, review emergency response agreements, review spill response equipment availability, develop a program for training on fueling methods to minimize spills, require review of new vessels to include technological features to minimize spills, and adopt applicable measures recommended by the Ferry Safety Plan (ABS 2002).

ES.5.5 Biological Resources

Impacts to biological resources could potentially result from dredging, wake wash, water quality impacts, and noise impacts from project construction and operations. Potential impacts are summarized below.

Construction – Construction of terminals is not anticipated to result in increased potential for the spread of invasive nonnative plant species in disturbed habitats. Potential areas of cordgrass have been identified primarily near Oyster Point and Redwood City. Site specific surveys would be conducted to identify and map areas of cordgrass, and nonnative species would be removed as part of the project.

Disturbance of "Special Aquatic Sites," including eelgrass beds, mudflats, and wetlands, would be avoided in the design of project features and routes. Specific areas of eelgrass beds and mudflats would be defined during site specific project planning. If impacts were unavoidable, the possibility of providing enhanced functions and values at equivalent sites could be investigated.

Dredging – New dredging for terminal construction and access channels is only anticipated for Hercules/Rodeo. This area has not been regionally identified as an area of wetland habitat. No eelgrass has been identified near the site and it is not a location used for Pacific herring spawning.

Wetlands are present near proposed new terminal sites at Pittsburg/Antioch and Martinez. Site specific studies would be required to determine whether wetlands could be impacted and to identify appropriate mitigation measures.

Indirect impacts to sensitive receptors would be avoided through the use of silt curtains or other appropriate methods. Special aquatic sites have been identified on a regional level at Berkeley, Martinez, Richmond, and Hercules/Rodeo.

Pile Driving – Underwater noise from pile driving and other construction activities could affect nearby fish. Mitigation will need to be evaluated on a site specific basis. Underwater pile driving noise could disturb marine mammals. The Redwood City location is near a seal haul-out site. Incidental harassment permits may be required from the National Marine Fisheries Service (NMFS). As appropriate, preconstruction surveys would be conducted for the presence of mammals, monitoring would be conducted, and safety zones would be established.

Ferry Traffic – Ferry traffic could disturb roosting, rafting, and foraging water waterfowl. Ferry routes would be consolidated, especially in the South Bay, to leave as much undisturbed shallow open water as possible. Large portions of habitat in San Pablo Bay in the North and the South Bays would remain undisturbed. Potential impacts to waterfowl along new ferry routes would require evaluation. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).

Transiting ferries could disturb marine mammals resting at haul-out sites. Ferry routes would be at least 100 to 250 meters from haul-out sites. The Redwood City terminal location is near a haul-out site and maintaining the recommended distance may not be possible. Potential impacts would require site specific study.

High-speed ferries could potentially strike gray whales. Operators would receive whale sighting reports and exercise diligence. Dedicated lookouts could be warranted and/or ferries could be equipped with whale-detection systems.

ES.5.6 Air Quality

As a result of the Proposed Project, regional cumulative emissions of NO_X, PM_{10}, and CO would decrease. Emissions of SO_2 and ROG would increase by 0.3% and 0.02%, respectively. While the Proposed Project would result in ferries emitting toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel, $PM_{2.5}$ emissions from ferries would be less than for the No Project Alternative. The Proposed Project would result in a net increase in emissions of CO_2.

Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water. Deposition of nitrates would decrease, but sulfate deposition would increase. Use of a fuel technology that lowers SO_2 emissions would reduce sulfate emissions and subsequent deposition. However, this impact would still be potentially significant.

Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard. Cold-start emissions could be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

Local concentrations of NO_2 and particulate matter could exceed state and federal standards at the Ferry Building. This impact would be reduced to less than significant levels by locating engine exhaust pipes at least 20 feet above the water line and minimizing dockside idling time at the Ferry Building.

Dredging at Hercules/Rodeo for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_X, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years.

ES.5.7 Land Use

The Proposed Project includes nine new ferry terminals located within South San Francisco and Treasure Island, the Peninsula, and the East Bay. With the exception of one terminal (Hercules/Rodeo), all are within existing ports or maritime areas. Therefore, disruption to existing neighborhoods should be avoidable or minimal. At a regional level, the implementation of these terminals is not considered a significant impact to existing communities. Specific community impacts may occur at a local level related to some necessary property acquisition and land use changes, depending on each terminal site. These effects would be evaluated when each of the terminal plans is advanced for further review. Based on the terminals included in the Proposed Project, these impacts are not anticipated to be significant, but would be considered at the time each route and terminal are advanced for implementation.

The development of new ferry terminals in urban locations could result in the displacement of existing land uses. Site specific projects would be designed to avoid or minimize the displacement of homes or businesses. If displacement is unavoidable, project proponents would execute a relocation assistance plan or its equivalent.

Construction could disrupt existing neighborhoods due to noise, dust, and traffic. These potentially disruptive impacts will be analyzed on a project-by-project basis as part of the environmental review under CEQA, but are most often minimized to a less than significant level through project design features and best management practices. Furthermore, construction-related impacts are temporary and would not result in permanent changes in an established community.

Implementation of the Proposed Project could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods. Site specific evaluation would be necessary to avoid these potentially significant impacts.

ES.5.8 Aesthetics

Only one of the nine new terminals would be located in an area without existing maritime character (Hercules/Rodeo). The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay. When possible, terminal facilities would be located so as not to obstruct or detract from views of the Bay from nearby public thoroughfares. They would be designed to provide new or enhanced point access areas or view areas such as piers, platforms, and walkways.

Ferry terminal designs will require site specific lighting plans. Outdoor lighting design and placement would be directed to the specific facility to be lit, to avoid excess light and glare impacts.

ES.5.9 Cultural Resources

Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related activities for buoy placement could impact submerged and sub-bottom cultural resources in the Bay. New terminal construction and channel dredging is anticipated only at Hercules/Rodeo, but retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources, and historic built environment resources. Site specific projects would be evaluated for presence and significance of resources, and avoidance procedures in compliance with established procedures. Identified resources that cannot be avoided would be subject to further recordation and or data recovery.

ES.5.10 Geology

No impacts to geologic resources are anticipated as a result of the Proposed Project. Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at improperly designed or constructed facilities. New facilities would be designed and constructed to applicable seismic requirements and codes. Site specific ground motion studies would be completed for proposed project sites. Exploratory investigations would be performed to

determine susceptibility to liquefaction, and potential locations removed or engineered to reduce this risk.

ES.5.11 Noise

It is unlikely that the Proposed Project would cause significant noise impacts to noise-sensitive land uses along new ferry routes. Measured fast ferry pass-by noise levels indicate that a maximum stand-off distance of 130 feet for a fast ferry at service power and speed avoids the FTA's "impact" designation at residential-type land use on the shoreline. Service-speed operations would not occur within 130 feet of the shoreline for safety, wake wash and other considerations.

Siting and planning of new ferry terminals would include planning to locate terminal areas away from noise-sensitive land uses. Compliance with existing zoning ordinances should be sufficient to avoid potential impacts of ferry terminal operations on noise-sensitive land uses, such as adjacent residential areas.

Implementation of the Proposed Project would be unlikely to impact small mammals, such as the salt marsh harvest mouse. No noise impacts to gray whales are expected. No impact is expected for sea lions and sea otters from ferry operations. There is a potential for impacts to seals at the haul-out site on the eastern side of Treasure Island and near Redwood City. The exact routes from San Francisco to Treasure Island and Redwood City would be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-outs or to other wildlife (birds and fish), could be significant.

Noise impacts to birds are difficult to determine because of the variety of habitats birds use within San Francisco Bay. There is a potential for impacts if noise levels exceed 60 dBA CNEL at the edge of sensitive habitat.

Although it is unlikely that fish would completely abandon ferry transit areas, available data preclude determination of impact. Therefore, impacts to fish could be potentially significant for some routes.

ES.5.12 Transportation

At a regional level, expansion of the ferry service would result in a decrease of the total automobile Vehicle Miles Traveled (VMT). At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals. Traffic mitigation measures would depend on local, site specific conditions. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.

Additional car access to terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals. Specific project proponents and terminal authorities/planners should study and develop terminal specific plans in conjunction with local and regional transit agencies. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.

ES.5.13 Energy

The Proposed Project would result in higher energy per passenger miles traveled (0.41% increase) than the No Project Alternative. The WTA would continue to investigate the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. Alternative energy sources and engine technologies would be incorporated as they become feasible.

ES.6.1 GROWTH INDUCEMENT

The Proposed Project would expand ferry service at existing terminals and add new ferry terminals primarily at developed waterfront areas. This could be growth inducing for areas near the terminals. The Proposed Project includes expansion of service at existing terminal locations and at new sites selected because they have attributes and public support that indicate ferry service would be successful in terms of ridership and cost effectiveness. All of the new terminal locations, with the exception of Hercules/Rodeo, would serve areas that are already generally developed with maritime or urban uses. The Hercules/Rodeo site is forecast (in their General Plan) for urban uses.

Growth can be considered negative or positive, depending on the objectives of the local government and the community. Local governments have the responsibility to make land use decisions. Potential growth inducement impacts should be considered by planning staffs at the local level to ensure that specific projects do not induce unplanned or unwanted growth. For these reasons, the Proposed Project is not anticipated to have a significant effect on unplanned growth. However, until site-specific analyses are performed, this impact remains potentially significant.

ES.6.2 CUMULATIVE IMPACTS

CEQA requires analysis of cumulative impacts of the Proposed Project and other projects that are planned and that could produce related cumulative impacts. The Proposed Project is treated as a program, and therefore the impact analyses evaluate the whole of the action. This allows for consideration of cumulative project impacts for each subject area. Cumulative impacts could potentially occur regionally or locally. Local cumulative impacts cannot be evaluated in a program EIR as the analyses are not site specific. Site specific analyses of cumulative impacts (such as site specific traffic impacts, noise, light/glare, etc.) may be required when specific locations and routes are determined.

Regionally, cumulative impacts are included in the analyses for several potential impact areas. Section 3.1 describes dredge management for the entire San Francisco Bay area, including existing dredge and disposal activities, current dredging projects, and the Long Term Management Strategy (LTMS) program for dredge management in future years. This includes estimates from the LTMS (USACE 1998) for future baywide (cumulative) dredging volumes. The LTMS program was used as a basis for comparison in the impact assessment, to provide an understanding of the quantity of dredge volumes against the anticipated regional quantities. The WTA Proposed Project would not affect achievement of the LTMS goals.

The navigation analysis (Section 3.2) includes projected increases in other vessel traffic on the Bay. Cumulative growth in regional vessel traffic was estimated using two extreme scenarios,

one low and one high, to which the proposed ferry transits were added. These cumulative scenarios were then used to evaluate the increase in potential ferry interactions between ferries, and between non-ferry vessels.

The air quality analysis includes projections of Bay Area-wide emissions for cars, busses, and ferries for the pollutants NO_X, PM_{10}, CO, SO_2, and ROG. The total estimated Proposed Project emissions were then compared against the no project alternative, providing an indication of how the cumulative regional pollutant emission 'burden' changes with and without the Proposed Project.

The transportation analysis includes transit forecasts from the Regional Transportation Plan (MTC 2001) and projections from ABAG.

The energy analysis is based on the same region-wide travel forecasts used for the air quality assessment, and evaluated in terms of energy consumption per passenger mile traveled (PMT) for vehicles and vessels. The total emissions for the Proposed Project were also compared against the No Project Alternative, to show the change in cumulative regional transportation energy consumption with and without the Proposed Project in place.

Table ES.1
Summary of Impacts and Mitigation Measures

Impact [1]		Level of Significance Prior to Mitigation[2,3]						Level of Sig. After Mitig.[2]	Notes on Proposed Project
	Alternative:	Prop Proj	1	2	3	4	Mitigation Measures		
3.1 Dredging									
D-1	Dredging of new channels and maintenance dredging would add to the total annual volume of dredged materials in the Bay.	**L**	PS	PS	N	N	**D-1.1:** The total amount of dredging required could be minimized by avoiding dredging in those proposed channels that would require removal of the largest sediment volumes. No mitigation is required for the Proposed Project.	**L**	The Proposed Project only includes new channel dredging at Hercules/Rodeo.
D-2	Dredging of new channels could locally reduce water quality by exposing and suspending contaminated sediment.	**PS**	PS	PS	N	N	**D-2.1:** Sample potential dredge locations and test for contamination. Minimize dredging. Develop and require specifications and allocation responsibility to the entities implementing new dredging to adopt the techniques and Best Management Practices (BMPs). Comply with DMMO and RWQCB directives.	**L**	New channel dredging only at Hercules/Rodeo.
D-3	Dredging new channels could remove bottom sediments that could result in a salinity intrusion into groundwater basins.	**L**	L	L	N	N	No mitigation is required.	**L**	New channel dredging only at Hercules/Rodeo.
D-4	Dredging could adversely impact threatened, endangered, or protected species.	**PS**	PS	PS	N	N	**D-4.1:** Implement Mitigation D-2.1. Use BMPs (such as silt curtains) and appropriate dredging techniques in accordance with DMMO recommendations. **D-4.2:** In consultation with resource agencies, identify suitable practices such as use of physical barriers and/or restriction of dredging in shallow waters to certain seasonal periods.	**L**	New channel dredging only at Hercules/Rodeo.
D-5	Dredging for construction of access channels to new ferry terminals could result in loss or disturbance of jurisdictional wetlands.	**PS**	PS	PS	N	N	Implement Mitigation Measure B-1.1 and B-1.2	**L**	New channel dredging only at Hercules/Rodeo, which has not been identified as an area of wetland habitat

[1] Impact numbers refer to impacts described in Section 3 for the Proposed Project. While the impact numbers correspond to those in Section 5 (analysis of Alternatives 1 to 4) for most impacts, due to more in-depth analysis of the Proposed Project and edits based on public comments on the DEIR, some Impact numbers in Section 5 may not be the same.
[2] L: Less than significant; N: No impact; PS: Potentially Significant; S: Significant.
[3] Impacts identified as Potentially Significant (PS) may be Significant based on further project definition and future analysis
[4] Note that the Proposed Project includes use of SCRs and PM traps and elimination of low ridership routes, which are mitigations for Alternatives 1 through 3.

Impact [1]		Level of Significance Prior to Mitigation[2,3]						Level of Sig. After Mitig.[2]	Notes on Proposed Project
Alternative:		Prop Proj	1	2	3	4	Mitigation Measures		
3.2 Navigation									
NAV-1	With expansion of water transit service there is a potential for an increase in incidents such as collisions, allisions, and groundings.	**PS**	PS	PS	PS	N	**NAV-1.1:** Implement ABS (2002) best practices to minimize navigation-related risks.	**PS**	
NAV-2	Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between windsurfers and ferries.	**PS**	PS	PS	PS	N	**NAV-2.1:** Train ferry crew regarding hazards at new terminals near windsurfing launch sites. **NAV-2.2:** Designate specific ferry employees to stand watch on select routes.	**PS**	
NAV-3	Increased ferry transits may lead to an increased risk of collision between recreational boaters and ferries.	**PS**	PS	PS	PS	N	**NAV-3.1:** Work with Harbor Safety Committees and potentially fund or sponsor new education and advisory training programs regarding boater safety. **NAV-3.2:** Designate ferry employees to stand watch for navigational hazards.	**PS**	
3.3 Wake Analysis									
WW-1	Increased frequency of ferry trips across the Bay could increase the wake energy at some shorelines, causing increased erosion. Service to new areas of the Bay could lead to shoreline impacts from increased wave heights.	**PS**	PS	PS	L	N	**WW-1.1:** 1) Maintain route alignments more than 1,500 m from sensitive shorelines; 2) Operate vessels to maintain maximum wake wave heights at 16 cm; 3) Operate vessels to maintain wake waves at shorelines at 50% of average sustained wind wave height. **WW-1.2:** Modify ferry routes to redirect wave energy away from sensitive habitats. **WW-1.3:** Use low-wake vessel technology, such as existing lighter-weight vessels. **WW-1.4:** Implement operational adjustments such as slowing of vessels near sensitive habitat. If speed limits are set, the mitigation shall include monitoring and enforcement to ensure compliance.	**L**	

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Impact [1]		Level of Significance Prior to Mitigation[2,3]					Mitigation Measures	Level of Sig. After Mitig.[2]	Notes on Proposed Project
	Alternative:	Prop Proj	1	2	3	4			
WW-2	Increased ferry service could impact surrounding marinas, potentially damaging moored vessels and interfering with recreational users.	**PS**	PS	PS	L	N	**WW-2.1:** Implement Mitigations WW-1.1 through WW-1.4.	**L**	
WW-3	Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.	**PS**	PS	PS	L	N	**WW-3.1:** Conduct habitat surveys of shoreline within 50 m of the marshland edge along proposed routes. If habitat is potential nesting habitat, perform site specific measurements of wake attenuation. For nesting sites or suitable nesting habitat more than 50 m from the edge of a marshland, no significant impacts or need for mitigation are anticipated. **WW-3.2** Use existing low-wake vessel technology to reduce both the total wake wash energy and height of individual waves. **WW-3.3** Adjust routes to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. **WW-3.4** Adjust operations (e.g., slow vessel near sensitive areas).	**PS**	Mitigation for any final specific routing that may cause a potentially significant impact shall require a Biological Opinion from the U.S. Fish and Wildlife Service under the federal Endangered Species Act.
WW-4	Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites.	**PS**	PS	PS	L	N	**WW-4.1:** Refer to Apply Mitigation B-14.1, which is to avoid marine mammal areas by 100 to 250 m.	**L**	
3.4 Water Resources									
W-1	Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface area, causing increased storm water runoff. If runoff contained pollutants or eroded disturbed soil, discharge could impact receiving water quality.	**PS**	PS	PS	N	N	**W-1.1:** Adopt measures for construction to prevent, minimize, and clean up spills and leaks. Require containment measures for equipment that could potentially release fuels. **W-1.2:** Design new terminals to control storm water runoff and discharge. Develop and apply BMPs.	**L**	

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Impact [1]		Level of Significance Prior to Mitigation[2,3]						Level of Sig. After Mitig.[2]	Notes on Proposed Project
Alternative:		Prop Proj	1	2	3	4	Mitigation Measures		
W-2	Some areas where terminals may be planned, could be within 100-year floodplains. Construction of new terminal facilities within a 100-yr floodplain could expose people and terminal facilities to flood hazard.	**N**	PS	PS	N	N	**W-2.1:** Verify base flood elevations in the areas where new terminals are proposed. If 100-yr floodplain cannot be avoided, design facilities to minimize flooding hazards, post flood hazard warnings, and develop flood evacuation plans. No mitigation required for the Proposed Project.	**N**	No terminals for the Proposed Project are located within 100-yr floodplain.
W-3	Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay. Although the probability of a spill is low, it still has the potential to occur.	**PS**	PS	PS	PS	N	**W-3.1:** Incorporate safety issues identified by the Harbor Safety Committee into the annual review of the Harbor Safety Plan. **W-3.2:** Assist or prompt ferry operators to update contingency plans and reviews of emergency response services. Review contingency plans, conduct drill exercises, and review emergency response agreements. Review spill response equipment availability. **W-3.3:** Develop a program for training on fueling methods to minimize spills. **W-3.4:** Require review of new vessels to include technological features to minimize spills. **W-3.5:** Adopt applicable measures recommended by the Ferry Safety Plan (ABS 2002).	**L**	
3.5 Biology									
B-1	Loss of jurisdictional wetland habitat could occur as a result of dredging and construction of terminal facilities.	**PS**	PS	PS	N	N	**B-1.1:** Impacts to wetlands shall be avoided if possible. **B-1.2:** In the event that impacts are unavoidable, mitigation measures would be developed for specific projects.	**PS**	Wetlands present near Pittsburg/Antioch and Martinez terminals. New terminal construction and channel dredging only at Hercules/Rodeo, which has not been regionally identified as an area of wetland habitat

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Impact [1]		Level of Significance Prior to Mitigation[2,3]					Mitigation Measures	Level of Sig. After Mitig.[2]	Notes on Proposed Project
	Alternative:	Prop Proj	1	2	3	4			
B-2	Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.	**PS**	PS	PS	N	N	**B-2.1:** Surveys shall be conducted to identify and map areas of cordgrass, and nonnative species shall be removed.	**L**	Potential areas of cordgrass primarily near Oyster Point and Redwood City locations
B-3	Project construction could result in the disturbance of "Special Aquatic Sites," including eelgrass beds, mudflats, and wetlands.	**PS**	PS	PS	N	N	**B-3.1:** Disturbance of eelgrass beds and mudflats shall be avoided in the design of project features and routes. Site specific sidescan sonar surveys would be required prior to implementation of new routes or construction of new terminals to verify that eelgrass is not present. **B-3.2:** Define specific areas of eelgrass beds and mudflats. If unavoidable, provide enhanced functions and values at equivalent sites. **B-3.3:** Avoid indirect impacts through the use of silt curtains or methods to protect from disturbance.	**PS**	Special aquatic sites identified on a regional level at Berkeley, Martinez, Richmond, and Hercules/Rodeo. New terminal construction and channel dredging only at Hercules/Rodeo
B-4	Turbidity caused by dredging would reduce light penetration in the water column and could locally reduce phytoplankton production.	**L**	L	L	N	N	No mitigation is required.	**L**	New terminal construction and channel dredging only at Hercules/Rodeo
B-5	Disturbance of benthic habitat from dredging could result in the loss of benthic (bottom dwelling) organisms.	**L**	L	L	N	N	No mitigation is required.	**L**	New terminal construction and channel dredging only at Hercules/Rodeo
B-6	Disturbance of habitat from dredging may result in the spread of nonnative benthic invertebrate species.	**L**	L	L	N	N	No mitigation is required.	**L**	New terminal construction and channel dredging only at Hercules/Rodeo
B-7	Dredging could adversely affect fish species near the construction activities.	**PS**	PS	PS	N	N	**B-7.1:** Implement Mitigations D-4.1 and D-4.2	**L**	New terminal construction and channel dredging only at Hercules/Rodeo

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[4] Note that the Proposed Project includes use of SCRs and PM traps and elimination of low ridership routes, which are mitigations for Alternatives 1 through 3.

Impact [1]		Level of Significance Prior to Mitigation[2,3]						Level of Sig. After Mitig.[2]	Notes on Proposed Project
	Alternative:	Prop Proj	1	2	3	4	Mitigation Measures		
B-8	Dredging and associated turbidity could affect spawning by Pacific herring.	**L**	PS	PS	N	N	**B-8.1:** Avoid dredging in known herring spawning grounds during spawning season. If dredging must occur during this period, monitors would be necessary, and activities might be halted. **B-8.2:** Use silt curtains while dredging to reduce turbidity, on a site-by-site basis. No mitigation is required for the Proposed Project	**L**	No dredging required at locations in the Bay used by herring to spawn.
B-9	Underwater noise from pile driving and other construction activities could affect nearby fish.	**PS**	PS	PS	N	N	**B-9.1:** Mitigation will be evaluated on a site specific basis. Measures to reduce sound pressure levels in surrounding waters could be deployed.	**L**	
B-10	Construction could result in loss of habitat for waterfowl, shorebirds and other birds.	**PS**	PS	PS	N	N	**B-10.1:** Implement Mitigations B-1.1 and B-3.1 through B-3.3.	**L**	New terminal construction and channel dredging only at Hercules/Rodeo – which has not regionally identified as an area of wetland habitat
B-11	Ferry traffic could disturb roosting, rafting, and foraging waterfowl in shallow areas.	**PS**	PS	PS	L	N	**B-11.1:** Consolidate ferry routes to leave as much undisturbed shallow open water as possible. **B-11.2:** Response of waterfowl to new ferry routes in shallow North and South Bay roosting, rafting, and foraging habitat shall be evaluated. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).	**L**	

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	Alternative:	Prop Proj	1	2	3	4	Mitigation Measures		
B-12	Increased turbidity and activity from dredging operations could affect marine mammal foraging.	**L**	L	L	N	N	No mitigation is required.	**L**	New terminal construction and channel dredging only at Hercules/Rodeo, which is not near known haul-out or feeding locations.
B-13	Underwater pile driving noise could disturb marine mammals.	**PS**	PS	PS	N	N	**B-13.1:** Incidental harassment permit may be required from NMFS. As appropriate, conduct preconstruction surveys for presence of mammals, conduct monitoring, and establish safety zones.	**L**	Redwood City location near a haul-out site
B-14	Transiting ferries could disturb marine mammals resting at haul-out sites.	**PS**	PS	PS	PS	N	**B-14.1:** Avoid marine mammal areas by at least 100 to 250 m, which exceeds recommended National Marine Fisheries Service guidelines.	**L**	Redwood City location near a haul-out site
B-15	High-speed ferries could potentially strike gray whales.	**PS**	PS	PS	PS	N	**B-15.1:** Ferry operators shall be aware of potential for whales and know how to spot whales at the surface. Operators shall receive USCG whale sighting reports and exercise due diligence. WTA shall implement a program of informing ferry operators of sightings, and reminders made during seasonal presence. Dedicated lookouts could be warranted. **B-15.2:** Ferries could be equipped with whale-detection systems.	**PS**	

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B-16	Project construction and/or operation could result in the "take" of state or federally listed species or loss or degradation of these species' habitat.	**PS**	PS	PS	PS	N	**B-16.1:** Review project construction sites for potential presence of species and institute measures to avoid sites with presence. Consultation with federal and state agencies shall be initiated and recommended measures followed. **B-16.2:** Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Proposed terminals and routes would be designed or located to avoid take of these species.	**PS**	Known distributions of salt marsh harvest mouse and/or suitable habitat include locations near the following proposed terminal locations: Antioch, Pittsburg, Martinez, and Redwood City. Black rail occur near Martinez. Clapper rail have known distributions near Martinez, Richmond, and Redwood City.
B-17	Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality, which could in turn, affect local biological resources.	**PS**	PS	PS	N	N	**B-17.1:** Implement Mitigations W-1.1 and W-1.2.	**L**	
B-18	Contaminated sediments could potentially become resuspended during construction and dredging operations and could potentially cause toxicity to Bay organisms.	**PS**	PS	PS	N	N	**B-18.1:** Implement Mitigation D-2.1.	**L**	
B-19	Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.	**PS**	PS	PS	PS	N	**B-19.1:** Implement Mitigations W-3.1 through W-3.5.	**L**	
B-20	Vessel wakes could potentially cause erosion and loss of wetland habitats, potentially impact special status species such as the clapper rail and salt marsh harvest mouse, and potentially impact marine mammals through disturbance at seal haul-out sites.	**PS**	PS	PS	PS	N	**B-20.1:** Refer to potential impacts and mitigations under Section 3.3, Wake Analysis.	**PS**	

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B-21	Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from terminal facilities and associated vehicle parking areas.	**PS**	PS	PS	N	N	**B-21.1:** New lighting shall be directed on intended project areas and avoid surrounding wildlife habitat.	**L**	With the exception of Hercules/Rodeo, all are within existing ports or developed maritime areas.
3.6 Air Quality									
A-1	Regional cumulative emissions of NO_X, PM_{10}, CO, SO_2, CO_2, and ROG could increase as a result of the implementation of the Proposed Project.	**S**	S	S	S	N		**S**	Regional cumulative emissions of NO_X, PM_{10}, and CO would decrease. Emissions of SO_2 and ROG would increase by 0.3% and 0.02% respectively. Net CO_2 emissions would increase.
A-2	Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard.	**PS**	PS	PS	PS	N	**A-2.1:** Cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access. In addition, feeder shuttle buses could be equipped with zero emission or ultra-low emission engines.	**PS**	
A-3	Ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel.	**L**	S	S	S	N	**A-3.1:** Eliminate routes with low ridership and utilize PM traps and SCRs. No mitigation is required for the Proposed Project [4].	**L**	The Proposed Project includes the mitigations. $PM_{2.5}$ emissions from ferries would be less than those for the No Project Alternative.

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Alternative:		Prop Proj	1	2	3	4			
A-4	Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water.	**PS**	PS	PS	PS	N	**A-4.1:** Use of a fuel technology that lowers SO_2 emissions would reduce sulfate emissions and subsequent deposition.	**PS**	Deposition of nitrates would decrease, but sulfate deposition would increase.
A-5	Construction of ferry terminals could create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO_X, CO, SO_2, and PM_{10} from construction equipment exhaust.	**PS**	PS	PS	PS	N	**A-5.1:** Follow BAAQMD Guidelines to control fugitive dust emissions from construction activities. Measures include activities such as watering and covering exposed soil surfaces to minimize dust emissions. **A-5.2:** Measures to reduce emissions from vehicles and heavy equipment could include: 1) Use alternative fueled construction equipment when possible; 2) Minimize idling time; 3) Properly maintain equipment; and 4) Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.	**L**	
A-6	Local concentrations of nitrogen dioxide and particulate matter could exceed state and federal standards at the Ferry Building.	**PS**	PS	PS	PS	N	**A-6.1:** Locate engine exhaust pipes at least 20 feet above the waterline. **A-6.2:** Minimize dockside idling time at the Ferry Building.	**L**	
A-7	Increased ferry service could result in increases of pollutants from ferry exhaust deposited directly into the Bay.	**PS**	PS	PS	N	N	**A-7.1:** Implement Mitigation A-6.1.	**L**	
A-8	Dredging for increased ferry service would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_X, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. Exceedences would occur for approximately 12 days every 3 to 6 years.	**PS**	PS	PS	N	N	**A-8.1:** Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval. **A-8.2:** Utilize dredging contractors with the best available emission controls on their equipment.	**L**	Dredging only at Hercules/Rodeo

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	Alternative:	Prop Proj	1	2	3	4	Mitigation Measures		
3.7 Land Use and Community Issues									
LU-1	Increased ferry service could include terminal locations in developed urban areas that do not currently have ferry terminal facilities. Development of new ferry terminals could result in the displacement of existing land uses.	**PS**	PS	PS	PS	N	**LU-1.1:** Projects shall consider alternatives to avoid displacement of homes or businesses. Displacement impacts shall be addressed in the site selection process and avoided through design measures. If displacement is unavoidable, project proponents must execute a relocation assistance plan or its equivalent.	**L**	
LU-2	Installation of new ferry terminals could disrupt or divide established neighborhoods. This impact has the potential to be significantly negative or positive, depending on how much the community supports or opposes the location of the terminal.	**PS**	PS	PS	L	N	**LU-2.1:** Local agencies desiring ferry service shall identify parcels along waterfronts for potential ferry terminal planning, considering surrounding land use compatibility. Project design elements that improve accessibility and maintain community cohesion shall be incorporated.	**L**	
LU-3	Increased ferry service could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods.	**PS**	PS	PS	PS	N	**LU-3.1:** Site specific evaluation is necessary to avoid these potential impacts. **LU-3.2:** Implement Mitigations LU-1.1 and LU-2.1.	**PS**	

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	Alternative:	Prop Proj	1	2	3	4	Mitigation Measures		
LU-4	New or modified ferry terminals would be located along the shoreline, and could affect and/or enhance existing public use and access to and along the Bay shoreline.	**PS**	PS	PS	N	N	**LU-4.1:** Incorporate public access to and/or along the Bay shoreline in the planning for terminal locations or expansion. This may include trails, parking set aside for shoreline users, viewpoints, disabled access, etc. **LU-4.2:** Incorporate the shoreline access guidelines described in: *Terminal Architecture and Engineering – Terminal Design Guidelines* prepared for the WTA (Parsons Brinckerhoff 2002). The guidelines include Shoreline Access for pedestrians and bicycles, and viewpoints to provide views of the shore, bay, and the loading/unloading of the ferries	**L**	
3.8 Aesthetics									
V-1	The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay.	**PS**	PS	PS	L	N	**V-1.1:** When feasible, the following shall be included in ferry terminal design: • Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares; • Design terminals and layout to integrate with the surrounding landscape and historical structures to preserve, and take advantage of, existing views of the Bay and shoreline; • Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways; • Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay;	**PS**	Only one of the nine new terminals would be located in an area without existing maritime character.

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V-1 (cont.)							• Vessels shall be standardized to support system-wide operations and to work interchangeably at all terminals. Vessel berthing shall be configured so as to allow maximum feasible visual access to the Bay. **V-1.2:** WTA-established Intermodal and Architectural Guidelines shall be considered for the planning and design of new and enhanced ferry terminals (WTA 2002). Design objectives shall focus on use by pedestrians, bicycles, and other transit modes.		
V-2	An increase in the number of ferries operating on the Bay could impact views or degrade the visual character of waterfront areas.	**L**	PS	PS	L	N	**V-2.1:** This impact is partially minimized by the concentration of routes along some common alignments. No mitigation is required for the Proposed Project.	**L**	The Proposed Project includes common alignments
V-3	Increased ferry operations could increase the amount of visible exhaust.	**L**	L	L	L	N	No mitigation is required.	**L**	
V-4	Expanded ferry service, including new terminals and additional ferries, would not impact scenic resources within a State Scenic Highway.	**N**	N	N	N	N	No mitigation is required.	**N**	
V-5	Expanded ferry service, including new terminals and additional ferries, could result in light and glare impacts.	**PS**	PS	PS	L	N	**V-5.1:** Ferry terminal designs will require site specific lighting plans. Outdoor lighting design and placement shall be directed to the specific location to be shielded.	**PS**	Only one of the nine new terminals would be located in an area without existing maritime character.
3.9 Cultural									
CUL-1	Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related activities for buoy placement could impact submerged and sub-bottom cultural resources in the Bay.	**PS**	PS	PS	PS	N	**CUL-1.1:** Site specific projects would have to be evaluated for presence and significance of resources, and avoidance procedures in compliance with established procedures. Identified resources that cannot be avoided would be subject to further recordation and or data recovery.	**PS**	New terminal construction and channel dredging only at Hercules/Rodeo.

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CUL-2	Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.	**PS**	PS	PS	PS	N	**CUL-2.1:** Implement Mitigation CUL-1.1. **CUL-2.2:** Avoid the disposal site.	**L**	
CUL-3	Project actions such as retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources, and historic built environment resources.	**PS**	PS	PS	PS	N	**CUL-3.1:** Implement Mitigation CUL-1.1.	**L**	
CUL-4	Project actions such as construction and related activities could impact previously unknown resources.	**PS**	PS	PS	L	N	**CUL-4.1:** Implement Mitigation CUL-1.1.	**PS**	
3.10 Geology									
G-1	Potential new terminals and facilities could be exposed to surface faulting. There is a potential for substantial damage and risk of injury or loss of life at facilities located on or near active faults.	**L**	PS	L	N	N	**G-1.1:** Significant risk of exposure to surface faulting for Alternative 1 can be avoided if the Half Moon Bay terminal location is dropped from further consideration. **G-1.2:** Any potential development at Half Moon Bay would have to be carried out in accordance with the regulations detailed in the Alquist-Priolo Act. No mitigation is required for the Proposed Project.	**L**	No terminals for the Proposed Project are located within an AP Zone
G-2	Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.	**PS**	PS	PS	PS	N	**G-2.1:** New facilities would be designed and constructed to seismic requirements and code. Site specific ground motion studies shall be completed for proposed project sites.	**L**	
G-3	Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.	**PS**	PS	PS	PS	N	**G-3.1:** Exploratory investigations shall be performed to determine susceptibility to liquefaction, and potential locations removed or engineered to reduce this risk.	**L**	

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G-4	Subsidence is ongoing in portions of the Bay Area. The potential geohazard presented by subsidence to potential new terminals is low to moderate.	**L**	L	L	N	N	No mitigation is required.	**L**	
G-5	Expansive soil behavior is associated with wetting and drying of soils containing mixed-layer clays. Expansive soils can lead to structural damage.	**L**	L	L	L	N	No mitigation is required.	**L**	
G-6	Slope movements have the potential to cause a range of impacts from minor structural damage (building impacts from rock fall) to major damage and injury/loss of life from building collapse.	**L**	PS	PS	PS	N	**G-6.1:** The hazard from mass wasting could be reduced by siting facilities away from steep and unstable slopes. For sites located adjacent to areas of steep topography, site specific geologic and geotechnical investigations and laboratory testing will determine the stability of slopes and their parent material. Using these data, appropriate slope strengthening and stabilizing designs could be developed. No mitigation is required for the Proposed Project.	**L**	All terminal location for the Proposed Project are located on relatively flat topography.
G-7	Erosion due to wind and water action could lead to the deterioration of terminal structures.	**PS**	PS	PS	PS	N	**G-7.1:** Determine erosion potential at each site through site specific studies, and adopt recommended measures to reduce or avoid this impact.	**L**	
G-8	Tsunami- and seiche-generated waves have the potential to inundate shoreline sites and damage terminal facilities. This potential impact would range from potentially significant at oceanside terminals (Half Moon Bay) to low or not significant at most of the Bay terminals.	**L**	PS	N	N	N	**G-8.1:** Potential impacts of tsunamis could be lessened or mitigated by appropriate engineering design. Detailed hydrodynamic modeling could be necessary for coastal locations to determine the potential extent of inundation. No mitigation is required for the Proposed Project.	**L**	The Proposed Project does not include any oceanside terminals

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G-9	The WTA ferry expansion program could potentially impact the geologic environment, including energy or mineral resources.	**L**	PS	PS	N	N	**G-9.1:** The presence of geologic, energy, or mineral resources would be identified in the course of site investigations for specific projects. Mitigations would be defined at that time. No mitigation is required for the Proposed Project	**L**	
3.11 Noise									
NOI-1	Passengers and crew would be exposed to shipboard noise from proposed enroute ferry operations.	**L**	L	L	L	N	No mitigation is required.	**L**	Vessels would comply with USCG guidelines and Cal/OSHA limits and would be designed to minimize exposure of passengers to excessive noise levels.
NOI-2	Noise-sensitive human receptors could be exposed to significant noise from proposed enroute ferry operations**.**	**L**	L	L	L	N	No mitigation is required.	**L**	
NOI-3	Noise-sensitive human receptors could be exposed to significant increases in ambient noise from proposed ferry terminal operations.	**PS**	PS	PS	PS	N	**NOI-3.1:** Compliance of existing and proposed ferry terminals with zoning ordinances and local requirements.	**L**	
NOI-4	Wildlife could be exposed to noise from proposed ferry operations.	**PS**	PS	PS	PS	N	**NOI-4.1:** The exact routes from San Francisco to Treasure Island and to Redwood City shall be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-outs or to other wildlife (birds and fish), could be significant.	**PS**	Impacts at the seal haul-out at T.I. and RWC. could remain potentially significant

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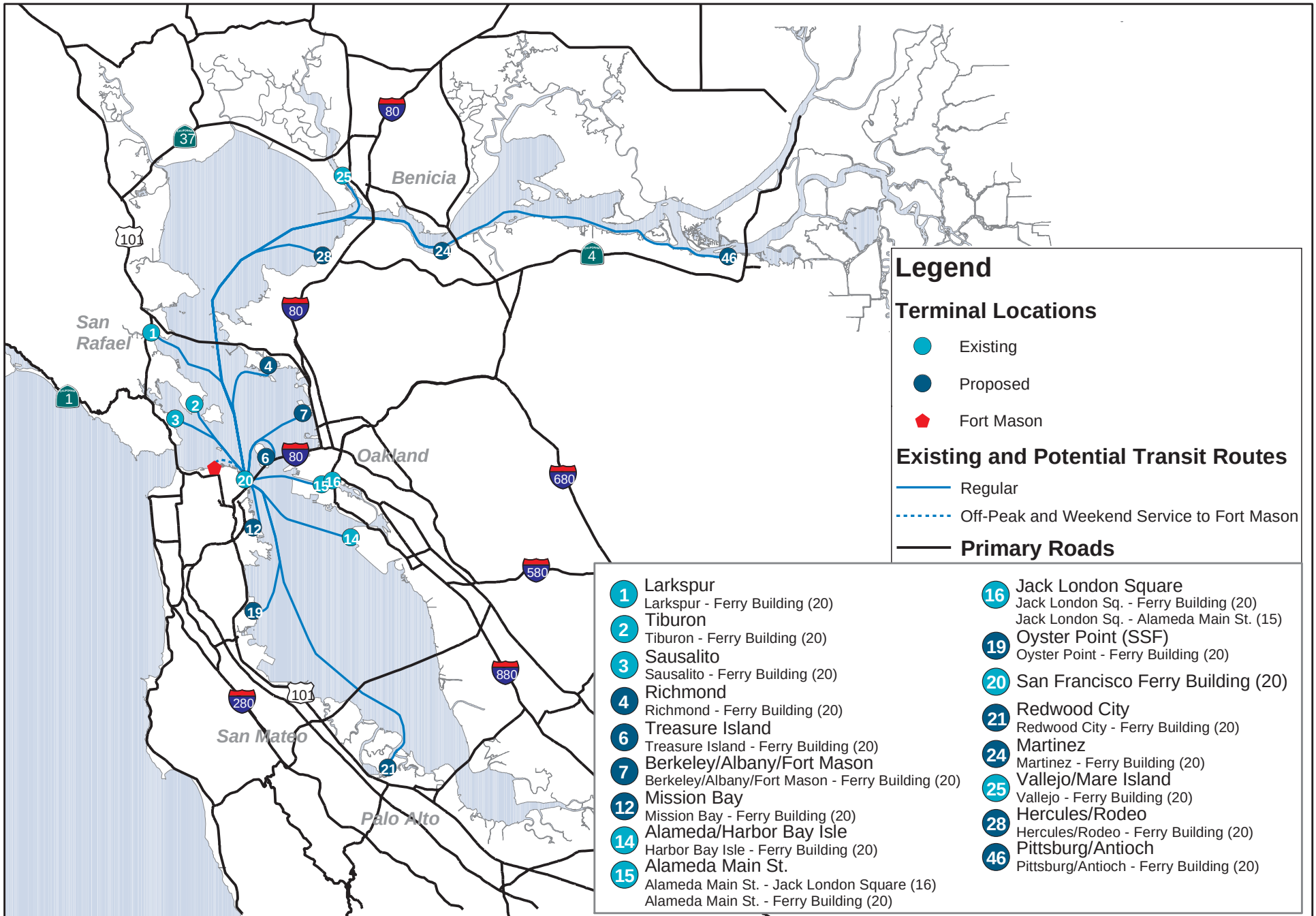
Alternative:		Prop Proj	1	2	3	4			
3.12 Transportation									
T-1	At a regional level, expansion of the ferry service would result in a decrease of the total automobile VMT. At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals.	**PS**	PS	PS	PS	N	**T-1.1:** Traffic mitigation measures would depend on local, site specific conditions. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed.	**PS**	
T-2	Additional car access to terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.	**PS**	PS	PS	PS	N	**T-2.1:** WTA and terminal authorities/planners should study and develop terminal-specific plans in conjunction with local and regional transit agencies. Determination of appropriate mitigation measures would be performed at the time site specific projects are proposed. **T-2.2:** Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.	**PS**	
3.13 Energy									
E-1	The Proposed Project could result in more transportation-related energy consumed.	**L**	L	L	L	N	No mitigation is required.	**L**	
E-2	The Proposed Project could result in higher energy per passenger miles traveled value than other transit modes.	**PS**	PS	PS	PS	N	**E-2.1:** Continue to investigate the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. Incorporate alternative energy sources and engine technologies as they become feasible.	**PS**	
3.14 Growth Inducement									
GRO-1	The Proposed Project includes expanded ferry service at existing terminals and addition of new ferry terminals primarily at already developed waterfront areas. The Proposed Project is not expected to be growth inducing at a regional level.	**PS**	PS	PS	N	N	**GRO-1.1:** Implement Mitigation LU-1.1.	**L**	

[1] Impact numbers refer to impacts described in Section 3 for the Proposed Project. While the impact numbers correspond to those in Section 5 (analysis of Alternatives 1 to 4) for most impacts, due to more in-depth analysis of the Proposed Project and edits based on public comments on the DEIR, some Impact numbers in Section 5 may not be the same.
[2] L: Less than significant; N: No impact; PS: Potentially Significant; S: Significant.
[3] Impacts identified as Potentially Significant (PS) may be Significant based on further project definition and future analysis
[4] Note that the Proposed Project includes use of SCRs and PM traps and elimination of low ridership routes, which are mitigations for Alternatives 1 through 3.



URS

Water Transit Authority Program EIR

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Proposed Project

Figure 1

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This document addresses the potential environmental impacts and mitigation of those impacts resulting from expansion of ferry service defined in the San Francisco Bay Area Water Transit Authority's (WTA) December 2002 Implementation and Operations Plan (IOP). The IOP defines a focused set of routes, terminals, and service improvements for expanded ferry service that will be presented to the California Legislature in 2003, in accordance with the implementing legislation that originally established the WTA.

1.1 INTRODUCTION

When the California Legislature created and directed the WTA to adopt a ferry transit expansion plan, no direction or funding was made available at the time to develop or implement specific routes, terminals, or other associated elements. Once the overall program was defined, priorities would be determined for further action. Therefore, this document is a program Environmental Impact Report (EIR), prepared to comply with the California Environmental Quality Act (CEQA). CEQA defines a program EIR as "an EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:

1. Geographically;
2. A logical part in the chain of contemplated actions;
3. In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or
4. As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways"(CEQA Guidelines Section 15168).

The WTA's program has elements of all of the above criteria, which effectively summarize the overall proposed action.

1. The proposed program considers alternatives that can expand ferry transit use throughout the greater San Francisco Bay Area.
2. The individual elements of the program are part of a potential series of actions consisting of new routes, terminals, and design criteria that can be implemented as ridership, funding, environmental mitigation, and local interest and planning successfully merge.
3. This proposed expansion of water transit service has been designed to advance in connection with the implementation of the IOP and the studies that support it, which are summarized below.
4. Finally, many of the actions associated with expanded ferry transit service have similar impacts, and can and should be studied in similar ways over a regional area to provide a basis for consistent evaluation and consideration of regional cumulative impacts.

This FEIR and the associated IOP are *not* the final steps in the consideration, evaluation, and possible advancement of expanded ferry transit service. Section 2 of this FEIR describes the alternatives, each of which is a regionwide set of routes, terminals, and service. The routes and terminals are identified and evaluated at a generalized level, and have intentionally not been specifically defined in this FEIR or in the IOP. As routes or terminals are advanced for further consideration, they would be further defined based on site-specific studies and evaluations, may

be subject to subsequent environmental review consistent with CEQA, and, if federal approval or involvement is necessary, may require environmental review consistent with the National Environmental Policy Act (NEPA).

As noted above, this FEIR is part of number of studies performed by WTA specifically to evaluate the need and feasibility of expanded ferry transit service. Other WTA-sponsored studies include topics such as the following:

- Ridership surveys and modeling that estimate potential demand for and use of an expanded system;
- New technologies, alternative fuels, and the range of engine, fuel, and propulsion options;
- Architectural criteria, addressing the overall design concepts for terminals (appearance and function);
- Intermodal criteria, addressing recommendations for compatibility and linkage with other passenger and transit modes and systems;
- Vessel criteria, dealing with the design options for the passenger vessel fleet;
- Safety plan, regarding recommendations and plans for safe operation of the system; and
- Financial plan, addressing the cost and economic feasibility of system expansion and operation.

These studies can be found at the WTA website, www.watertransit.org, or by contacting the WTA at:

Water Transit Authority
120 Broadway
San Francisco, CA 94111
Phone: (415) 291-3377
Fax: (415) 291-3388

The following subsections describe the purpose and objectives of the WTA program and the need and background for expanded ferry service in the Bay Area. The system alternatives, including routes and terminals, are described in Section 2. Section 3 describes and evaluates the environmental setting, impacts, and mitigation by subject area or discipline. Section 4 evaluates growth inducement potential and other environmental impact issues. Section 5 evaluates impacts and mitigation for other ferry alternatives that were initially considered. Section 6 lists the primary consultation and coordination activities involved with the EIR process and lists the preparers of this FEIR. Section 7 provides a list of acronyms and technical terms used in this document. Technical appendices appear under separate cover. Public comments to the DEIR and revised DEIR and the WTA's responses to those comments are included as a separate volume.

1.2 PURPOSE AND OBJECTIVES

The primary purpose of the WTA IOP is to increase Bay Area regional mobility and transportation options by providing new and expanded water transit services and related ground transportation terminal access in the San Francisco Bay Area.

1.3 NEED FOR THE PROPOSED PLAN

The existing Bay Area transportation network of roads, bridges, rail and bus systems, and ferry service must include plans for future expansion to serve existing and planned growth. The Bay Area is home to a highly diverse population and historically strong economic activity that is served by a complex transportation network. The existing transportation system is overwhelmed at many locations during peak periods, especially those routes and systems that cross the Bay. The ability to expand the capacity of this system is limited by many factors, among them funding and environmental constraints. In addition, commute patterns within the Bay Area are extremely diverse as housing and job centers have increasingly become geographically widespread. These issues all contribute to a need to plan for further improvements to and options for the region's existing transportation systems.

The WTA Bay Area ferry system expansion plan addresses several major Bay Area transportation needs and problems. The following sections describe each of these issues.

1.3.1 Bay Area Highway System is Unable to Meet Current and Future Demand

The 1990s witnessed one of the greatest economic expansions in decades. With an imbalance in the number of new jobs compared to the number of new housing units, people are commuting long distances, with the result of rising levels of travel on all of the region's highways, rail, and transit systems. Between now and 2025, the Bay Area is projected to gain 1.4 million residents and 1.2 million jobs (MTC 2001). This is a population increase of 19 percent and a job number increase of 33 percent. This projected imbalance of jobs and housing will lead to a net in-commute of some 300,000 workers a day from outside of the region, an increase of more than 75 percent from about 170,000 net in-commute daily trips in 2000.

Travel by Bay Area highway commuters has steadily risen by nearly 20 percent in total vehicle miles traveled between 1990 and 2000, and it is predicted to increase by about 48 percent from 2000 to 2025 (MTC 2001). The average hours per day of delay is predicted to increase by 248 percent between 1990 and 2020. In its 2002 San Francisco Bay Crossing Study, the Metropolitan Transportation Commission (MTC) predicted that the next 25 years may experience a 30 percent increase in regionwide travel and a 40 percent increase in transbay travel. The result of this congestion is an increase in travel time for Bay Area motorists. MTC's Regional Transportation Plan (RTP) estimates that an automobile trip from Mountain View to Hayward in the afternoon peak period, a distance of about 25 miles, commonly takes about 74 minutes (20 miles per hour [mph]). A trip from Union City to Moffett Field will take about 50 minutes by 2020. The RTP also estimates that the San Rafael to San Francisco commute will increase from an average of 41 minutes to 62 minutes by 2020 and that the Oakland to San Francisco trip time will slow from 34 minutes to 51 minutes. Overall, the average commute time in the Bay Area is expected to increase by about 25 percent between 2000 and 2025. Travel delays at current conditions already result in substantial frustration among the region's motorists; a 2001 MTC survey found that over 70 percent of Bay Area residents considered traffic, transportation, and congestion among their major issues of concern.

1.3.2 Transbay BART and Bridges Are at Capacity

Of the 10 worst Bay Area congestion locations, three involve approaches to the Bay bridges.

Furthermore, daily transbay trips over the Bay bridges are expected to increase by more than 46 percent in 2025. More specifically, daily transbay travel is expected to increase 42.5 percent over the San Francisco-Oakland Bay Bridge (Bay Bridge) corridor (including bridge traffic, Bay Area Rapid Transit [BART] and ferries), 47.8 percent over the San Mateo and Dumbarton Bridges, and 79.1 percent over the Richmond-San Rafael Bridge (MTC 2001).

MTC has nearly completed its San Francisco Bay Crossings Study and issued draft findings in July 2002. The evaluation identified operational strategies such as expanded bus and carpool networks that could help and be relatively inexpensive. Recommendations for further study included improvements to the approaches of the Dumbarton Bridge, new carpool lanes and carpool connections, and improving the capacity at existing BART stations. Major long-term projects such as a new mid-Bay bridge, widening of the San Mateo-Hayward Bridge, and rail line improvements were noted as having high costs and potential environmental and community constraints.

BART serves crossbay destinations very effectively and carries a substantial number of passengers. The BART transbay tube currently has a capacity of 30 trains per hour – only eight more than BART currently operates during the peak hour. MTC's Bay Crossings Study noted that the BART system will be able to handle demand between now and 2025, but capacity of the transbay trains and San Francisco stations will be a concern in the future.

In the last 10 years, the number of vehicles crossing the Bay Bridge has increased by more than 30,000 per day, or about 12 percent. Total daily travel along the Bay Bridge corridor is about 274,000 vehicles on the bridges, approximately 134,000 BART passengers, 14,000 AC Transit bus passengers, and 4,000 ferry passengers (Vallejo, Alameda/Oakland, and Harbor Bay Isle). Even a 10 percent increase in vehicle counts in the next 10 years (less than one percent annually) would generate about 28,000 new trips, severely limiting travel in the corridor even with improvements planned by BART and AC Transit.

1.3.3 Coping with Accidents, Natural Disasters, and Other Travel Disruptions

Millions of dollars are being invested in the Bay Area transportation system to strengthen bridges, highways, and rail systems to minimize damage from major earthquakes. The Bay Area is crossed by a number of active faults, including the San Andreas and Hayward faults, which are capable of causing significant damage. An earthquake on the San Andreas Fault (the Loma Prieta event in 1989) caused significant temporary damage to the Bay Bridge, and commuters shifted to other options including ferry service. Since 1979, a number of events have disrupted travel across the Bay, resulting in significant use of ferry service:

- 1979 BART tube fire
- 1982 Marin County mudslides (Golden Gate Bridge)
- 1989 Loma Prieta earthquake (Bay Bridge)
- 1997 BART strike
- 1998 BART power outage
- 2001 Events Related to Terrorist Threats in the Bay Area (Bay and Golden Gate Bridges)

These situations have underscored the viability and important benefits of having a variety of transportation options that include ferry services.

Water transit also has the greatest ability to serve as a primary transportation service in times of emergency – such as a major earthquake – because of its inherent flexibility. It is also less likely than other transportation modes to experience severe damage and disruption. On September 11, 2001, the New York Waterway ferry service responded to the destruction of the World Trade Center towers with 23 of their 24-boat fleet within 15 minutes of the attack. Ferry service helped to evacuate more than 160,000 people from Manhattan that day, including over 2,000 injured persons within the first hour. This compares to an average daily service of about 34,000 (Smith 2001). Prepared with a comprehensive water transit system in place, the Bay Area will be better poised to respond to and cope with disruptive events.

1.4 BACKGROUND

1.4.1 Establishment of WTA for Expansion of Water Transit System in the Bay Area

During 1996 and 1997, the Bay Area Council (BAC) and the Bay Area Economic Forum (BAEF) cooperatively convened a wide spectrum of regional experts, stakeholders, and key decision-makers in a series of symposia, interviews, and fact-finding sessions to discuss transportation and mobility problems and the potential role of a water transit system in the Bay Area. These efforts resulted in the California State Senate unanimously passing Senate Resolution 19, which directed the BAC and the BAEF to form a Blue Ribbon Task Force to study and explore the feasibility of greatly expanding water transportation in the Bay Area.

The 52-person Blue Ribbon Task Force assembled by the BAC and the BAEF launched the Bay Area Water Transit Initiative. Together, the Task Force guided the production of the "Action Plan" and investigated whether a viable water transit plan could be developed that would add significant capacity to the regional transportation system, improve mobility, relieve congestion, and provide a viable alternative to driving alone, while minimizing environmental impacts. Based on its investigation, analyses, and public input, the Blue Ribbon Task Force recommended creation of an authority that would oversee expansion of ferry service in the Bay Area.

The WTA was established as a direct consequence of legislation developed from recommendations contained in the Bay Area Water Transit Initiative Action Plan. The charter of the WTA is to develop a Bay Area water transit IOP. The WTA was not granted the authority to implement specific projects at this time. The legislation also does not restrict future implementation of routes or terminals; specific projects could be implemented by others not under WTA jurisdiction.

1.4.2 Summary of Legislation

Based on the recommendations given in the Action Plan developed by the Blue Ribbon Task Force, the California Senate passed Senate Bill No. 428 (Chapter 1011 of the Statutes of 1999), which created the WTA and empowered it to develop a water transit plan for the Bay Area. Funding for the Authority is provided in Chapter 656 of the Statutes of 2000.

As a result of this legislation, WTA is required to prepare and adopt a Bay Area water transit implementation and operations plan, and to operate a comprehensive Bay Area regional public

water transit system. This plan will include all appropriate landside, vessel, and support elements, operational and performance standards, and policies. As part of the preparation of the plan, WTA will review and consider, in addition to other materials and information, the findings presented in the document entitled "San Francisco Bay Area Water Transit Initiative," dated February 1999, prepared by the BAC and the BAEF. The adoption of the plan will be subject to public hearings within the Bay Area, and will be reviewed by the MTC.

The primary focus of WTA and its plan will be to provide new or expanded water transit and related ground transportation terminal access services that were not in operation as of June 30, 1999. As part of the implementation planning and operations, WTA will seek cooperative involvement from existing water transit services and related ground transportation agencies in whose jurisdictions existing or planned water transit terminals are located. Additionally, WTA will avoid impacting water transit services and related ground transportation terminal access services that were in existence as of June 30, 1999.

In connection with the plan, WTA is required to produce a system-wide program EIR and study of the plan, in accordance with the requirements of CEQA. Although the plan does not require formal approval by a federal agency, it should also be consistent with NEPA.

1.4.3 History of Ferry Service in the Bay Area

At one time, the Bay Area had one of the most extensive water transit systems in the world. From the Gold Rush until the completion of the Bay and Golden Gate Bridges, ferries provided the only transportation of goods and people across the Bay waters. In addition to playing an important transportation role in the development of the Bay Area, ferries also served recreational purposes.

The first recorded ferry system on the Bay was established in 1850. By the late 1800s, 22 passenger cross-bay ferry companies were in operation, and five other companies carried only automobiles. Together, the ferries served approximately 30 destinations, about half of them on the San Francisco-Oakland corridor. By the early 1900s most ferry operators had consolidated, and in 1921, the three largest ferry operators together carried about 49 million passengers in the Bay Area.

The ferry transit service peaked between 1935 and 1936, with 50 to 60 million people crossing the Bay annually on almost 50 ferries. Scores of ferry routes traveled between San Francisco and the East and North Bays, and ferries traveled as far north and east on the Bay as Vallejo, Benicia, and Martinez. During this time, San Francisco's Ferry Building had 250,000 passengers flowing through it on a daily basis. On the waterside, ferries made 340 arrivals and departures daily. On the landside, connecting streetcars left every 20 seconds.

The demise of the ferries started with the building of the Golden Gate and Bay Bridges in the 1930s. By 1958, ferry service on the Bay had ceased. Moreover, regulations related to construction of the bridges and the rapid growth of automobile use discouraged entrepreneurs from operating ferry services.

By the late 1950s and early 1960s, the Legislature recognized that congestion within the Bay Area, especially on bridges crossing the Bay, would reach a critical stage and authorized the BART system. The BART transbay tube was paid for with bridge tolls, as compensation for the two bridge railway tracks removed from the lower deck in the early 1960s.

Over time, assisted by mounting traffic congestion, transit system emergencies and natural disasters (most notably the 1979 BART transbay tube shutdown and the 1989 Loma Prieta earthquake), ferry service slowly started returning to the Bay Area. These difficult times demonstrated the viability and benefits of ferry service and highlighted the role of ferries as important emergency links across the Bay. In response to the 1989 Loma Prieta earthquake, the Legislature repealed the prohibitions against other competing transportation modes, removing the last of the "passive" constraints to increased ferry service.

At the same time, ferry technology has made rapid progress toward achieving higher speeds with lower operating costs. Until the mid-1980s, the fastest ferry operated at about 18 knots (20 mph), too slow to effectively compete with highway travel. The introduction of the high-speed catamaran, powered by conventional diesel engines, brought ferries into the universe of marketable, competitive, and financially viable transit options. Ferries can now routinely achieve speeds of more than 40 mph, substantially increasing their marketability. Modern high-speed catamarans now combine fast speeds with a more stable, comfortable ride. These improvements now enable ferry services to effectively compete for passengers between certain origin and destination points. For example, existing ferry service from Larkspur (Marin County) to the downtown San Francisco ferry terminal on a high-speed catamaran vessel is about 30 minutes. The primary alternative transportation options for this route are automobile and bus service, which must travel the congested routes of U.S. 101, the Golden Gate Bridge, and downtown San Francisco.

References

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MTC. 2001. Draft 2001 Regional Transportation Plan for the San Francisco Bay Area.

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2.1 INTRODUCTION

As described in Section 1.0, the primary purpose of the WTA's program is to increase regional mobility and transportation options by providing new and expanded water transit services and ground transportation terminal access in the San Francisco Bay Area (Bay Area). This section describes the alternatives evaluated in this EIR to achieve that purpose.

The implementing legislation that established the WTA (Government Code Section 66540 et seq.) mandates the study of various water transit routes for consideration by the WTA. The legislation states that the WTA should "investigate ... terminal locations throughout the San Francisco Bay Area." The WTA is to consider, but not be bound by, the Water Transit Initiative (WTI) developed by the Bay Area Council (BAC) and Bay Area Economic Forum (BAEF) (described in Section 1.0). In addition, the Legislature directed the Authority to increase regional mobility through the development and operation of a comprehensive water transit system and its associated landside facilities and adjunct services (Government Code Section 66540.24).

Government Code Section 66540.20 directs the completion of two documents, a program environmental document and the Implementation and Operations Plan (IOP). The WTA completed and circulated a Draft EIR (DEIR) for review that evaluated four program alternatives, representing a range of service expansion options. The initial comment period for the DEIR ended on January 31, 2003. The Draft IOP was also circulated for review, describing expansion of service and the additional new routes. All of the routes and terminals identified in the IOP were included as elements of the various alternatives evaluated in the DEIR.

Partly as a result of public comment and review, the Program DEIR was revised to specifically address the expansion of existing service and the new routes as described in the IOP. This recirculated EIR investigated the potential environmental impacts associated with implementation of the IOP. It was circulated for public review, with the comment period ending on May 16, 2003.

Based partially on the technical information included in the environmental document, the Draft IOP made recommendations for phased implementation. Together, the IOP and this Final EIR (FEIR) will be used to develop the recommendations for the components of the system that are advanced for further evaluation and possible implementation.

2.2 PROPOSED PROJECT AND SYSTEM ALTERNATIVES EVALUATED IN THE EIR

The WTA is proposing implementation of the December 2002 IOP[1] (WTA 2002), which is the "Proposed Project" analyzed in this FEIR as defined in the California Environmental Quality act (CEQA) Guidelines Section 15378. The Proposed Project provides a program for the development and operation of new ferry routes on the San Francisco Bay. Terminal locations and ferry transit routes form the core of the system. While the routes and terminals have not been precisely determined at this time, the Proposed Project described below most closely reflects the anticipated terminals and routes resulting from implementation of the IOP. Prior to the development of any new terminal or addition of any new route, all associated activities would

[1] *A Strategy to Improve Public Transit with an Environmentally Friendly Ferry Service*

be reviewed to ensure that the environmental impacts have been appropriately assessed in this FEIR. It is likely additional documentation would be prepared pursuant to CEQA and the CEQA Guidelines.

2.2.1 Proposed Project

The Proposed Project considered for implementation by the WTA and analyzed in this Program FEIR is the IOP, which provides expanded ferry service and associated land-side transit to be implemented in phases over an approximately ten year period. While the IOP does not represent a precisely fixed set of routes and terminal sites, the Proposed Project is based on the anticipated routes and terminals that would result from implementation of the IOP. The routes, terminals, and frequency of service (headways)[2] associated with the Proposed Project are listed in Table 2.1. The routes and terminals are shown on Figure 2.1. Further site-specific studies and design would be necessary prior to IOP implementation to determine actual terminal sites and routes.

The Proposed Project would utilize clean vessels only, which would exceed EPA 2007 Tier II air quality standards by 85%. The Proposed Project consists of two types of vessels; one providing 350-passenger ferries with speeds up to 35+ knots, and the other providing 149-passenger ferries with speeds up to 25 knots.

Passengers would arrive at ferry terminals by a variety of modes, including public transportation and walking. Anticipated vehicle traffic generated at the proposed terminal locations during the AM peak period would range from zero (at the Treasure Island terminal) to approximately 1,100 trips. Parking demand would range from zero to over 1,400 spaces.

Of the expanded routes included in the Proposed Project and listed in Table 2.1, only the Hercules/Rodeo terminal would require additional dredging for implementation. All other terminal sites proposed for expanded ferry service are within existing ports or marinas. Therefore, other than possible minor dredging for facility improvements, dredging for construction or operations is not anticipated in these locations. All of the routes included in the Proposed Project meet minimum levels of ridership criteria established by the WTA. All routes have a minimum forecast 2025 ridership of at least 900 trips per day. In addition to the routes and terminals listed in Table 2.1 that are included in the Proposed Project or initial Project Alternatives, the IOP also identified other routes for future study. Ridership studies of the Port Sonoma and Recreation Loop routes forecast adequate ridership for these routes to be cost effective. However, those forecasts were based on assumptions related to the provision of parking, access, and ferry landing locations. In the case of both of these routes, potentially significant environmental impacts could make infeasible the ability to access the ferry terminal. For example, adjacent wetlands at Port Sonoma could severely constrain the ability to provide adequate parking facilities at this location. For the Recreation sites, public comments identified potential environmental impacts associated with providing access to recreational land uses. Therefore, as a result of extensive public comment and input during the Draft IOP and initial DEIR scoping and review periods, the feasibility of these potential ferry sites and routes cannot be determined at this time. However, Section 2.6 describes associated projects that are under

[2] *A headway is the distance of time separating each ve*ssel. A smaller headway results in more frequent service, and a larger headway is less frequent.

evaluation by the Golden Gate National Recreation Area (GGNRA).

Other routes, including San Francisco to Benicia, Airport Service, East Bay to Peninsula, San Francisco to Hunters Point, and San Francisco to Moffett Field, were also identified in the IOP for future study. The ridership studies for these routes did not forecast adequate ridership to be cost effective at this time (Cambridge Systematics 2002a,b). However, changes in future land use assumptions could affect the ridership forecasts and the sites were therefore recommended for future study.

Additional details regarding the Proposed Project can be located in the WTA's December 2002 IOP (WTA 2002).

2.2.2 Alternatives to the Proposed Project

This section describes the No Action Alternative and the three other alternatives identified for ferry service expansion during public scoping meetings, the initial DEIR review period, and Draft IOP public meetings held throughout the Bay Area. The initial DEIR addressed a range of alternatives that were considered feasible to meet the purpose and need for the project at the time of publication. The discussion and analysis of these alternatives is intended to further inform both decision-makers, project stakeholders and other members of the public.

Three project alternatives for expanding ferry service in the Bay Area as well as a fourth alternative representing the No Project Alternative were analyzed at the same level of detail in the initial DEIR. The initial DEIR did not contain a Proposed Project or Preferred Alternative. Each of the four alternatives consisted of a set of ferry transit routes and terminals. Together, the alternatives represent a broad range of investment in water transit service expansion.

Table 2.1 lists the routes, terminals, and frequency of service of the project alternatives, along with a comparison to the Proposed Project. Figures 2.2, 2.3, and 2.4 present the routes for each project alternative. The following summarizes these alternatives. Sections 2.2 and 2.3 summarize related programs carried out by the WTA to evaluate terminal design and vessels. Section 2.4 discusses additional alternatives that were considered, but subsequently eliminated from further consideration.

- **Alternative 1 – Augmented Blue Ribbon System (Comprehensive) Alternative** (Figure 2.2). As mandated by the WTA Legislation, the WTA must consider the work of the WTI developed by the BAC and BAEF. Alternative 1 represents the potential buildout system as developed by the BAC. This alternative comprises the largest conceptual improvement of the Bay Area's ferry system. It includes the routes recommended by the Blue Ribbon Task Force, which developed the Bay Area WTI Action Plan, plus additional routes identified by local entities and early project scoping. It includes all of the routes and services included in Alternative 2 but is not necessarily constrained by operational requirements or development costs.
- **Alternative 2 – Expanded System Alternative** (Figure 2.3). The WTA Legislation also mandates the study of an expanded system that could be implemented within a 10-year planning horizon. This alternative includes potentially feasible routes that emerged from the WTI and the Metropolitan Transportation Commission (MTC) ferry studies that could be implemented within a 10-year horizon. It also includes expansion of service on existing routes and a wide range of ferry service corridors throughout the Bay Area. These corridors

would serve a number of passenger service markets, including commuter transit, recreation, Bay Area special events, and regional airport connections. The goal for service frequencies would be designed to provide convenient and dependable service for passengers.

- **Alternative 3 – Enhanced Existing Service Alternative** (Figure 2.4). Six ferry routes currently serve the Bay Area. Alternative 3 would focus on limited expansion of this existing system. This alternative would increase and improve service along these routes by adding or substituting new vessels to increase the number of trips and decrease the time (headways) between trips. Existing single routes with more than one destination (e.g., San Francisco to Jack London Square and Alameda) may be divided into two separate routes to improve travel time and performance. Improvements may also be made to existing passenger terminal facilities. This alternative represents the lowest investment of new capital and operating costs, other than the No Project Alternative.
- **Alternative 4 – No Project Alternative**. This alternative consists of existing ferry service with minimal improvements. Ferry service would continue to operate on existing routes (shown on Figure 2.4) at about the same frequency, as determined by each service provider. Funding for changes or improvements to service would continue to be allocated through the MTC.

2.2.2.1 Changes to the Range of Alternatives Identified in the Initial DEIR

The CEQA Guidelines require an EIR to analyze a reasonable range of feasible alternatives to the project or the location of the project that would "avoid or substantially lessen any of the significant effects of the project" (Section 15126.6). In the initial DEIR, Alternatives 1, 2, and 3 were all considered to be feasible ferry service alternatives. However, extensive public comments and other input provided to the WTA have made clear that Alternatives 1 and 2 described in the initial DEIR could not be determined to be feasible without undertaking extensive further studies pertaining to their potential significant environmental impacts.

As a result of this public input, the WTA developed a reduced version of Alternative 2 that would mitigate or avoid many of the environmental impacts identified for Alternative 2. This mitigated version of Alternative 2 became the Proposed Project described in the December 2002 IOP (WTA 2002).

This FEIR eliminates Alternatives 1 and 2 from further consideration. With the identification of the Proposed Project, Alternatives 1 and 2 as described above no longer meet the CEQA requirement that project alternatives reduce or avoid project impacts. Both of these alternatives describe more extensive systems than the Proposed Project and would have more severe impacts than the Proposed Project. In addition, the feasibility of Alternatives 1 and 2 is questionable due to low cost effectiveness. For these reasons, based on evidence provided in the administrative record, this FEIR carries forward for evaluation the Proposed Project, Alternative 3, and the No Project Alternative (Alternative 4).

2.2.2.2 Relationship Between Baseline Conditions and the No Project Alternative

Based on CEQA Guidelines Section 15125, the assessment of potential impacts should be conducted against a baseline consisting of the existing environmental conditions. The purpose of this comparison is to identify specific changes to the physical environment that could occur as a

result of the Proposed Project. Significant impacts result from substantial or potentially substantial adverse changes in the physical environment (Guidelines Section 15382).

For this FEIR, the No Project Alternative reflects future conditions if none of the other alternatives were implemented, including the Proposed Project. Under this scenario, existing ferry service would continue, along with increases in other vessel traffic and vehicular traffic.

For the majority of the technical sections presented in Section 3.0 of this FEIR, potential impacts are evaluated against the existing environmental conditions. For Air Quality (Section 3.6), Transportation (3.12), and Energy (Section 3.13), however, the analyses are based on comparison to the No Project Alternative. For these three issue areas, comparison of future (year 2025 [3]) levels of travel at full operation of the Proposed Project against the baseline of existing conditions is not useful because it would not show whether the project improves or impacts regional travel patterns, and consequently regional air quality emissions and energy consumption. Changes resulting from buildout of the Proposed Project would be masked by the much greater changes that will occur as a result of anticipated future growth in the Bay Area. Therefore, these sections include analysis of potential impacts compared to the No Project Alternative for the same study year, rather than the baseline.

2.3 TERMINAL FUNCTION AND DESIGN

Terminal design concepts for an expanded system include the function of the terminal, its connection with other passenger or transit services, and its actual design and appearance. Existing, active ferry terminals provide examples of the range of concepts, from Sausalito or Jack London Square to more developed sites such as Larkspur. The WTA performed studies to initially define design recommendations and concepts, terminal access, connections with other transit, and conceptual design.

2.3.1 Terminal and Passenger Access and Connections with Other Transit Services

Ferry terminal facilities are vital links in the Bay Area regional transit system. The WTA has conceptually considered opportunities for access to the ferry terminals by various modes of public transit, for pedestrians and cyclists, with the overall aim to increase transit ridership and decrease the need for parking at waterfront terminals. Efficiency of connections between passenger systems requires planning in the design and operation of transit transfer facilities. The WTA developed conceptual design guidelines to promote intermodal concepts by providing seamless and efficient transfer between transport modes as well as better integration with the local urban context. The objective of the intermodal terminal facility is to not only complement but also serve as a catalyst to ferry service expansion in the Bay Area.

2.3.2 Terminal Design

The WTA has also prepared conceptual recommendations on terminal architecture and engineering, including operational design parameters (Parsons Brinckerhoff 2002). These recommendations are based on a study of expectations of ferry service that is efficient, secure,

[3] The study year 2025 was chosen because it is consistent with Bay Area planning horizon years used to represent "buildout" of the regional transportation system.

and convenient, as well as on the differentiation between land-based and water-borne transit, namely, the U.S. Coast Guard (USCG) restrictions on the number of passengers allowed on a vessel. The vessel capacity limits influence the design of ticketing, waiting and boarding areas. Several configuration options for the relative placement of queuing areas, control gates, and boat docking floats have been conceptually evaluated. Each option involves trade-offs between passenger comfort, efficiency of boarding procedures, and terminal size.

2.4 VESSEL TECHNOLOGY

The WTA considered and evaluated a wide range of technologies that might be applied to an expanded ferry fleet. Advances in design and operating technologies have increased the range of choices in hull design, fuel type, and propulsion systems. However, each of these technologies have both benefits and limitations that can affect their suitability to meet different performance applications and expectations. These parameters are briefly summarized below.

Types of vessel hulls include hydrofoil, catamaran, conventional monohull, surface-effect-ship, and hovercraft. Of these, the catamaran design has become the vessel of choice by many passenger ferry operators in the Bay Area for its ability to provide high-speed service. It is relatively stable, provides a wide hull to accommodate passenger arrangement options, and has a relatively shallow draft (depth in the water).

The WTA's evaluation of vessel technologies involved a comprehensive investigation of emerging technologies and their relative suitability to Bay Area passenger service (JJMA and BAH 2002). The WTA also formed a "Clean Marine Ad Hoc Work Group" to discuss the scope of the investigation and provide input and peer review. All of the ferries in service in the Bay use diesel-cycle (compression ignition) engines as their main propulsion and power generation method. All currently use diesel.

The evaluation of technologies was based on two representative vessel types, a small moderate-speed vessel and a larger "fast" ferry. The study compiled a list of technology alternatives, including modifications to diesel engines, alternative fuels, and alternative propulsion systems. Engine modifications that can directly provide exhaust emission reductions were examined, including internal and external diesel fuel modifications. Alternative fuels can also provide exhaust reductions, and those evaluated included bio-diesel, natural gas, liquefied petroleum gas (LPG), Fischer-Tropsch (FT), hydrogen, methanol, ethanol, ultra-low sulfur diesel, diesel fuel emulsions, and fuel additives. Propulsion technologies reviewed included sail, solar sail, battery flywheel, internal compression engine generator electric, hybrid sail-solar sail-battery-generator, variations of fuel cell combinations, gas turbine, and diesel. These alternatives were evaluated against a set of performance and economic specifications, which included a survey of the Clean Marine Group that was used to weigh and score the alternatives. Finally, the alternatives were screened for air quality performance in terms of emission reductions. This evaluation resulted in five options that can provide at least an 85 percent reduction in air pollutant emissions in comparison to the EPA Tier II 2007 requirements:

1. Diesel engines with nitrogen oxides adsorbers, SCRs, and/or humidification, combined with DPTs, using low- or no-sulfur diesel fuel
2. Diesel engines using gaseous fuels
3. Diesel engines using hydrogen fuel

4. Electric drive with a clean source of electricity (e.g., fuel cell, battery, or electric photo voltaic cell)
5. Gas turbine drive using either liquid diesel or gaseous fuel

The evaluation provides information and guidance toward the types of emission goals that can be met as an expanded water transit system is implemented. These types of technologies would require further development and review in regard to how they can be incorporated into future service.

2.5 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER EVALUATION

In addition to Alternatives 1 and 2, a number of other alternatives were considered by the WTA and eliminated from further evaluation. These alternatives were not carried forward for detailed environmental analysis based on considerations that included cost, feasibility, and environmental effects. Many of the Alternatives are being considered for implementation by other transit agencies. Both the Transportation System Management (TSM) Alternative and the Smart Growth Alternative discussed below provide unique strategies for relieving congestion in the Bay Area. However, as noted by MTC in the Regional Transportation Plan (RTP) EIR, many of the innovative strategies associated with TSM have not yet been sufficiently developed for widespread implementation. Future implementation of a comprehensive TSM strategy would also require further consensus among project stakeholders. Implementation of the Smart Growth Alternative would ultimately require changes to land use through local jurisdictions. To that end, the Association of Bay Area Governments (ABAG) is currently focused on fiscal and regulatory incentives for promoting Smart Growth.

Table 2.2 provides a summary comparison of the anticipated ridership and costs associated with the alternatives discussed below, as well as the Proposed Project, and Alternatives 1 through 3. In addition, Table 2.2 provides the estimated change in total daily vehicle miles traveled (VMTs) within the nine-county Bay Area projected for each alternative.

2.5.1 Express Bus Alternative

The Express Bus Alternative is based on the scenario described in the IOP that would provide express and/or additional bus service for similar origin and destination points as those ferry routes planned for under the IOP. This Alternative would offer similar mass transit opportunities to catchment areas served by the Proposed Project, but in the mode of bus, rather than ferry trips. This alternative was developed to better understand the relative costs and benefits of bus system enhancements that could be implemented in lieu of the expanded ferry service described in the IOP. The alternative includes a combination of express bus service, as well as service to the nearby transit nodes.

Under this alternative, express bus service would be provided from park and ride lots, at or near the terminal locations proposed under the IOP. For example, express bus service to San Francisco would be provided from the vicinity of the proposed Richmond, Alameda, Oakland, and Berkeley ferry terminals. A few of the routes would provide bus service to the nearest BART station: from Antioch/Pittsburg and Martinez to the Pleasant Hill BART station, and Hercules Rodeo to the Del Norte BART station. Similarly, commuters in South San Francisco

and Redwood City would be provided bus service to Caltrain. Additional MUNI service would be made available at Treasure Island. The conceptual Express Bus Alternative routes and points of origin are shown on Figure 2.5.

As shown on Table 2.2, this alternative is estimated to result in an annual ridership of 3,219,000 and a total subsidy per rider of $9. The comparative estimates for the Proposed Project are 9,639,100 annual riders and a $9 total subsidy per rider. The Express Bus Alternative is estimated to result in a reduction of 40,145 total daily VMTs compared to the 2025 No Project Alternative.

The Express Bus Alternative would result in approximately one-third of the transit ridership associated with the Proposed Project, and would provide less benefit in terms of total daily VMT reduction. This alternative does provide a similar cost effectiveness to ferry expansion. Further, jurisdictional constraints, such as limitations of additional bus traffic within some areas of San Francisco, could impede full implementation of this alternative. Finally, this alternative would not meet the basic project objectives described in Section 1 of this FEIR. Therefore, the Express Bus Alternative was not carried forward for further evaluation. It should be noted that the WTA studies found that ferry expansion was complimentary with bus expansion and that the combination of bus and ferry expansion provided a high level of cost effectiveness. Bus alternatives to serve bridge corridors are being further investigated for implementation by MTC and other transit agencies.

2.5.2 Express Bus, HOV, and Operational Improvements Alternative

The Express Bus/HOV/Operational Improvements Alternative is based on an alternative from *MTC Bay Crossing Study* (MTC 2001a) that includes the implementation of expanded express bus service, carpool lane extensions, and operational improvements in the Bay Bridge, San Mateo Bridge, and Dumbarton Bridge corridors. Similar to the previous alternative, this would attempt to provide travel opportunities comparable to the Proposed Project, but in modes other than ferry service.

This alternative includes 16 operational improvements related to express bus, high occupancy vehicle, and to the existing transbay corridors (I-80, SR 92, SR 84) and their approach facilities. The projects include restriping of existing lanes; extensions of existing HOV/Fastrak lanes within existing right-of-way; prohibition of parking on San Francisco approach streets; restriction and relocation of casual carpool locations; and construction of new HOV ramps and park and ride lots. In addition, this alternative involves the purchase and use of three-door BART cars and the addition of three additional trains per hour on the transbay routes. The BART improvements were developed to reduce peak hour crowding on BART lines. The routes, terminals, and improvements are shown on Figure 2.6.

Prior analysis prepared by MTC in the *San Francisco Bay Crossing Study, Travel Evaluation Report* (MTC 2002) indicated that this alternative would generate the following increases in transbay transit ridership:

- Bay Bridge – 8,000 passengers/day;
- San Mateo Bridge –6,200 passengers/day (no bus service exists in the Baseline); and
- Dumbarton Bridge – 900 passengers/day.

As shown on Table 2.2, this alternative is estimated to result in an annual ridership of 3,868,400 and a total subsidy per rider of $18. The comparative estimates for the Proposed Project are 9,639,100 annual riders and a $9 total subsidy per rider. The Express Bus/HOV/Operational Improvements Alternative would result in less than one-half the transit riders provided by the Proposed Project. The cost per rider is estimated to be greater than that of the Proposed Project. This alternative would not meet the basic project objectives described in Section 1.0 of this FEIR. Therefore, the Express Bus/HOV/Operational Improvements Alternative was not carried forward for additional analysis in this FEIR. MTC is continuing to study this alternative.

2.5.3 BART Crossing Alternative

This alternative is derived from the MTC's *2000 San Francisco Bay Crossings Study* (MTC 2001a). The BART Crossing Alternative includes the phased implementation of new BART service within San Francisco followed by a new transbay BART tunnel connecting the East Bay with San Francisco. It would attempt to provide transit opportunities comparable to the Proposed Project, but through the BART system rather than ferry service.

The first phase involves construction of a second subway line in San Francisco located on either Mission Street or Howard Street. After passing through the downtown area, the alignment would turn up Geary Street toward the intersection of Van Ness. A total of six new stations would be constructed along an alignment extending for approximately 1.7 miles. In the second phase, a new transbay tube would be constructed connecting the second San Francisco BART alignment to the East Bay via Alameda. Two new BART stations would be constructed on Alameda, and a third at Jack London Square, which would allow for transfer to Amtrak and Capital Corridor trains. The alignment would continue through Oakland to the MacArthur station along a new fourth track.

The new commuter rail tunnel would serve approximately 16,000 new daily transbay passengers on commuter rail lines for service contained within the Bay Area. The 16,000 new trips associated with the new BART tunnel represent an approximately six percent increase over the 2025 Baseline BART forecast. Approximately 68 percent (183,000 daily trips) of BART trips would use the existing tunnel, with 32 percent using the new tunnel (86,000 daily passengers).

As shown on Table 2.2, this alternative is estimated to result in an annual ridership of 4,545,400 and a total subsidy per rider of $149. The comparative estimates for the Proposed Project are 9,639,100 annual ridership and $9 total subsidy per rider. The substantially higher costs associated with the BART Crossing Alternative are due primarily to high capital investment required for implementation. This alternative would provide approximately one-half the ridership of the Proposed Project, and would require a substantial capital investment for implementation. For these reasons, and the fact that this alternative does not meet the basic project objectives outlined in Section 1.0 of this FEIR, the BART Crossing Alternative was not carried forward for further evaluation in this FEIR.

2.5.4 Dumbarton Rail Alternative

This alternative is derived from the *MTC Bay Crossing Study* (MTC 2001a), which addressed two levels of commuter rail service. The Basic Service Plan would connect Union City with San Jose and Millbrae. The Expanded Service Plan would include the Union City service, plus additional service from Tracy to San Jose and Millbrae, and potentially San Francisco/Milpitas

service. It would attempt to provide mass transit opportunities comparable to the Proposed Project, but in the mode of enhanced rail service rather than ferry service.

According to the MTC *San Francisco Bay Crossing Study, Travel Evaluation Report* (MTC 2002), the Basic Service Plan from Union City is estimated to result in an additional 3,300 daily transbay passengers. Institution of the Expanded Service Plan would add 2,600 transbay passengers, for a total additional ridership of approximately 5,900 daily riders. A Milpitas-San Francisco service would attract approximately 3,800 new daily transbay riders.

As shown on Table 2.2, this alternative is estimated to result in an annual ridership of 844,800 and a total subsidy per rider of $22. The comparative estimates for the Proposed Project are 9,639,100 annual ridership and $9 total subsidy per rider. Based on prior analysis prepared by the MTC, this alternative is estimated to result in a reduction of 239,564 total daily VMTs compared to the 2025 No Project Alternative.

The Dumbarton Rail Alternative would generally serve a different catchment area than that of the Proposed Project. Mobility benefits of the Dumbarton Rail project are expected to be limited to the southern portion of the nine-county Bay Area. In addition, this alternative does not meet the basic project objectives described in Section 1.0 of this FEIR. For these reasons, the Dumbarton Rail Alternative was not carried forward for additional analysis in this document. The project is under further study by MTC and other transportation agencies.

2.5.5 Transportation System Management (TSM) Alternative

The TSM Alternative includes a set of projects intended to address existing corridor mobility issues. This alternative was developed by MTC during preparation of the 2000 RTP and the environmental analysis of the RTP. The TSM Alternative emphasizes the application of available funds in ways that would improve the operational efficiency of the existing transportation system. This would include additional express bus service, reversible carpool lanes, and a better connected HOV and transit system. The TSM Alternative provides more funding for street and road maintenance shortfalls. Freeway ramp metering would be added to the most congested corridors. Congestion pricing would be implemented on the Bay bridges to generate additional revenues, including transit-operating revenues. Some highway projects would be deferred to provide additional capital funding. Details of the transportation improvements included in this alternative are listed in the Final EIR prepared for the RTP.

As noted on Table 2.2, the total cost of implementing this alternative is estimated to be $511 million ($70 million in capital costs and approximately $18 million annual operating cost). Based on prior analysis provided by MTC in the *RTP Environmental Impact Report* (MTC, 2001b), this alternative is estimated to result in a reduction of 553,537 total daily VMTs compared to the 2025 No Project Alternative.

The TSM Alternative involves innovative strategies, some of which are not available for immediate implementation. Full implementation of this alternative would also require further coordination among, and approval by, the various affected jurisdictions and stakeholders in the transportation community. In addition, this alternative does not meet the basic project objectives outlined in Section 1.0 of this FEIR. Therefore, the TSM Alternative was not carried forward for further evaluation in this FEIR.

2.5.6 Smart Growth Alternative

This alternative would utilize a set of public policies and other incentives to encourage compact, mixed use and mixed income development along transit corridors, near public transit stations, and in town centers. Development of the Smart Growth project is led by the ABAG, along with four other regional planning agencies in the Bay Area (MTC, Bay Conservation and Development Commission, Bay Area Air Quality Management District, and Regional Water Quality Control Board). As noted in *the Smart Growth Strategy, Regional Livability Footprint Project* (ABAG 2002a), the project seeks to minimize sprawl, provide adequate and affordable housing, improve mobility, protect environmental quality, and preserve open space. Presumably, these policies and incentives would result in development patterns that would provide some of the traffic congestion relief that is an objective of the Proposed Project.

The plan was developed through a series of workshops held throughout the Bay Area over a two-year period. Representatives of the five regional government agencies have since developed a set of smart growth policies that were conceptually adopted by the ABAG Executive Board in September 2002. Policy refinement is ongoing.

Because this alternative does not involve direct expenditures for transit, cost and ridership comparisons to the other project alternatives are not applicable. However, prior analysis provided by ABAG in the *Transportation Indicators Summary* (ABAG 2002b) indicated that under this alternative the number of transit trips would increase while total VMTs would decrease, compared to the future baseline. In addition, preliminary analysis prepared for the WTA, which modeled implementation of this alternative along with the IOP Alternative, indicates that ferry ridership would substantially increase for many of the IOP routes. However, because of the alteration of jobs/housing patterns under the Smart Growth Alternative, demand for some IOP routes may not increase.

The benefits and costs of this alternative are not directly comparable to the Proposed Project. However, WTA studies have shown that implementation of the Smart Growth Alternative would increase ferry ridership on most of the routes proposed by the WTA as noted above. Implementation of the Smart Growth Alternative would occur incrementally, subject to changes in land use policies and standards at the city and county level. Because this alternative does not meet the basic project objectives as described in Section 1.0 of this FEIR, and because implementation efforts under the leadership of ABAG are voluntary rather than mandatory (making any determination of their effectiveness speculative), the Smart Growth Alternative was not carried forward for additional analysis.

2.6 ASSOCIATED PROJECTS

The Golden Gate National Recreation Area (GGNRA) of the National Park Service (NPS) is developing a *Water Shuttle Access Plan* consistent with the long-term transportation strategy outlined in the *GGNRA General Management Plan* (GMP) (GGNRA 1980), and the former Congressionally-mandated *Golden Gate Travel Study* (GGNRA 1977). With the park facing the challenges of being the most visited tourist attraction in California (per California Department of Tourism) with over 15 million visitors annually, the GMP identified ferry services as one means to "alleviate existing problems and minimize potential ones in the interest of making park access as pleasant, safe and convenient as possible."

The goals of the *Water Shuttle Access Plan* include: 1) to maintain consistency with GGNRA and applicable regional, state and water transit plans; 2) to contribute to improving the Bay Area environment and preserve and protect the park's natural and cultural resources associated with accessing the park; 3) to enhance the quality of the visitor experience; 4) to increase opportunities for diverse visitor populations to access park sites; and 5) to provide cost-effective, reliable and safe water shuttle service.

To adequately evaluate the demand for such new service to GGNRA, the water shuttle planning efforts in 1999 began with focus groups, intercept surveys, and a telephone survey to help better understand the market. The results of that effort, and the development of a unique, recreational travel model, have been used in developing the preliminary alternatives for providing alternative access to GGNRA sites including Fort Mason, Crissy Field and Fort Baker. The survey findings indicate connections to nearby sites including Fisherman's Wharf, the San Francisco Ferry Building, Sausalito, and Berkeley are key to achieving the plan's goals. Connections to Berkeley, as planned by the WTA, and to Oakland via existing service to the Ferry Building will provide one means of increased opportunity for diverse visitor populations from the East Bay to access the park. East Bay connections to the GGNRA sites are highly constrained at this time.

Development or expansion of service to East Bay terminals is under the jurisdiction of the WTA. Although having separate jurisdiction of terminal sites, the GGNRA Water Access Plan is being developed in coordination with the WTA planning efforts to insure the system are complementary and to achieve common goals and objectives. The environmental considerations addressed as part of the WTA EIR process will serve as a framework in which to evaluate the more specific potential impacts of GGNRA alternatives during Environmental Impact Statement analyses and documentation. Inter-lining of the proposed WTA Berkeley to San Francisco route to Fort Mason during weekday off-peak and weekends is proposed in order to effectively utilize off-peak commuter capacity to provide recreational access to GGNRA sites, and provide a potential bridge service to complement any GGNRA-established service. Such coordination provides benefits in terms of access and flexibility for riders of both systems.

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Table 2.1
Routes and Frequencies
Proposed Project and Project Alternatives

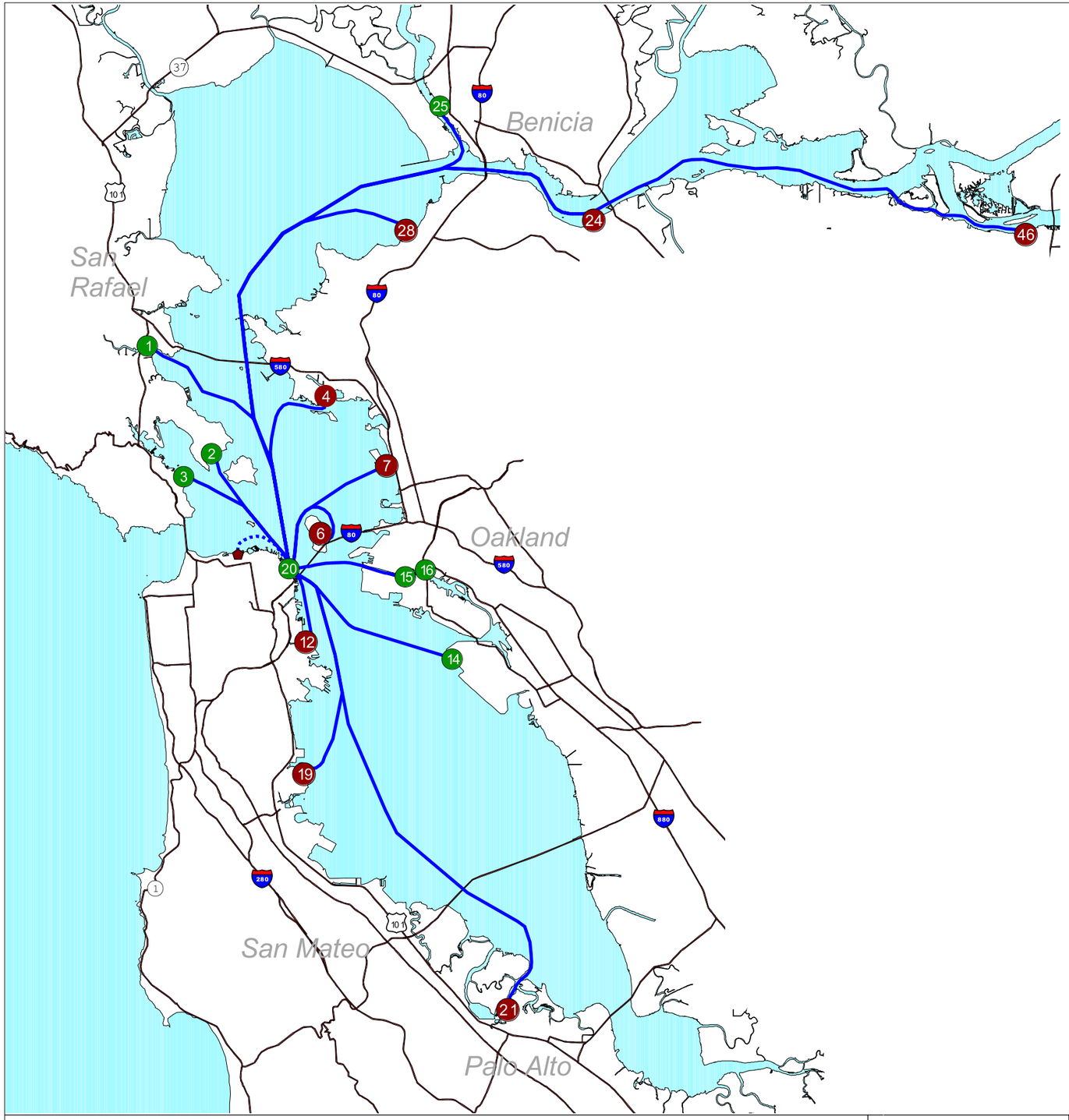
	Corridor/Ferry Route	Proposed Project Peak/ Off-Peak Headway (min)	Alt. 1 Peak/ Off-Peak Headway (min)	Alt. 2 Peak/ Off-Peak Headway (min)	Alt. 3 Peak/ Off-Peak Headway (min)	Alt. 4 (No Project) Peak/ Off-Peak Headway (min)
Existing System	Oakland to San Francisco	30/60	15/15	15/15	30/60	30/60[2]
	Alameda Point-Mission Bay-SF[1]	30/60	15/15	15/15	30/60	X
	Harbor Bay to San Francisco	60/0	30/30	30/30	60/0	60/0
	Vallejo to San Francisco	30/60	15/30	15/30	30/60	45/90
	Sausalito to San Francisco	30/60	30/30	30/30	30/60	70/80
	Larkspur to San Francisco	20/60	15/15	15/15	20/60	20/75
	Tiburon to San Francisco	30/60	30/30	30/30	30/60	45/60
Proposed Project	Berkeley (unspecified) -SF-Mission Bay	X	15/15	15/15	X	X
	Berkeley (University) – SF-Mission Bay (Ft. Mason on weekends)	30/60	X	X	X	X
	Richmond to San Francisco	30/60	15/30	15/30	X	X
	San Francisco to Treasure Island	30/30	15/15	15/15	X	X
	Antioch/Pittsburg to Martinez to San Francisco	60/200	30/60	30/60	X	X
	Hercules/Rodeo to San Francisco	60/240	30/30	30/30	X	X
	South San Francisco (Oyster Pt.) to San Francisco	30/60	30/30	30/30	X	X
	Redwood City to San Francisco	60/60	30/30	30/30	X	X
Alternative Routes and Terminal Locations Considered for Future Study	Benicia/Martinez to San Francisco	X	30/60	30/60	X	X
	San Leandro to San Francisco	X	30/30	30/30	X	X
	Oakland Army Base to San Francisco	X	15/15	X	X	X
	Harbor Bay to So. San Francisco	X	30/30	30/30	X	X
	Harbor Bay to Redwood City	X	30/30	30/30	X	X
	Harbor Bay to Moffett Field	X	30/30	30/30	X	X
	Harbor Bay to Hunters Pt.	X	30/30	X	X	X
	Harbor Bay to Coyote Pt.	X	15/15	X	X	X
	Harbor Bay to Foster City	X	15/15	X	X	X
	Harbor Bay to East Palo Alto	X	15/15	X	X	X
	Port Sonoma to San Francisco	X	30/60	30/60	X	X
	Coyote Pt. To San Francisco	X	30/30	X	X	X
	Foster City to San Francisco	X	30/30	X	X	X
	Moffett Field to San Francisco	X	30/30	30	X	X
	E. Palo Alto to San Francisco	X	30/30	X	X	X
	Berkeley to Treasure Island	X	15/15	15	X	X
	Oakland to Treasure Island	X	15/15	15	X	X

Notes:
1. The route under the Proposed Project is from Alameda to SF only
2. This route under Alternative 4 would include Alameda

Table 2.2
Comparison of Cost, Ridership, and VMTs
Proposed Project and Alternatives

Project Alternative	Capital Cost ($M)	Annualized Cap. Cost ($M)	Capital Cost/ Rider	Annual Operating Subsidy ($M)	Operating Subsidy/ Rider	Total Subsidy/ Rider	Annual Ridership	Change in Daily VMTs from Future Baseline[1]
Proposed Project (IOP Alternative)	$440	$38	$4	$50	$5	$9	9,639,100	(142,460)
Alternative 3	$160	$14	$2	$26	$4	$6	6,399,000	(40,131)
Alternatives Considered but Eliminated from Further Consideration								
Alternative 1	$1,007	$87	$6	$333	$23	$29	14,545,000	(277,659)
Alternative 2	$730	$63	$5	$218	$16	$21	13,685,400	(232,990)
Express Bus	$75	$8	$2	$22	$7	$9	3,219,000	(40,145)
Express Bus/HOV/ Operational Improvements	$547	$50	$13	$18	$5	$18	3,868,400	N/A [2]
BART Crossing	$7,108	$622	$137	$57	$13	$149	4,545,000	N/A[2]
Dumbarton Rail	$180	$16	$19	$3	$4	$22	844,800	N/A[2]
Transportation System Management	$70	NA	NA	$18	NA	NA	NA	(553,537)[3]
Smart Growth	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
1. Total Daily VMT's under the 2025 No Project Alternative (Baseline) are estimated to be 184,279,70
2. VMT not used for evaluating alternatives in MTC Bay Crossings Study
3. Derived from VMT reduction calculated by MTC (MTC 2001b), adjusted to the No Project VMT of 184,279,700



1 Larkspur
Larkspur - Ferry Building (20)

2 Tiburon
Tiburon - Ferry Building (20)

3 Sausalito
Sausalito - Ferry Building (20)

4 Richmond
Richmond - Ferry Building (20)

6 Treasure Island
Treasure Island - Ferry Building (20)

7 Berkeley/Albany/Fort Mason
Berkeley/Albany/Fort Mason* - Ferry Building (20)

12 Mission Bay
Mission Bay - Ferry Building (20)

14 Alameda/Harbor Bay Isle
Harbor Bay Isle - Ferry Building (20)

15 Alameda Main St.
Alameda Main St. - Jack London Square (16)
Alameda Main St. - Ferry Building (20)

16 Jack London Square
Jack London Sq. - Ferry Building (20)
Jack London Sq. - Alameda Main St. (15)

19 Oyster Point (SSF)
Oyster Point - Ferry Building (20)

20 San Francisco Ferry Building 20

21 Redwood City
Redwood City - Ferry Building (20)

24 Martinez
Martinez - Ferry Building (20)

25 Vallejo/Mare Island
Vallejo - Ferry Building (20)

28 Hercules/Rodeo
Hercules/Rodeo - Ferry Building (20)

46 Pittsburg/Antioch
Pittsburg/Antioch - Ferry Building (20)

LEGEND
Primary Roads
Proposed Ferry Terminal
Existing Ferry Terminal
Existing and PotentialTransit Routes
Off-peak & Weekend Service to Fort Mason
Fort Mason
* See Section 2.6

3 0 3 6 Miles
Scale 1:380,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-0006890

PROPOSED PROJECT

Figure 2.1

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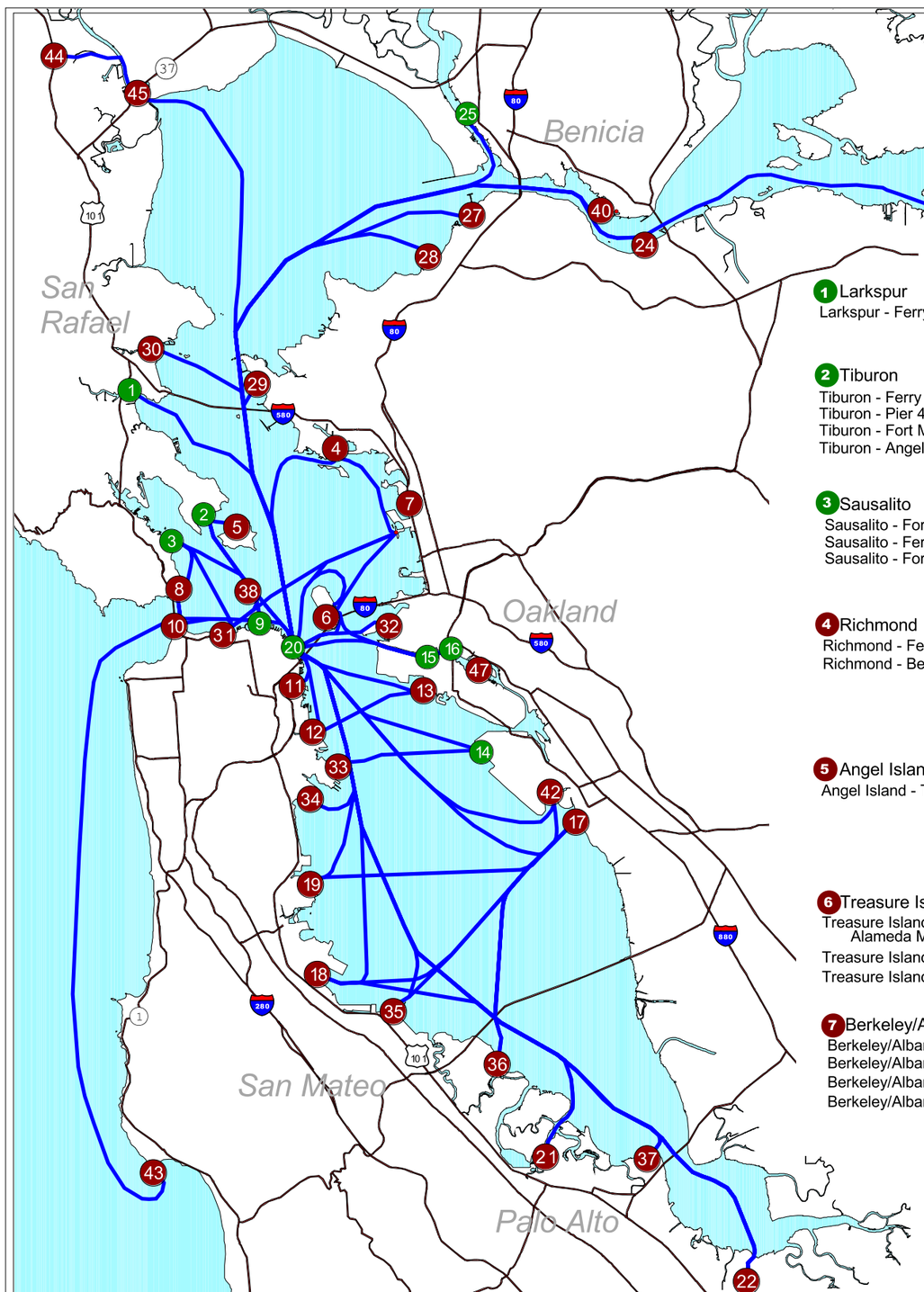


1 Larkspur
Larkspur - Ferry Building (20)

2 Tiburon
Tiburon - Ferry Building (20)
Tiburon - Pier 41/43 (9)
Tiburon - Fort Mason (31)
Tiburon - Angel Island (5)

3 Sausalito
Sausalito - Fort Mason (31)
Sausalito - Ferry Building (20)
Sausalito - Fort Baker (8)

4 Richmond
Richmond - Ferry Building (20)
Richmond - Berkeley/Albany (7)

5 Angel Island
Angel Island - Tiburon (2)

6 Treasure Island
Treasure Island - Jack London Square/ Alameda Main St. (16,15)
Treasure Island - Berkeley/Albany (7)
Treasure Island - Ferry Building (20)

7 Berkeley/Albany
Berkeley/Albany - Treasure Island (6)
Berkeley/Albany - Ferry Building (20)
Berkeley/Albany - Richmond (4)
Berkeley/Albany - Fort Mason (31)

8 Fort Baker
Fort Baker - Presidio (10)
Fort Baker - Sausalito (3)

9 San Francisco Pier 41/43

10 Presidio
Presidio - Fort Baker (8)
Presidio - Fort Mason (31)

11 China Basin/Pac Bell Park
China Basin/Pac Bell Park - Ferry Building (20)

12 Mission Bay
Mission Bay - Ferry Building (20)
Mission Bay - Alameda Point (13)

13 Alameda Point
Alameda Point - Ferry Building (20)
Alameda Point - Mission Bay (12)

14 Alameda/Harbor Bay Isle
Harbor Bay Isle - Ferry Building (20)
Harbor Bay Isle - Hunter's Point (33)

15 Alameda Main St.
Alameda Main St. - Jack London Square (16)
Alameda Main St. - Ferry Building (20)
Alameda Main St. - Treasure Island (6)
Alameda Main St. - SFO (18)

16 Jack London Square
Jack London Sq. - Ferry Building (20)
Jack London Sq. - Treasure Is. (6)
Jack London Sq. - SFO (18)
Jack London Sq. - Alameda Main St. (15)

17 East Bay/San Leandro Marnia
East Bay - Moffett Field (22)
East Bay - Redwood City (21)
East Bay - Oyster Point (19)
East Bay - Coyote Point (35)
East Bay - Foster City (36)
East Bay - East Palo Alto (37)
East Bay - Ferry Building (20)

18 San Francisco Intl. Airport
SFO - Moffett Field (22)
SFO - Ferry Building (20)
SFO - Jack London Square/ Alameda Main St. (16,15)
SFO - Oakland Intl. Airport/ Coliseum (41,42)

19 Oyster Point
Oyster Point - Ferry Building (20)
Oyster Point - East Bay/ San Leandro Marina (17)

20 San Francisco Ferry Building 20

21 Redwood City
Redwood City - East Bay/ San Leandro Marina (17)
Redwood City - Ferry Building (20)

22 Moffett Field
Moffett Field - Ferry Building (20)
Moffett Field - SFO (18)
Moffett Field - East Bay/ San Leandro Marina (17)

24 Martinez
Martinez - Ferry Building (20)

25 Vallejo/Mare Island
Vallejo - Ferry Building (20)

26 Pittsburg
Pittsburg - Ferry Building (20)

27 Crockett
Crockett - Ferry Building (20)

28 Hercules/Rodeo
Hercules/Rodeo - Ferry Building (20)

29 Point Molate
Point Molate - Ferry Building (20)

30 San Rafael
San Rafael - Ferry Building (20)

31 Fort Mason
Fort Mason - Pier 41/43 (9)
Fort Mason - Berkeley (7)
Fort Mason - Presidio (10) - Fort Baker (8) - Sausalito (3)
Fort Mason - Sausalito (3)
Fort Mason - Tiburon (2)

32 Oakland Army Base
Oakland Army Base - Ferry Building (20)

33 Hunter's Point
Hunter's Point - Ferry Building (20)
Hunter's Point - Harbor Bay Is. (14)

34 Candlestick Point
Candlestick Point - Ferry Building (20)

35 Coyote Point
Coyote Point - Ferry Building (20)
Coyote Point - East Bay/ San Leandro Marina (17)

36 Foster City
Foster City - Ferry Building (20)
Foster City - East Bay/ San Leandro Marina (17)

37 East Palo Alto
East Palo Alto - Ferry Building (20)
East Palo Also - East Bay/ San Leandro Marina (17)

38 Alcatraz Island
Alcatraz - Ferry Building (20)
Alcatraz - Pier 41/43 (9)

40 Benicia
Benicia - Ferry Building (20)

42 Oakland Intl. Airport/ Oakland Coliseum 42
Oakland Intl./Coliseum - Ferry Building (20)
Oakland Intl./Coliseum - SFO (18)

43 Half Moon Bay
Half Moon Bay - Pier 41/43 - Ferry Building (20)

44 Gnoss Field
Gnoss Field - Ferry Building (20)

45 Port Sonoma
Port Sonoma - Ferry Building (20)

46 Antioch
Antioch - Pittsburg (26)

47 Oakland Inner Harbor 9th St.
Oakland 9th St. - Jack London Square (16)

LEGEND
Primary Roads
Proposed Ferry Terminals
Existing Ferry Terminals
Existing and PotentialTransit Routes

3 0 3 6 Miles
Scale 1:380,000

N

URS

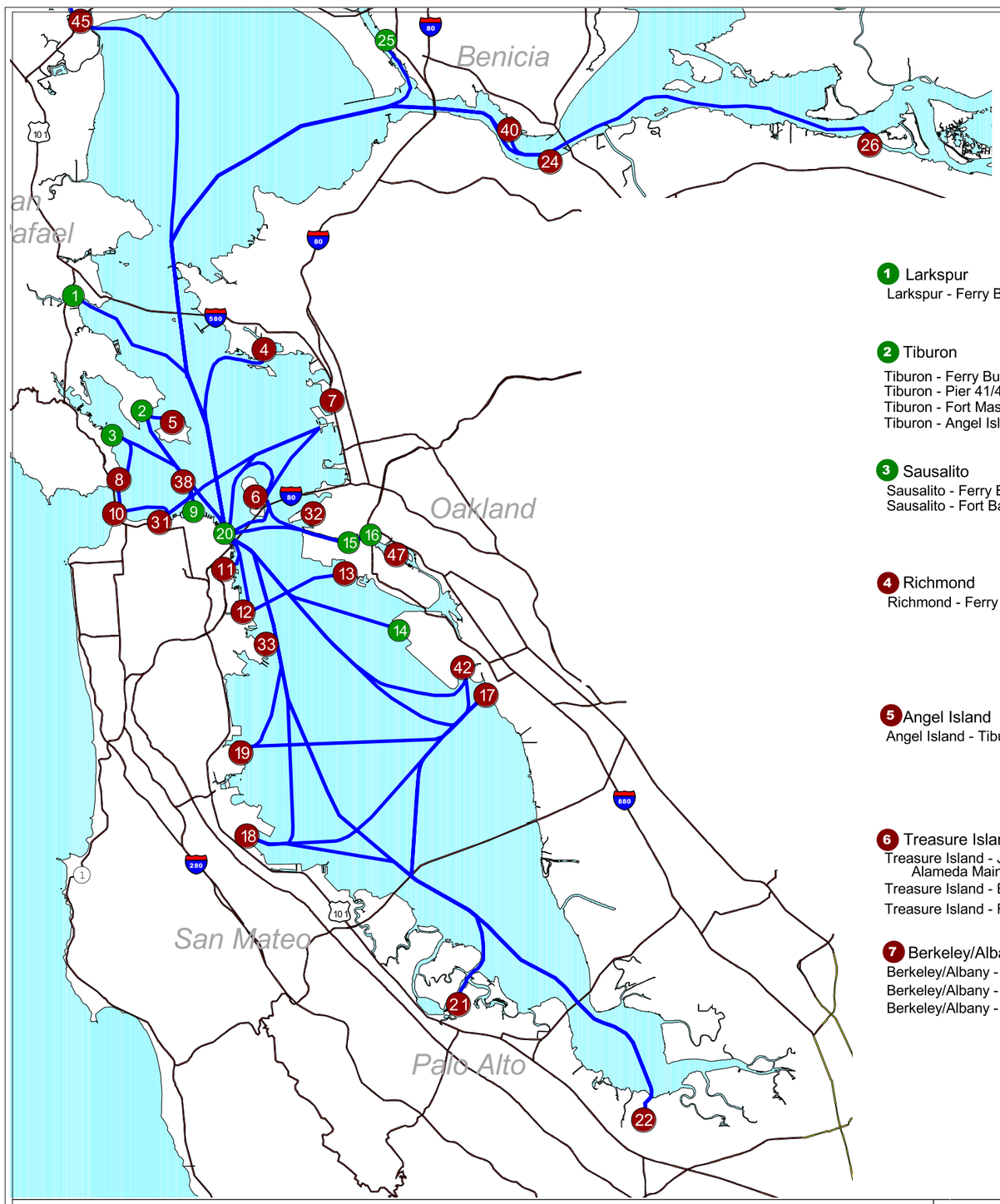
Water Transit Authority
Program EIR

Project No. 43-0006890

ALTERNATIVE 1 COMPREHENSIVE

Figure 2.2

l:/projects/wta/apr/water_resources.apr



1 Larkspur
Larkspur - Ferry Building (20)

2 Tiburon
Tiburon - Ferry Building (20)
Tiburon - Pier 41/43 (9)
Tiburon - Fort Mason (31)
Tiburon - Angel Island (5)

3 Sausalito
Sausalito - Ferry Building (20)
Sausalito - Fort Baker (8)

4 Richmond
Richmond - Ferry Building (20)

5 Angel Island
Angel Island - Tiburon (2)

6 Treasure Island
Treasure Island - Jack London Square/ Alameda Main St. (16,15)
Treasure Island - Berkeley/Albany (7)
Treasure Island - Ferry Building (20)

7 Berkeley/Albany
Berkeley/Albany - Treasure Island (6)
Berkeley/Albany - Ferry Building (20)
Berkeley/Albany - Fort Mason (31)

8 Fort Baker
Fort Baker - Sausalito (3)

9 San Francisco Pier 41/43

10 Presidio
Presidio - Fort Mason (31)

11 China Basin/Pac Bell Park
China Basin/Pac Bell Park - Ferry Building (20)

12 Mission Bay
Mission Bay - Ferry Building (20)
Mission Bay - Alameda Point (13)

13 Alameda Point
Alameda Point - Mission Bay (12)

14 Alameda/Harbor Bay Isle
Harbor Bay Isle - Ferry Building (20)

15 Alameda Main St.
Alameda Main St. - Jack London Square (16)
Alameda Main St. - Ferry Building (20)
Alameda Main St. - Treasure Island (6)
Alameda Main St. - SFO (18)

16 Jack London Square
Jack London Sq. - Ferry Building (20)
Jack London Sq. - Treasure Is. (6)
Jack London Sq. - SFO (18)
Jack London Sq. - Alameda Main St. (15)

17 East Bay/San Leandro Marnia
East Bay - Moffett Field (22)
East Bay - Redwood City (21)
East Bay - Oyster Point (19)
East Bay - Ferry Building (20)

18 San Francisco Intl. Airport
SFO - Moffett Field (22)
SFO - Ferry Building (20)
SFO - Jack London Square/ Alameda Main St. (16,15)
SFO - Oakland Intl. Airport/ Coliseum (41,42)

19 Oyster Point
Oyster Point - Ferry Building (20)
Oyster Point - East Bay/ San Leandro Marina (17)

20 San Francisco Ferry Building 20

21 Redwood City
Redwood City - East Bay/ San Leandro Marina (17)
Redwood City - Ferry Building (20)

22 Moffett Field
Moffett Field - Ferry Building (20)
Moffett Field - SFO (18)
Moffett Field - East Bay/ San Leandro Marina (17)

24 Martinez
Martinez - Ferry Building (20)

25 Vallejo/Mare Island
Vallejo - Ferry Building (20)

26 Pittsburg
Pittsburg - Ferry Building (20)

31 Fort Mason
Fort Mason - Pier 41/43 (9)
Fort Mason - Berkeley (7)
Fort Mason - Presidio (10) - Fort Baker (8) - Sausalito (3)
Fort Mason - Tiburon (2)

32 Oakland Army Base

38 Alcatraz Island
Alcatraz - Ferry Building (20)
Alcatraz - Pier 41/43 (9)
Oakland Army Base - Ferry Building (20)

40 Benicia
Benicia - Ferry Building (20)

42 Oakland Intl. Airport/ Oakland Coliseum 42
Oakland Intl./Coliseum - Ferry Building (20)
Oakland Intl./Coliseum - SFO (18)

44 Gnoss Field
Gnoss Field - Ferry Building (20)

45 Port Sonoma
Port Sonoma - Ferry Building (20)

47 Oakland Inner Harbor 9th St.
Oakland 9th St. - Jack London Square (16)

LEGEND
Primary Roads
Proposed Ferry Terminals
Existing Ferry Terminals
Existing and PotentialTransit Routes

3 0 3 6 Miles
Scale 1:350,000

N

URS

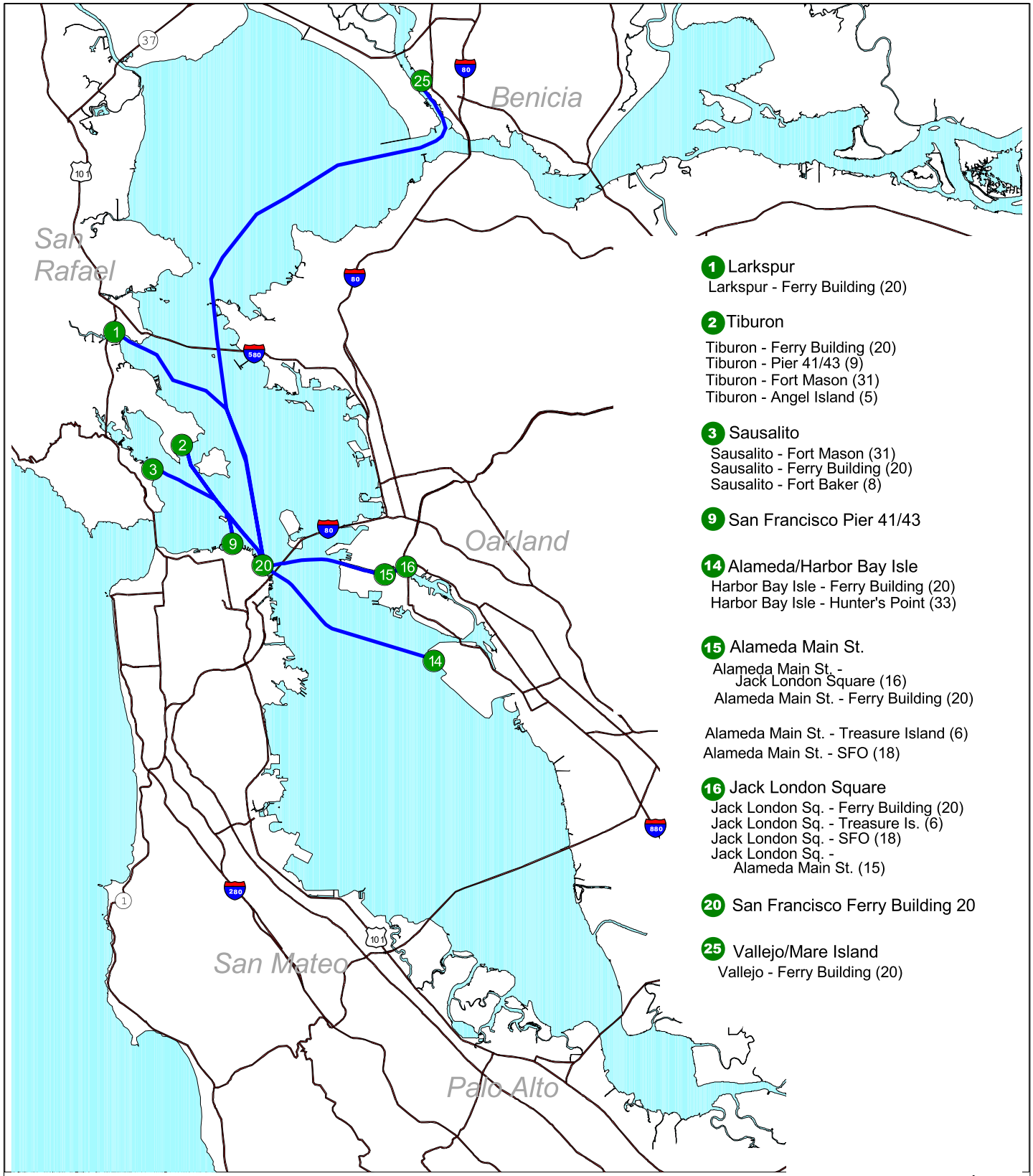
Water Transit Authority Program EIR

Project No. 43-0006890

ALTERNATIVE 2 EXPANDED SERVICE

Figure 2.3

L:/projects/wta/apr/water_resources.apr



URS

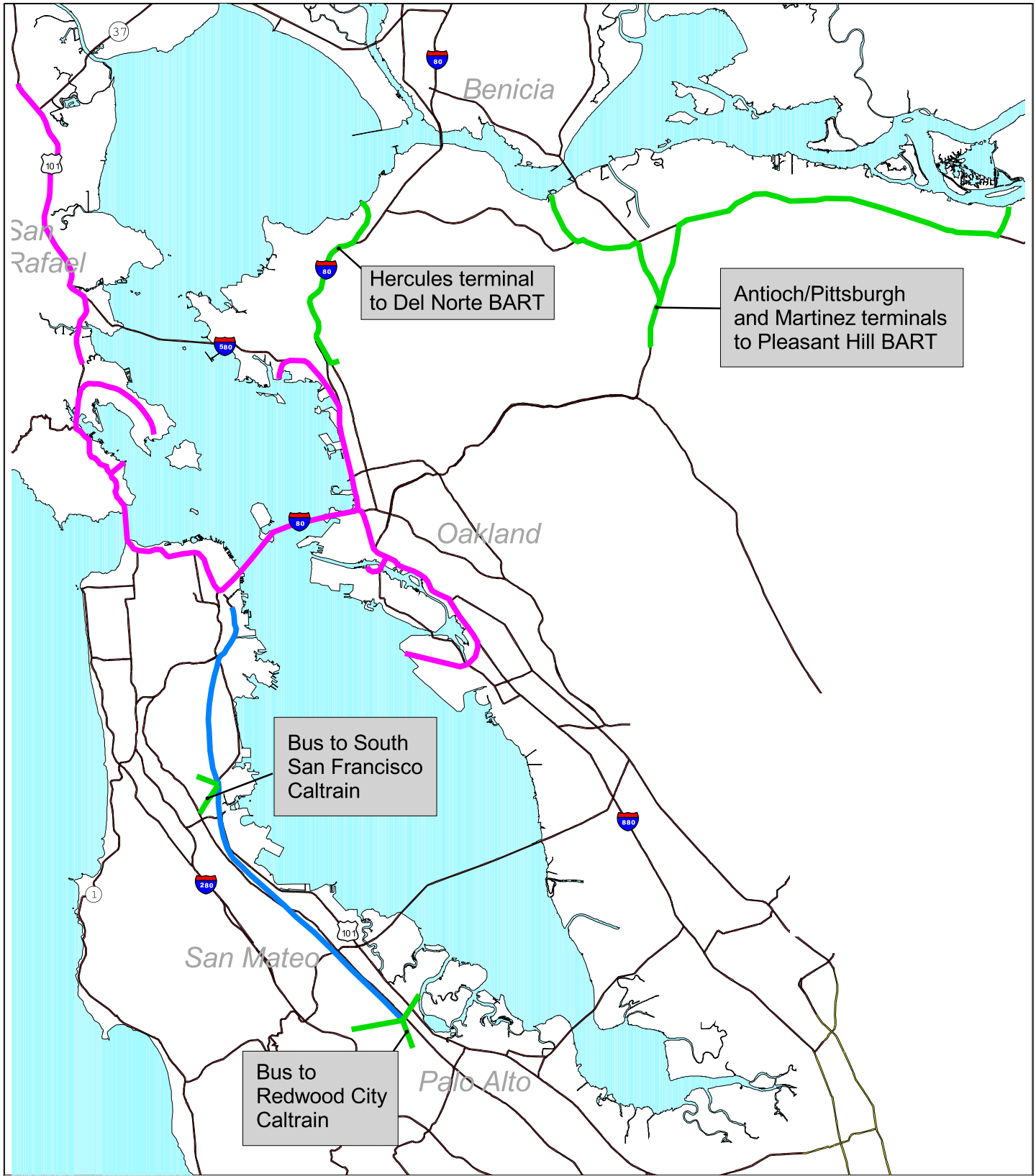
Water Transit Authority
Program EIR

Project No. 43-00066890

ALTERNATIVE 3
ENHANCED EXISTING SERVICE

Figure
2.4

L:/projects/wta/apr/water_resources.apr



URS

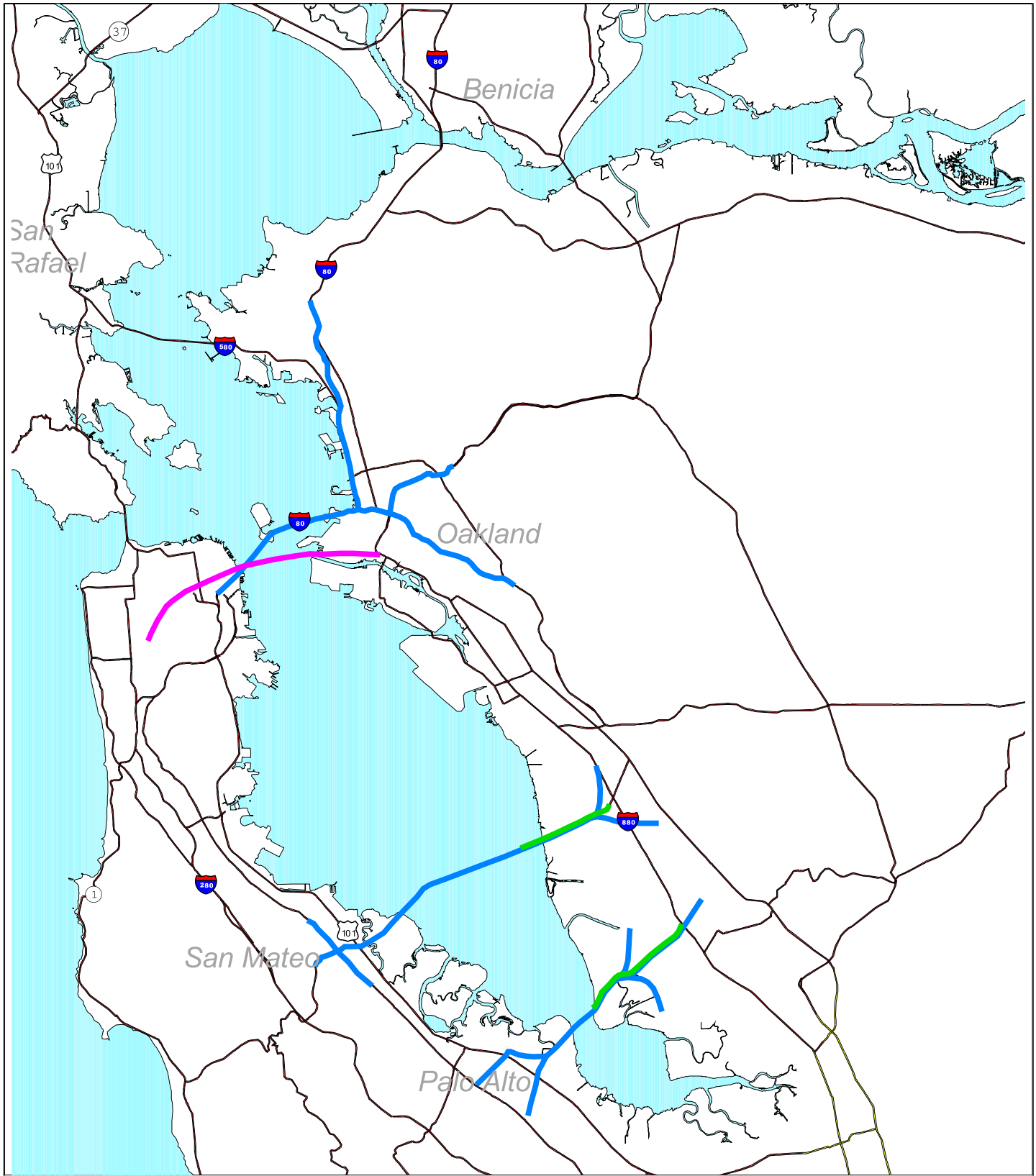
Water Transit Authority Program EIR

Project No. 43-00066890

EXPRESS BUS ALTERNATIVE

Figure 2.5

L:/projects/wta/apr/water_resources.apr



LEGEND

Primary Roads

3 Door BART Cars - Transbay

Carpool and Toll Plaza Improvements

Express Bus Expansion

3 0 3 6 Miles

Scale 1:380,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

EXPRESS BUS, HOV, OPERATIONAL IMPROVEMENTS ALTERNATIVE

Figure
2.6

L:/projects/wta/apr/water_resources.apr

The following subsections evaluate and discuss 13 environmental analyses. The potential for the Proposed Project to impact resources, and recommended mitigation measures to avoid or reduce those impacts are described. The impact analyses are regional and broad in discussion but focus on issues and topics of relevance to the potential for impacts. For example, biological issues is a wide-reaching subject area because it encompasses all of San Francisco Bay's local environments, which can be varied. The evaluation does not include a complete inventory of biological resources present in the Bay but does provide information to characterize those resources. Regional types of habitats and species are described, and those that are of most concern to potential ferry system expansion are described and evaluated. Cumulative impacts are discussed in Section 4.3.

Based on California Environmental Quality Act (CEQA) Guidelines (Section 15125), assessment of potential impacts should be conducted against a baseline consisting of existing environmental conditions. The purpose of this comparison is to isolate and identify specific impacts that could occur as a result of the Proposed Project. For this EIR, the alternatives included a "No Project" Alternative that reflects future conditions if none of the other alternatives were implemented. For this alternative, although the WTA project would not be implemented, other ferry service expansion, as well as increases in other vessel traffic and vehicular traffic, would continue.

For the majority of the technical sections presented in this section, potential impacts are evaluated against the existing environmental conditions, which are equivalent to the No Project Alternative. For Air Quality (Section 3.6), Transportation (3.12), and Energy (Section 3.13), however, the analyses include projections for both the Proposed Project and the No Project Alternative. For these three issue areas, comparison of future (year 2025) levels of travel against existing conditions is not a useful evaluation as it would not show whether the project improves or impacts regional travel patterns, and consequently regional air quality emissions and energy consumption. (The study year 2025 was chosen because it is consistent with Bay Area planning horizon years used to represent "buildout" of the regional transportation system). Therefore, these sections include analysis of potential impacts compared to the No Project Alternative for the same study year.

3.1 DREDGING

The San Francisco Bay Estuary System (Estuary) is the largest estuary along the Pacific Coast of North and South America. Waters from the Sacramento and San Joaquin River systems and the Bay flow through a single opening at the Golden Gate, which is less than 1 mile wide at its narrowest point. While the Bay is extremely deep at the Golden Gate (110 meters, or 356 feet), approximately two-thirds of the Bay is less than 5.5 meters (18 feet) deep. The Bay bottom in shallower areas is covered with silt, sand, and clay that have been carried from tributaries, recirculated in the Bay, and eventually deposited. The San Francisco Estuary Project (SFEP 1992) estimated that 286 million cubic yards (mcy) of previously deposited bottom sediments are resuspended and redistributed annually by currents and wind-driven waves.

To maintain navigational depths within the Bay, dredging is required from channels, harbors, and marinas. Each year between 3 and 5 mcy of sediment are dredged from such locations and deposited at permitted disposal sites in the Bay. The shallow areas of the Bay also constrain navigational movement. For example, the water depths near the refineries in Contra Costa and Solano Counties are too shallow to safely accommodate larger oil tankers. These tankers must transfer oil to smaller tankers or barges to move their cargo to the shallower marine terminals.

Dredging and disposal of sediment directly affects the environmental health of San Francisco Bay. Some contaminants adsorb to specific sediment types, making contaminant movement largely dependent on sediment movement. Processes that govern natural sediment movement also affect the distribution of wetlands, a crucial habitat.

This section provides an overview of dredging and disposal in the Bay and discusses their importance from environmental and regulatory perspectives.

3.1.1 Environmental Setting

3.1.1.1 Study Area

The study area for dredging and dredge disposal impacts encompasses jurisdictions of nine Bay Area counties. It comprises San Francisco Bay and its embayments as well as the Carquinez Strait and Suisun Bay to Antioch at the San Joaquin River. Also included are the portion of the Pacific Ocean along the shoreline from Half Moon Bay to the entrance of San Francisco Bay at the Golden Gate and the route to the San Francisco Deep Ocean Disposal Site (SF-DODS) (Figure 3.1.1).

Sediment Sources

The Estuary has two distinct hydrographic regimes: the South Bay, which extends from the Bay Bridge to the southern terminus of the Bay in San Jose, and the Central and North Bays, which connect the Sacramento-San Joaquin River Delta (Delta) and the ocean.

The South Bay is characterized by large areas of broad shallows that are incised by a main channel 10 to 20 meters deep. Bottom sediments are typically composed of clays and silts (Thompson et al. 1981), with silts containing sand and shell fragments in the eastern shallow areas (Nichols and Thompson 1985). The North Bay consists of several small embayments, the two largest being San Pablo Bay and Suisun Bay. The embayments are connected to each other

and the ocean by deep, narrow channels ranging from 13 meters deep in San Pablo Bay to over 110 meters deep at the Golden Gate. The shallower regions of San Pablo and Suisun Bays consist of mudflats primarily composed of poorly sorted silt and clay. Bottom sediments in deeper waters are sand and silty sand (Conomos and Peterson 1977).

The Delta is the largest source of sediment load entering the Bay and contributes about 86 percent of the total fluvial sediment supply (Krone 1996). The remaining sediment is contributed from local tributaries. Most of the sediment entering the Bay in suspension is silts and clays (Conomos and Peterson 1977). The bathymetry of the Bay changes with time as a result of erosion and deposition of sediment, which can be characterized by its grain-size distribution. Fine-grained sediment, which has particle sizes smaller than a few microns, is dominant in the South Bay and most parts of the Central and North Bays. It consists mainly of cohesive clays and fine silts. This cohesiveness is a main factor in the deposition, re-entrainment, and transport of sediment under waves (Mehta 1993, 1996).

Sedimentation in the Estuary is a complex process that has been affected by 150 years of human activity in the region. Changes in sedimentation patterns are related to changes in the runoff, alteration of the Bay shoreline wetlands and marshes that trap sediment, Bay filling, and sediment dredging and excavation activities.

Large amounts of sediment entered the North Bay between approximately 1853 and 1884 due to hydraulic mining in the Sierra Nevada Mountains. This sediment was resuspended by waves and transported by currents further down the Bay. Sediment entering into the North Bay also increased significantly from 1923 to 1950, indicating sediment from mining operations was continuing to impact the North Bay (Krone 1996). Beyond the movement of historic mining sediments, the Sacramento and San Joaquin Rivers continue to naturally discharge sediments. Studies conducted by the U.S. Geologic Survey (USGS) from 1957 to 1966 yielded an estimate of an annual median sediment discharge of 2.6 million tons for 1960 conditions. This 1960 sediment budget estimated that a total of 10.5 mcy of sediment entered the Bay, of which 1 mcy was dredged and disposed on land, 5.5 mcy accumulated in the Bay, and 4.0 mcy exited from the Golden Gate (Krone 1996). The California Department of Water Resources (DWR) calculated an average annual sediment inflow of 7.8 mcy between 1956 to 1990, with an annual average discharge of 5.9 mcy in 1990.

The Delta is the largest but not the only source of sediment to the Bay. Based on data from 1909 to 1966, an estimated 0.89 million tons of sediment entered Suisun, San Pablo, and San Francisco Bays each year from local tributaries (Ogden Beeman and Associates 1992).

In addition to new inputs of sediment, as many as 286 mcy of existing sediments in the shallows of San Francisco Bay are resuspended by currents and wind-driven waves. As a result, areas that have been dredged lower than the surrounding substrate begin to refill with sediment. The rate at which the dredged areas fill ranges from 0.1 to 5.2 feet per year (USACE 1990). Maintenance of design depths requires dredging. The frequency of maintenance dredging at a particular site depends on the rate at which it fills, and may vary from once a year to once a decade.

Sediment Quality

Bay sediments have been influenced by natural and anthropogenic influxes of toxic chemicals over time, with a significant increase since the 1800s, when mining and industrial activities in the Northern California watersheds became widespread. To evaluate whether sediments have

elevated levels of toxic chemicals, the San Francisco Bay Area Regional Water Quality Control Board (RWQCB) performed a statistical analysis of available sediment analytical data. The results of this study are reported in Gandesbury et al. (1998). The objective of the study was to determine what the RWQCB should consider as "ambient" levels of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), heavy metals, and pesticides in the Bay. Sediment quality is further described in Section 3.4 (Water Resources).

3.1.1.2 Dredging Activities in San Francisco Bay

Dredging activities in San Francisco Bay can be generally divided into dredging for the purpose of new projects and "maintenance" dredging, which is done on a periodic or regular basis to maintain existing facilities. The U.S. Army Corps of Engineers (USACE) San Francisco District conducts most of the dredging in San Francisco Bay.

Since 1824, USACE has planned, built, and maintained federal navigation projects in the Bay. The San Francisco Bay region has in excess of $5.4 billion of annual economic activity directly dependent on deep and shallow draft navigation channels (OGDEN BEEMAN 1990). Because over 70 percent of the Bay is shallow (less than 6 meters deep), this dredging work is extremely important to maintain required navigational depths. Recent historical annual dredge volumes have averaged 5.0 mcy. Annual maintenance of navigational channels represents the bulk of this removal. Actual maintenance dredge volumes vary from year to year and have reached up to 4.5 mcy. Recently, new work has become more important and pending new channel improvements, including the Oakland 50-foot dredging project, will call for removal of an additional 16 mcy in the coming years. The USACE San Francisco District's operation and maintenance program projects represent the most significant routine dredging in the Bay Area. Other dredging activities are conducted by both public and private marine operators, ports, refineries, and flood control and reclamation districts around the Bay.

Dredged material from navigation channels and other sources in San Francisco Bay has been historically disposed at more than three dozen sites in and around the Bay. Currently, in-Bay disposal is limited to four state and federally designated sites (see Figure 3.1.1): Carquinez Strait (SF-9), San Pablo Bay (SF-10), Suisun Bay (SF-16), and Alcatraz (SF-11)[1]. In 1982, it was discovered that dredged materials at Alcatraz, the most used site, were mounding instead of dispersing as originally planned. Despite site management changes, this mounding persisted to the point that it posed potential navigation problems. The concern regarding site capacity was heightened due to the expectation of large dredge volumes to be generated from large projects. The long-term dredging and disposal need for the Bay Area was estimated at approximately 300 mcy over a 50-year period, an average of 6 mcy per year (USACE 1998). This is a conservatively high estimate based on historical dredge volumes.

Disagreements between regulatory agencies, environmental interest groups, and dredge operators over how to address dredging and disposal needs resulted in project-by-project and agency-by-agency considerations that became known as the "mudlock," delaying permits and nearly halting dredge activities in the Bay Area during the 1980s. In 1990, the U.S. Environmental Protection Agency (USEPA), USACE, RWQCB, and Bay Conservation and Development Commission (BCDC) joined with diverse interest groups to establish the Long-Term Management Strategy

[1] Nomenclature in parentheses refers to USACE designation of disposal sites.

Program (LTMS) for the dredged material from the Bay Area (USACE 2001). The LTMS goals are to:

- Maintain in an economically and environmentally sound manner those channels necessary for navigation in San Francisco Bay;
- Eliminate unnecessary dredging activities in the Bay and Estuary;
- Conduct dredged material disposal in the most environmentally sound manner;
- Maximize the use of dredged material as a resource; and
- Establish a cooperative permitting framework for dredging and disposal applications.

3.1.1.3 Dredging Technologies

The National Shipbuilding Research Program (NSRP) Contaminated Sediment Management Guide (1999) describes several current dredge technology categories commonly used for environmental dredging. Each of these methods, summarized below, results in some suspension of sediments. The appropriateness of each method depends on site conditions, including dredged material volumes, sediment grain size, and depth of excavation.

Mechanical

Clamshells: These dredges use a two-part bucket manipulated and controlled by cables and can be used for almost all types of sediments. They have a relatively high production rate. Limitations are that large rocks or debris prevent the two halves from closing completely, they can tend to bring up large quantities of water, and there can be a significant amount of resuspension while the bucket is being lifted.

Cable-arm: This system is a variation on clamshell dredges, which is designed to increase precision and reduce material loss. They are designed to work more precisely and enclose the sediments. While this system is widely available and can be used in deep water, it is expensive and has a relatively low production rate.

Hydraulic

Conventional Excavators: These are similar to land-based excavators that use hydraulically operated arms and buckets. This method can be difficult to control the resuspension of sediments and is limited to shallow operating depths of 15 to 20 feet of water (which would be sufficient for the depth needed for ferry vessels). The use of a visor has been shown to reduce the resuspension losses.

Portable Hydraulic: Similar in operation to a vacuum cleaner, the portable hydraulic dredge creates a low pressure that siphons the sediment off the bottom. Portable systems are limited to operations involving unconsolidated sediments in relatively shallow water and can be controlled very well in such conditions. Production rates associated with this technology are fairly low.

Plain Hydraulic: Larger than portable hydraulic dredges, plain hydraulic systems operate on the same principle but can operate in much deeper water. The water to solids ratio is high and resuspension of sediments can be a problem.

Cutter Head: Cutter head systems add a mechanical device to loosen sediments to a plain hydraulic dredge. Cutter head dredges can work in a greater variety of sediments than plain hydraulic dredges and tend to have higher production rates, but they are not as widely available and are costlier to operate.

Pneumatic

Air-Lift: Air-lift systems work on the same principle as hydraulic dredges but they rely on vacuum pumps and chambers to draw sediment off the bottom. Although not as widely available as portable or plain hydraulic dredges, air-lift systems generate a slurry with a lower water to solids ratio and fewer resuspended solids. They can be more efficient at depth and have a good production rate but are relatively expensive.

Miscellaneous Technologies

A variety of innovative dredging technologies have been developed and tested. The Eriksson Sediment Systems Method for Marine Sediment Removal and Dewatering freezes the sediment and removes it in solid blocks. By freezing the sediment adjacent to that being removed, this technology releases very little sediment into the water column. The STUMP (Submersible, Transportable, Utility Marine Pump) encloses the sediment in a cylinder, loosens it with water jets, and pulls it to the surface with standard hydraulic pumps.

Several commercially available dredging mechanisms can be applied for the dredging and removal of contaminated sediments that can reduce impacts associated with the methods listed above. These techniques are referred to as "environmental dredging" and are listed in Table 3.1.1. Environmental dredging techniques have been required in areas of known sediment contamination, but can have a higher cost of operation. The methods used for any necessary dredging would be determined for each project or situation, and would depend on the appropriateness of the available environmental techniques to the specific logistic needs and conditions of contamination, depth, and sediment compaction at proposed new dredge channels.

3.1.1.4 Dredge Disposal Options

Only finer-grained materials (Bay Mud and sand) are suitable for aquatic disposal or upland reuse. Rock, coarse gravel, or materials such as concrete, steel, and other construction debris are not suitable for aquatic disposal/upland wetland reuse and must be taken to appropriate locations for disposal or recycling. Depending on volume and suitability of dredged materials, dredging projects may consider a range of reuse/disposal sites within the nine-county region. Options include:

- In-Bay disposal;
- Ocean disposal;
- Upland/wetland reuse (UWR);
- Upland landfill disposal; and
- Reuse as fill material for construction projects.

Beneficial reuse sites identified by the LTMS are shown in Figure 3.1.2. A list of sites has been compiled as part of the Dredging and Disposal Road Map (BCDC and USACE 1998). The Road

Map is a compilation of existing and planned sites identified by the BCDC and the USACE that can potentially accommodate current and potential dredged Bay materials. Table 3.1.2 summarizes the status of each of these potential sites.

Suitability for Disposal

Suitability refers to the chemical, biological, and physical properties of the sediment. Materials can be categorized as Suitable for Unconfined Aquatic Disposal (SUAD) or Not Suitable for Unconfined Aquatic Disposal (NUAD). SUAD material is chemically and biologically suitable for any reuse option and can be placed in a wide variety of locations, including in-Bay, ocean, construction, landfills, and can be used to create/restore wetlands. NUAD materials may not be biologically and/or chemically suitable for use in all environments. There are three classes of NUAD material. Category 1 material can be used in wetland creation/restoration as "noncover" material if SUAD materials are used to cap the NUAD material. NUAD Category 2 material requires additional analyses and may or may not be suitable as wetland noncover material. NUAD Category 3 material generally must be taken to appropriate landfills. Allocation of materials according to their suitability categories to appropriate disposal or reuse sites will be part of the dredging permit conditions.

In-Bay Disposal

Current annual dredge maintenance in San Francisco Bay results in disposal of between 2 and 5 mcy. Less than 3 mcy are disposed of at in-Bay disposal sites. All aquatic dredged material disposal sites are operated as dispersive sites; that is, material disposed at the sites tends to disperse and be carried by currents. Bay currents are very complex and do not necessarily transport material out to the sea. Dispersal is dependent upon material type, disposal volume, and frequency. Dredged materials are disposed of at sites downstream of the dredging sites with the intention of moving sediments away and out of the Bay, although this is only partly effective.

Alcatraz (SF-11)

The Alcatraz disposal site (SF-11) is located approximately 0.3 mile south of Alcatraz Island in central San Francisco Bay (Central Bay). The site is a circular area, approximately 2,000 feet in diameter. The site was formally designated as a sediment disposal site in 1972, although dredged material has been deposited there since 1894. Because of frequent disposal at this site, a mound developed in the 1980s, which posed a potential threat to navigation in the area. The site is actively managed by the USACE to maintain it at navigable depths. It currently has an annual limit of 3,058,104 cubic meters, or 4 mcy, with a monthly restriction of 400,000 cubic yards from October to April, and 300,000 cubic yards from May to September (USEPA and USACE 1998).

Ocean Disposal

San Francisco Deep Ocean Disposal Site (SF-DODS)

This site is located on the continental shelf, approximately 50 nautical miles west of the Golden Gate, at a depth of approximately 760 feet. This site was designated in 1994 under Section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972 (MPRSA). It can accept up to

4.8 mcy per year. MPRSA requires project sponsors to consider feasible, practicable, and environmentally superior alternatives to the use of this site if alternatives are available.

Wetland Reuse

Hamilton Wetlands Restoration

The former Hamilton Army Airfield (HAAF) is located near the City of Novato in Marin County. The site is bounded by San Pablo Bay to the east and U.S. 101 and Hamilton Base facilities to the west. The site was historically within the tidal zone of San Pablo Bay. In the 1930s, portions of the area were diked and used as a military base and airfield until the 1970s, when the base was closed. The site is currently being prepared for transfer and reuse under the Base Realignment and Closure Act of 1988. A wetlands restoration project has been proposed to restore a mix of seasonal and tidal wetlands on up to 900 acres of land, which were previously used as the airstrip for the base and an adjacent antenna field to the north (State Lands Commission parcel). The State of California is the project sponsor for the Hamilton Wetlands Restoration Project and is considering use of dredged material from a variety of sources. USACE is the federal sponsor. The Hamilton restoration project is managed by USACE, the California Coastal Conservancy (Conservancy), and the San Francisco BCDC, with the close coordination of the City of Novato, which is managing the contracts for preparation of the conceptual restoration plan, and the Hamilton Restoration Group, composed of representatives of government, business, and environmental communities.

Montezuma Restoration Project

Montezuma Wetlands is the site of a privately sponsored wetlands restoration proposal, referred to as the Montezuma Wetlands Project (MWP). The MWP would use dredged material to restore approximately 1,800 acres of historic tidal wetlands, providing habitat for a variety of sensitive species that inhabit brackish tidal marshes and shallow-water habitats. The MWP is currently being considered by federal, state, and local agencies. A Final EIR/EIS on the MWP was released for public review in July 1998 (USACE and Solano County 1998).

Upland Landfill Disposal and Reuse

Specific permit restrictions for each landfill may apply depending on the results of a waste characterization analysis, which must be performed within 1 year prior to disposal. In general, Class III landfills accept only nonhazardous materials. Class II landfills can accept nonhazardous materials in addition to designated wastes. Class I landfills can accept hazardous materials. However, Bay dredged materials have never been found to be hazardous. If dredged material is determined to be suitable for disposal at a Class III facility, then a number of potential landfill sites may be considered. The following are Class III sites that can accept nonhazardous material only:

- Vasco Road – Located in Livermore on Vasco Road off of I-580 in eastern Alameda County.
- Redwood Landfill – Located in Novato on Redwood Highway, off Highway 101 in northern Marin County.
- Newby Island – Located in Milpitas on Dixon Landing Road off I-880 in northern Santa Clara County.

- Ox Mountain – Located near Half Moon Bay on Highway 92 in San Mateo County.

The following is a Class II site that can accept nonhazardous material and designated waste:

- Altamont Landfill – Located near Altamont Pass off of Interstate 580 in eastern Alameda County.

Limitations of Upland Sites

If dredged material is taken to a landfill, the material must be dried to a moisture content of less than 50 percent by weight prior to disposal. The material cannot contain any free liquids if it is to be transported by truck. When fine-grained sediments are polluted, uncontrolled dumping in the environment must be avoided. When recycling and cleaning operations are not applicable, storage must then take place in special depots that are isolated from their surroundings. No existing sediment depots have been identified in the Bay Area as part of this EIR.

Reuse and Rehandling Facilities at Dredge Sites

Some dredging operations have associated rehandling and reuse facilities for the dredged materials in the vicinity of the dredge site. This is the case for dredging projects near two of the proposed ferry terminal locations: the San Leandro and Port Sonoma Marinas, discussed below. The Suisun City marina also has a rehandling/disposal site at Pearce Island.

San Leandro

According to the City of San Leandro Draft General Plan (City of San Leandro 2001), dredging and the disposal of dredge material are a large part of the cost of operating San Leandro Marina. The City has received federal funds for dredging since the early 1970s. The boat basin is dredged about once every 8 years, and the Maltester Channel is dredged approximately every 4 years. Dredging is authorized to a depth of 8 feet. Although the City maintains a dredge materials management site, current federal regulations stipulate that the site may be used for drying purposes only. Because the site is also managed as a tidal mudflat and provides habitat for shorebirds, its use for additional material disposal is not assured. Ongoing coordination with state and federal agencies will be necessary to develop long-range solutions for material disposal.

Port Sonoma

Dredging of the marina and channel has been conducted for approximately 20 years to maintain a depth of -7 feet using 10- to 12-inch suction dredges. The dredge permit allows up to an annual volume of 60,000 cubic yards, but the marina typically only dredges between 30,000 and 50,000 cubic yards annually. The Port Sonoma Marina owns a reuse facility, which consists of 20 acres of dewatering ponds onsite. The marina's dredged material is placed on a 110-acre upland site, of which 43 acres are typically wetlands. Dredged material has been used for levees, landfill caps, and an agriculture enhancement project. The marina reuse site ceased taking outside dredge materials about 10 years ago (Sweetburg 2002).

3.1.1.5 Long-Term Management Strategy

The LTMS is being conducted in five separate phases:

- Phase I – Evaluation of Existing Management Options
- Phase II – LTMS Technical Studies
- Phase III – LTMS EIS/EIR
- Phase IV – Preparation and Implementation of Management Plan
- Phase V – Periodic Reviews and Revisions of the Management Plan

Phases I and II were completed between 1991 and 1992. In 1992, Phase III was initiated. The EIS/EIR evaluated five alternative long-term dredged material management strategies for the Bay, in addition to the "no action alternative," representing existing conditions. Each alternative reflected a combination of volumes of dredged material placement at the Bay, ocean, and beneficial reuse environments. Alternative 3, emphasizing placement of dredged material at upland and ocean environments (40 percent of material each) with limited in-Bay disposal (the remaining 20 percent of the material), was selected because it provided the best balance of the overall goals and objectives of the LTMS. Compared to the other alternatives, the EIS/EIR determined that Alternative 3 would result in significant environmental benefits, no direct risk to the ocean site, and only a low risk to sensitive resources at beneficial reuse areas.

In 1999, the Record of Decision (ROD) for the EIS was signed by USEPA and USACE, completing the federal requirements under the National Environmental Policy Act (NEPA). That same year, the State Water Resources Control Board (SWRCB) certified the EIR, according to California Environmental Quality Act (CEQA) requirements.

Phase IV began with the preparation of an LTMS Management Plan. An Interim Management Plan was completed in 1994 and replaced in 2000 by a Management Plan, which contains specific guidance to implement the new dredged material management strategy for the Bay Area over the next 50 years. The overall policy for dredging and disposal under LTMS was adopted by amendments to the RWQCB Basin Plan and BCDC Bay Plan in July 2001. These amendments reflect the complementary mandates of the two agencies. The amendments to the Bay Plan focus on the process for regulating dredging and disposal activities within BCDC's jurisdiction.

The goals of LTMS include a reduction of in-Bay disposal volumes and increased emphasis on beneficial reuse of dredged material. The most likely beneficial reuse is wetland restoration projects or levee maintenance and repair. The long-term goal is to reduce disposal at in-Bay sites to approximately 20 percent of recent historical volumes. A transition schedule with overall volume targets for in-Bay disposal has been established, as shown on Table 3.1.3.

The remainder of dredged material generated each year should be disposed of at SF-DODS or any of the existing or potential beneficial reuse and upland sites (Figure 3.1.2).

Phase V of LTMS involves periodic updating of the Management Plan. During the initial 3-year period following finalization of the Management Plan (2001-2003), LTMS agencies will produce annual progress reports. Subsequently, the Management Plan would be reviewed every 3 years and revised if necessary to reflect statutory, regulatory, technical, and environmental changes.

Dredged Material Management Office

In 1995, the Dredged Material Management Office (DMMO) was established as a coordinated permit application review program. The purpose of the DMMO is to increase the efficiency and to reduce redundancy in the dredging permitting process. The multi-agency DMMO seeks to foster a comprehensive and consolidated approach to handling dredged material management issues. Agency members include:

- USACE;
- USEPA;
- BCDC;
- San Francisco RWQCB; and
- California State Lands Commission (SLC).

A number of resource agencies, while not formal members, participate in application review:

- California Department of Fish and Game (CDFG);
- U.S. Fish and Wildlife Service (USFWS); and
- National Marine Fisheries Service (NMFS).

Although the DMMO issues a recommendation regarding preferred dredged material management options, individual agencies must still issue specific regulatory approvals.

With the establishment of the DMMO, one of the original goals of the LTMS program was accomplished. Non-DMMO local, state, and federal agencies also have a role in permit application decision making. California law provides for local government at the city and/or county level to oversee the use of local resources through a variety of requirements for project proponents. Adherence to plans, permits, and approvals may be required for dredging activities and the use of beneficial reuse sites. Disposal at SF-DODS may also require a permit or a federal consistency determination from USEPA, which oversees consistency with the California Coastal Act outside the area of jurisdiction of the BCDC.

The DMMO is working toward improving coordination and implementation of the laws, regulations, and policies of the member agencies as part of a cooperative permitting framework. The DMMO has devised a consolidated dredging and dredge material reuse/disposal permit application form. The DMMO consolidated application may now be used by the BCDC to issue a standard 5-year permit.

While the individual member agencies continue to meet their statutory requirements, the DMMO makes joint staff reviews and recommendations regarding:

- Approval of sampling and testing plans;
- Results of testing conducted as part of approved plans;
- Completeness of consolidated permit applications; and
- Material suitability for disposal at existing in-Bay disposal sites, ocean disposal site, and upland disposal sites.

DMMO staff members make a recommendation for a given site only if their own agencies have regulatory authority over that site. Different regulatory agency requirements apply to disposal permits for in-Bay and deep-ocean sites. Permitted upland wetland reuse/disposal and upland landfill disposal sites have their own individual regulatory requirements, which are the responsibility of the site operators and not of the dredger.

3.1.1.6 Current USACE Dredge Projects in San Francisco Bay

A number of ongoing dredging projects are underway in the Bay Area. These activities include dredging of channels that are currently used by ferry vessels. These projects are briefly discussed below.

Navigation Projects

Oakland Harbor Deepening

Sponsor: Port of Oakland

Status: Deepening of the harbor to -42 feet mean lower low water (MLLW) was completed in 1998. A feasibility study and an EIS/EIR for deepening the harbor to -50 feet MLLW was completed in 1999. This project was initiated in 2001.

Richmond Harbor Deepening

Sponsor: Port of Richmond and USACE

Status: The existing channel has been deepened to -38 feet MLLW. Further deepening to -41 feet is authorized and may be scheduled according to sponsors' needs.

San Francisco Bay to Stockton

Sponsor: Contra Costa County

Status: Two phases of this project have already been implemented. Implementation of an additional phase, consisting of deepening the main channel in Suisun Bay to -45 feet MLLW, and providing a maneuvering area for a petroleum terminal and a turning basin at Avon, is delayed pending analysis of environmental impact concerns to the Delta.

Southampton Shoal Channel

Sponsor: Contra Costa County is a prospective sponsor

Status: The channel is the entrance to Richmond Harbor and the Richmond Longwharf Maneuvering Area. It is currently maintained at a depth of -45 feet MLLW. A study, dependent on funding availability, will address the potential improvements to channel alignment and depth for more efficient navigation.

Mare Island Strait Dredging Expansion

Sponsor: U.S. Navy

Status: The channel has never been dredged to its fully authorized width. USACE maintained the channel to a depth of -36 feet MLLW until 1995, when the U.S. Navy announced that the

channel was no longer needed for naval operations. Once a redevelopment plan for the Mare Island facility is prepared, dredging needs may be reevaluated.

Concord Naval Weapons Station Channel Deepening

Sponsor: TRANSCOM Military Command

Status: USACE has been tasked with the evaluation and potential construction of a deep draft navigation channel (-42 feet MLLW) to accommodate the current and future fleet of container ships. Design and construction are contingent upon modeling results and testing to determine impacts.

Operations and Maintenance Projects

Oakland Harbor

Sponsor: Port of Oakland

Status: Maintenance is scheduled on an annual basis and includes entrances to Inner Harbor, Outer Harbor, turning basin, and channels to Howard Terminal, Government Island, and San Leandro Bay. Deepening of Outer and Inner Harbors to -42 feet was completed in 1998, and deepening to -50 feet was scheduled for Fiscal Year 2001.

San Francisco Harbor

Sponsor: USACE. This is 100 percent federally maintained, because no local sponsor has been identified.

Status: The project provides for maintenance of various channels in San Francisco Bay, including annual dredging of the 2,000-foot-wide Main Ship Channel to -55 feet MLLW; dredging at Presidio Shoal, Black Point Shoal, Blossom Rock, Rincon Reef, and Alcatraz Shoal to -40 feet MLLW; dredging at Arch Rock, Harding Rock, Shag Rocks, Point Stuart Light and an approach to Islais Creek to -35 feet MLLW; and a 10-foot-deep channel at San Francisco Airport.

San Leandro Marina

Sponsor: City of San Leandro

Status: Operation and maintenance project of the Jack Maltester Channel, a shallow-draft light commercial and recreational channel, provides for 4-year cycle maintenance of Main Access and Interior Auxiliary Channels to -6 and -7 feet MLLW, respectively. The sponsor is responsible for providing a suitable upland disposal site.

San Pablo Bay and Mare Island Strait

Sponsor: City of Vallejo (formerly U.S. Navy property)

Status: The project provides for dredging of a 600-foot-wide, 11-mile-long channel to -35 feet MLLW in San Pablo Bay (across Pinole Shoal), and through Mare Island Strait, with a turning basin between Mare Island and Vallejo. The Pinole Shoal channel is dredged every 2 years. Mare Island Strait was dredged annually until 1994. With the closing of the Navy's facility in 1995, the center of the channel (400 feet) is the only portion of the Mare Island Strait Channel

economically justifiable for maintenance dredging. Because the channels are needed now for recreational and commercial uses only, existing depths are more than sufficient and maintenance dredging frequency has been reduced.

Suisun Bay Channel

Sponsor: USACE. This is 100 percent federally maintained, because no local sponsor has been identified.

Status: Suisun Bay is dredged annually to maintain a channel 300 feet wide and -35 feet deep from the Carquinez Strait at Martinez to Pittsburg. Under this project, the dredging continues further upstream to Antioch through the New York Slough Channel, which is dredged every 4 years.

Suisun Channel

Sponsor: City of Suisun

Status: The project provides an entrance channel to the head of navigation at the City of Suisun that is -8 feet, with widths between 100 and 200 feet. Upland disposal options to accommodate materials for the last dredging cycle were not found.

Petaluma River

Sponsor: City of Petaluma

Status: This project provides for maintenance dredging of a channel 200 feet wide and -8 feet deep across the flats in San Pablo Bay to the mouth of the Petaluma River, and then 100 feet wide along the river to Petaluma. The City of Petaluma has requested USACE to conduct river surveys every 2 years to determine shoaling conditions that may warrant dredging.

San Rafael Creek

Sponsor: City of San Rafael

Status: This project is a shallow draft channel for light commercial and recreational uses. The maintenance project includes two dredge sections: the Across-the-Flats Channel dredged to -8 feet MLLW every 7 years, and the Inner Canal Channel dredged to -6 feet MLLW every 4 years. The City of San Rafael has been unable to provide adequate upland disposal for material located at the upper Turning Basin, which is unsuitable for unconfined aquatic disposal. Therefore, this area has not been dredged according to the maintenance cycle.

Larkspur Ferry Channel

Sponsor: Golden Gate Highway and Transportation District, which provides ferryboat transit service between Marin County and San Francisco.

Status: This project has a design of -13 feet MLLW depth for the main navigation channel, and -5 feet MLLW for the Terminal Turning Basin. USACE assumed maintenance responsibility under the 1986 and 1999 Water Resources Development Acts. The channel was last dredged in 2002 and will also occur in 2003.

Redwood City

Sponsor: Redwood City

Status: The federal channel is authorized to be dredged to -30 feet on a 3-year maintenance cycle.

In addition to USACE-maintained dredging projects, there are numerous small- and medium-sized dredge operations in San Francisco Bay that do not require USACE involvement except for permitting. "Small dredgers" are considered those with project depth of less than 12 feet and annual volume of 50,000 cubic yards. Medium dredgers are those non-USACE projects exceeding the depth or volume limits of the small dredger category. The total and average annual dredged volumes for the period from 1991 through 1999 that have been disposed of at in-Bay disposal sites for all the dredger categories in San Francisco Bay are presented in Table 3.1.4.

3.1.1.7 Regulatory Setting

Regulatory requirements applicable to dredging and dredged material disposal/reuse are presented in the following sections and summarized in Table 3.1.5. Section 3.5 (Biology) presents additional regulations that apply to dredging impacts.

Federal

Clean Water Act (33 USC 1251–1376)

Section 401. In accordance with Section 401 of the Clean Water Act (CWA), dredging permit applicants intending to dispose material in water must obtain water quality certification from the State of California through the RWQCB with jurisdiction over the project area. The RWQCB, after reviewing the project, may recommend to the SWRCB that certification be granted or denied.

Dredged material considered for disposal in water must be tested to determine disposal suitability. Authority to determine suitability is exercised by the state under Section 401 of the CWA. The RWQCB defined its testing guidelines for wetland and upland beneficial reuse of dredged material in *Interim Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Use* (Wolfenden and Carlin 1992). Those guidelines have been superceded by the Draft Staff Report *Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines* (RWQCB 2000).

Section 404. Dredged material disposal is regulated pursuant to Section 404 of the CWA, which requires authorization from the Secretary of the Army, acting through USACE, for the discharge of dredged or fill material into all waters of the United States, including wetlands. The USACE is mandated to protect and maintain navigable capacity of the nation's waters under 33 Code of Federal Regulations (CFR), Navigation and Navigable Waters. Section 33 CFR requires the USACE to issue permits for dredging and placement of dredged or fill material into the waters of the U.S. (Part 323), and for ocean dumping of dredged material (Part 324).

Dredging material for disposal at aquatic sites must undergo testing to determine its potential effects on the disposal site environment. Testing is also used to determine whether dredged material is suitable for unconfined aquatic disposal (SUAD). For disposal sites in or potentially

affecting inland waters, such as San Francisco Bay, testing requirements are defined by Section 404 of CWA. Guidance for suitability testing procedures for inland waters is provided by the *Evaluation of Dredged Material for Discharge in Inland and Near Coastal Waters – Testing Manual,* also called Inland Testing Manual or ITM (USEPA/USACE 1998). For ocean disposal sites, suitability requirements are defined by 40 CFR 227.6. Guidance for suitability testing is provided by the *Evaluation of Dredged Material Proposed for Ocean Disposal – Testing Manual,* also known as the Green Book (USEPA and USACE 1991).

Rivers and Harbors Act of 1899 (33 USC 401 et seq.)

The Rivers and Harbors Act of 1899 (33 USC 401 et seq.) regulates development and use of the nation's navigable waterways. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters, and vests regulatory authority in the Secretary of the Army, acting through the USACE, for work in, under or over any navigable water of the U.S. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States.

Marine Protection, Research, and Sanctuaries Act of 1972 (16 USC 1431 et seq.)

Section 103 of the MPRSA, as amended, requires authorization from the Secretary of the Army, acting through the USACE, for the transportation of dredged material for the purpose of ocean disposal. The USEPA is charged with providing oversight of the USACE's regulatory program and maintaining the integrity of the nation's waters. USEPA has responsibility for designating ocean disposal sites. According to the MPRSA, the USEPA oversees disposal of materials into ocean waters and must provide written concurrence before material can be disposed in the ocean.

State

Water Quality Control Act (Porter-Cologne Act) (California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15)

Under the California Water Quality Control Act (Porter-Cologne Act), the RWQCB may also act by either issuing or waiving waste discharge requirements for the dredging project for upland disposal of dredged material. These actions by the RWQCB are not equivalent to issuing or waiving water quality certification. The RWQCB must issue a separate 401 Certification.

State Lands Commission (Public Resources Code Section 6001 et seq.)

Projects involving use of state lands may require lease or permitting from the SLC, which is charged with managing California's sovereign lands for purposes consistent with the public trust.

Local

McAteer-Petris Act (Public Resources Code Section 66600 et seq.)

The BCDC regulates dredging and disposal under the provisions of the McAteer-Petris Act. BCDC, on the basis of the Suisun Marsh Preservation Act of 1977 (Public Resources Code Section 29000-29612) and the Federal Coastal Zone Management Act (CZMA) (33 USC 1451 et seq.), is mandated to reduce Bay fill and to protect and manage the coastal zone resources of San Francisco Bay. The BCDC's jurisdiction includes the Bay and a 100-foot shoreline band, salt

ponds, managed wetlands, tidal marshes five feet above mean sea level, and certain named tributary waterways, such as rivers. According to the Bay Plan, BCDC can authorize dredging when it can be demonstrated that the dredging is needed to serve a water-oriented use or other important public purpose, the materials to be dredged meet the water quality requirements of the RWQCB, important fisheries and natural resources would be protected through seasonal restrictions established by CDFG, USFWS and/or NMFS, dredging is minimized through project siting and design, and the materials would, if feasible, be reused or disposed outside the Bay and certain waterways. The amendments to the Basin Plan focus on regulating the known and potential impacts to water quality, and beneficial uses of those waters by disposal activities.

3.1.2 Impacts and Mitigation

3.1.2.1 Significance Criteria

Impacts from dredging would be considered significant if they would:

- Result in a substantial adverse impact on water quality;
- Affect threatened, endangered, or protected species in a manner that results in a take under the Endangered Species Act; or
- Result in the reduction of protected wetland habitat as defined in Section 404 of the Clean Water Act or result in alteration of desirable functions and values established in applicable regulations through direct removal, filling, hydrological interruption, or other means; or
- Hinder achievement of Long Term Management Strategy (LTMS) goals for allocation of dredged materials to in-Bay, ocean, and upland reuse sites.

Potential impacts to habitats due to dredging are addressed in Section 3.5.2.2 (Biology).

3.1.2.2 Impacts

Construction and Operation (Maintenance Dredging)

Impact D-1: **New channel dredging and maintenance dredging, which would be conducted on a periodic basis in shallow areas, would add to the total annual volume of dredged materials in San Francisco Bay.**

A relatively small amount of dredging would be required for implementation of the Proposed Project. Of the sixteen ferry terminal locations included, seven currently have ferry service and would, therefore, not require additional dredging. All but one of the nine new terminal locations (Hercules/Rodeo) already have port or maritime land uses at the site and have water depths, either naturally or through maintenance dredging, capable of accommodating ferries. Ferries have relatively low draft requirements (approximately 7 feet) and would not require channels deeper than those at existing marinas and ports. Therefore, new channel dredging would only be required at Hercules/Rodeo. At other locations, retrofitting of existing piers or expansion of existing terminals could require additional minor amounts of dredging.

Dredging in San Francisco Bay currently includes dredging for new projects and maintenance dredging for existing navigational channels. USACE San Francisco District conducts most of the

dredging in the Bay. The long-term dredging and disposal need for the Bay Area is estimated as approximately 300 mcy over a 50-year period, or an average of 6 mcy per year (USACE 1998a). This is a conservatively high estimate based on historic dredge volumes as well as on proposed projects foreseen during the period of LTMS EIR/EIS preparation. Some of the new projects included in the estimates, such as a round-the-bay channel, have since been eliminated from consideration. Dredge volume varies greatly from year to year, depending on new projects as well as the level of dredging maintenance required, which appears to have declined in recent years. In 2001, for example, total dredging and disposal in the Bay Area was only 2.0 mcy according to USACE data (Dwinell 2002). Dredge materials disposal sites are shown on Figure 3.1.1.

The goals of the LTMS include a reduction of in-Bay disposal volumes and increased emphasis on beneficial reuse of dredged material. The most likely beneficial reuses are wetland restoration and levee maintenance and repair. The long-term goal is to reduce disposal at in-Bay sites from approximately 50 percent of recent dredged volumes to approximately 20 percent by the year 2013. Volume targets have been established for each in-Bay disposal site, based on sediment-dispersive dynamics and historical information (USACE 1998b). A transition schedule with overall volume targets for in-Bay disposal has been established, as shown on Table 3.1.3. In addition to the target volumes, the LTMS contemplates a contingency volume of 0.25 mcy per year, which would be allowed for emergency situations or for years when sedimentation or other factors result in unanticipated volumes of deposited sediment to be dredged. The remainder of dredged material generated each year should be disposed of at the San Francisco Deep Ocean Disposal Site (SF-DODS) or at any of the existing or potential beneficial reuse and upland sites (Figure 3.1.2).

Figure 3.1.3 presents a Geographic Information System (GIS) map of San Francisco Bay showing the bathymetry and the proposed WTA ferry routes for the Proposed Project. The potential dredge volume was calculated by delineating three-dimensional segments on a GIS map. These segments were defined to allow safe passage of ferries; they include a buffer zone 300 feet wide (150 feet to each side of the center line to enable two vessels to pass with sufficient separation) and depth of 7 feet, which is conservative for ferry navigation (i.e., 5 feet maximum navigational draft and 2 feet of required keel clearance). The depth to be dredged was derived from bathymetric data.[2]

As indicated, only the Hercules/Rodeo site would require construction dredging. The required volume is approximately 49,830 cy. This potential construction dredging volume is very small when compared to current dredging activities in the Bay; it would represent 0.08 percent of the Bay Area's long-term annual new and maintenance dredging requirements of 6.0 mcy estimated in the LTMS.

In addition to construction dredging, the channel at Hercules/Rodeo would likely require maintenance dredging. Although the long-term dredging maintenance requirements cannot be determined without location-specific sedimentation rates and hydrodynamic conditions, it is

[2] The GIS map was developed using NOAA National Ocean Service Bathymetric Digital Elevation Models (DEM) that were generated from original point soundings collected during hydrographic surveys conducted by the National Ocean Service and its predecessors. Mean High Water shoreline as defined by NOAA nautical charts was used as a constraining boundary and assigned its local elevation relative to the local datum (typically Mean Low Water) (NOAA-National Ocean Service 1998).

reasonable to assume that maintenance dredge volumes would not exceed the construction dredging volumes, and would likely recur on 3- to 8-year periods, as is the case for other channels in the Bay. This volume is very small in comparison with the total average volume of 4.5 mcy dredged for annual maintenance of USACE channels in the Bay. Since the LTMS estimate of 6.0 mcy is conservatively high and includes dredged volumes for projects that are no longer planned, such as proposed tourism navigation channel ring around the Bay, volumes generated by the WTA ferry expansion should not result in the average annual estimate being significantly exceeded in the long term.

The LTMS dictates that by the year 2013 only 20 percent of the annual volume of dredged material may be disposed of at in-Bay disposal sites. The LTMS goals are based on historical information and sediment-dispersive dynamics (USACE 1998b). In-Bay sites are generally reserved for disposal of USACE maintenance dredging materials. Therefore, during project implementation, WTA would have to ensure that new ferry channel dredged materials could be accommodated at either the ocean disposal site or at beneficial reuse sites while observing annual and/or total capacity restrictions at those sites. Alternatively, the small volume of dredge materials could be disposed of at an upland disposal site.

Consultation with the DMMO and associated permitting agencies will be required before proceeding with dredging and disposal plans in order to comply with regulatory requirements. At that time, DMMO will advise on available opportunities for the creation of new upland and wetland reuse areas for disposal of dredged materials associated with the proposed ferry routes. Fostering such opportunities would facilitate achievement of LTMS goals for reduction of in-Bay disposal. Potential beneficial dredged sediment reuse sites have been identified throughout the Bay Area by the LTMS (Figure 3.1.2). Those sites and other sites that may be eventually identified should be evaluated in terms of logistics, availability, and capacity to accommodate the disposal needs of the WTA ferry expansion.

In-Bay dredge disposal will be restricted by permit conditions for each individual project and is expected to be minimal. The LTMS target for the amount of annual in-Bay disposal will vary with respect to when the disposal would occur, based on other scheduled or proposed dredging projects.

Summary of Impact D-1

- The Proposed Project involves expansion of ferry service to new terminals. Construction dredging of approximately 49,830 cy could be required. The construction dredging would represent approximately 0.08 percent of the dredging activities occurring in the Bay. Because the volumes of dredged materials required for construction and maintenance of new channels are relatively small for the Proposed Project, and they would be within the LTMS goals for reduction of in-Bay disposal, impacts are anticipated to be less than significant. In addition, implementation of Best Management Practices (BMPs) described in Impact D-2 would minimize water quality impacts from dredging. However, consultation with the DMMO and associated permitting agencies would be required before proceeding with dredging and disposal plans in order to comply with regulatory requirements.

Impact D-2 **Dredging of new channels to accommodate expanded ferry service could locally reduce water quality by exposing and suspending contaminated sediment.**

Bay sediments have been influenced by natural and anthropogenic influxes of toxic chemicals over time, with a significant increase since the 1800s, when mining and industrial activities in Northern California watersheds became widespread. Dredging and the disposal of sediments directly affect the health of the Bay because these activities can remobilize previously deposited particulate-bound pollutants. For this reason regulatory controls greatly restrict new activities that might require dredging.

Contaminated sediments are not distributed evenly in the Bay, but tend to be in localized areas. Trace metals, pesticides, and numerous organic contaminants are monitored for Bay sediments through the Regional Monitoring Program (RMP). Pollutant concentrations in sediments tend to be highest in harbors, harbor entrances, marinas, and industrial waterways, and lowest in the central portions of the embayments.

Sediment "toxic hot spots", where sediment dredging could result in the degradation of water quality, have been identified in San Francisco Bay by the Bay Protection and Toxic Cleanup Program (BPTCP) and are shown on Figure 3.1.4. For the Proposed Project, only one terminal location, Hercules/Rodeo, would require construction dredging. As indicated on Figure 3.1.4, no known toxic hot spots are located near this area; however, unknown contaminated sediment could be present. In addition, retrofitting of existing piers or expansion of existing terminals could require dredging at other locations. Before dredging, proposed bottom sediments would have to be sampled and tested for contamination in accordance with DMMO guidelines.

If impacted sediments are to be dredged, precautions to prevent release of contamination must be taken. The National Shipbuilding Research Program (NSRP) Contaminated Sediment Management Guide (1999) describes several commercially available dredging technologies commonly used for environmental dredging (listed in Table 3.1.1). Environmental dredging techniques have been required in areas of known sediment contamination, but can have a higher cost of operation. The methods used for any dredging would be determined for each project or situation. Which methods are used would depend on the appropriateness of the available environmental techniques to the specific logistic needs and conditions of contamination, depth, and sediment compaction at proposed new dredge channels.

All methods result in some suspension of sediments. However, dredging impacts to water quality can be minimized through the use of BMPs, including:

- Use of silt curtains, which prevent suspended sediment from migrating out of the immediate project area;
- Dredging only on the incoming tide;
- Hydraulic or closed clamshell dredging to reduce the generation of suspended sediments;
- Shunting, which involves pumping of the free water in a sediment holding barge to the bottom of the water body, which reduces turbidity; and
- Employment of an independent, certified, on-board dredging inspector to ensure compliance with permit conditions.

Monitoring should be conducted during dredging to allow for the following:

- Measurement of the efficiency of contaminated sediment removal;
- Determination of dredged volumes;
- Measurement of sediment resuspension at the dredge site; and
- Checking performance of barriers and other controls.

These are commonly used BMPs that have been accepted by the RWQCB as significantly reducing the impacts to water quality from sediment resuspension. A Section 401 Water Quality Certification is required from the RWQCB under the Clean Water Act for dredging permits.

As part of the DMMO dredging permit requirements, proposed dredging locations are required to be sampled and tested to determine the existence and extent of any contamination and to determine suitability for disposal. Suitability refers to the chemical, biological, and physical properties of the sediment. As described in Section 3.1.1.4, materials can be categorized as SUAD or NUAD. SUAD material is chemically and biologically suitable for any reuse option and can be placed in a wide variety of locations, including in-Bay, ocean, construction, and landfills, and can be used to create wetlands. NUAD materials may not be biologically and/or chemically suitable for use in all environments. There are three classes of NUAD material. Category 1 material can be used in wetland creation as "noncover" material if SUAD materials are used to cap the NUAD material. NUAD Category 2 material requires additional analyses and may or may not be suitable as wetland noncover material. NUAD Category 3 material generally must be taken to appropriate landfills.

Summary of Impact D-2

- The Proposed Project would require construction dredging at Hercules/Rodeo. While no known contamination is present at this location, the sediments to be dredged could be contaminated. In addition, retrofitting of existing piers or expansion of existing terminals could require dredging at other locations. If proposed channel bottom sediments are found to be contaminated after pre-dredging testing, a potentially significant impact to water quality could occur if contaminants were substantially resuspended or contaminated dredged material were not disposed of properly.

Mitigation D-2.1: Dredging shall be minimized. For dredging that is required, as part of the DMMO dredging permit requirements, proposed dredging locations shall be sampled and tested to determine the existence and extent of any contamination. Whenever contaminated materials are to be dredged, negative impacts on water quality shall be minimized through the use of the most appropriate dredge type and dredging techniques for each site. Engineering included in the plans and permits for dredging projects shall include the use of BMPs described above to reduce potential impacts to less than significant levels.

The DMMO permit requirements also include a Section 401 Water Quality Certification from the RWQCB, which will require implementation of appropriate BMPs if they are necessary to protect water quality. Individual project proponents shall incorporate appropriate BMPs for dredging plans and specifications.

Impact After Mitigation: Impact D-2 would be less than significant after implementation of Mitigation Measure D-2.1.

Impact D-3 **There is a possibility that dredging new channels could remove bottom sediments that could result in a salinity intrusion into groundwater basins.**

Maintaining groundwater quality is of concern near ferry terminals or where dredging could impact a groundwater basin's water quality. Groundwater quality can be degraded through the intrusion of saltwater. Saltwater intrusion would reduce the groundwater basin yield, diminishing production from existing activities and limiting future groundwater development. Deep dredging of Bay mud could strip the "cover" from the top of a freshwater reservoir under the Bay, allowing the saltwater to contaminate the fresh water, or allowing fresh water (if artesian) to escape in large quantities, thus causing land to sink. However, the precise location of groundwater reservoirs under the Bay is not well known. Dredging Policy 9 of the Amendments to the Bay Plan, found in Chapter 10 of the Final LTMS, specifies that "to protect fresh water reservoirs (aquifers): (a) all proposals for the dredging or construction work that could penetrate the mud 'cover' should be reviewed by the San Francisco Bay Regional Water Quality Control Board and the State Department of Water Resources; and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should provide additional data on groundwater conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project" (USACE 2001).

With the exception of terminals proposed in the San Francisco and Oakland Bay front areas, where groundwater is not used as a fresh water reservoir since it is not considered fit for consumption, other future dredging may be required in the vicinity of aquifers that are subject to protection. The only terminal that would require construction dredging is Hercules/Rodeo. Retrofitting of existing piers or expansion of existing terminals could also require dredging at other locations. Dredging for the purpose of terminal access would not be sufficiently deep to strip the freshwater reservoir cover. Furthermore, in most cases, dredging would be used to rehabilitate former dredged channels. However, following DMMO procedures, WTA may be required to document aquifer depth and conditions at proposed terminal locations.

Summary of Impact D-3

- The Proposed Project could require channel dredging in areas underlain by freshwater aquifers. Dredging would not extend to depths where protective layers may be damaged. The maximum dredging depth would be approximately -7 feet Mean Lower Low Water (MLLW), which is well above the top elevations of known aquifers (see Water Resources Section 3.4.1.6). Groundwater pollution is not expected to occur as a result of dredging. This would be a less than significant impact. Therefore, no mitigation is required.

Impact D-4 **Dredging activities could adversely impact threatened, endangered, or protected species.**

Dredging and the disposal of dredged material temporarily increases turbidity, which could influence bottom-feeding organisms at and near dredge and disposal sites, and may affect the behavior and physiology of fish and other organisms. Temporarily increased suspended sediment concentrations are an unavoidable consequence of dredging and disposal of dredged

material. During dredging, sediments are suspended as material is excavated from the bottom. Clamshell dredges also release sediments into the water column as the bucket is raised from the bottom, and hopper dredges release suspended sediments during barge dewatering. Regardless of the dredging method, the aquatic disposal of material increases suspended sediment concentrations at the disposal site. Increased turbidity can cause acute and chronic effects in adult fishes. Direct mortality results from impaired oxygen exchange caused by the laceration, irritation, or clogging of the gills. Even if exposed to suspended sediment concentrations found adjacent to disposal barges or in the water column immediately following disposal, fish would have to be exposed for several hours in order for death to occur. Plumes of highly concentrated suspended solids last only for minutes.

Construction dredging for the Proposed Project would be limited to Hercules/Rodeo. As shown on Figure 3.1.5, this location is not included as an area requiring restricted dredging for species of special concern. However, consultation with the CDFG and/or site specific studies could be required as verification.

At other locations, retrofitting of existing piers or expansion of existing terminals could require additional dredging in areas where dredging is restricted. Potential impacts to endangered species at these locations will require reviews and concurrence by federal and state agencies.

Summary of Impact D-4

- The Proposed Project requires dredging at Hercules/Rodeo. This location does not appear to be a restricted dredging area for special status species. However, proposed dredging activities will require review by the DMMO to determine whether impacts to special status species could occur. At other locations, retrofitting of existing piers or expansion of existing terminals could require additional dredging in areas where dredging is restricted. Potential impacts to endangered species at these locations will require reviews and concurrence by federal and state agencies. Dredging could be a potentially significant impact on species of concern.

Mitigation D-4.1: Negative impacts on threatened, endangered, or protected species shall be minimized through use of dredge types and techniques and implementation of BMPs. BMPs could include use of silt curtains and adhering to dredge windows for special status species. Use of BMPs and appropriate dredging techniques will be part of the DMMO recommendation and incorporated as conditions for regulatory approval of the permit application.

Mitigation D-4.2: Individual projects would undergo consultation with the resource agencies. Several mitigation measures have been utilized in previous projects to reduce or avoid impacts to biological resources related to dredging operations. These include the use of physical barriers such as silt curtains to contain the turbidity plume; selection of dredging equipment to reduce suspension of materials; and, if construction sequencing permits, restricting dredging in shallow water to between June 1 and November 30.

During the preparation of the LTMS EIS/EIR, the LTMS agencies consulted with USFWS, NMFS, and the CDFG regarding potential impacts of dredging and dredged material disposal on sensitive biological resources. These resource agencies, in conjunction with LTMS agencies, developed a list of restrictions specific to San Francisco Bay to protect critical habitat for special status and important commercial and recreational species. Figure 3.1.5 shows areas and times of

restricted dredging activity related to these species. Dredging shall be conducted in conformance to applicable seasonal restrictions to minimize impacts to biological resources.

Impact After Mitigation: Impact D-4 would be reduced after implementation of Mitigations D-4.1 and D-4.2. Implementation of site-specific mitigation measures at the project level would further reduce Impact D-4 to a less than significant level.

Impact D-5 **Dredging for construction of access channels to new ferry terminals could result in the loss or disturbance of jurisdictional wetlands.**

Dredging of new access channels would be conducted for the Proposed Project only at Hercules/Rodeo. This impact is addressed in Section 3.5.2.2 (Biology), Impact B-1.

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Table 3.1.1
Commercial Environmental Dredging Technologies

Mechanism	Capability
Specialized clamshell	Large or small volumes; high precision; low loss, depth limited by need for divers and visibility
Mechanical shovel with sliding cover (visor)	Small or large volumes; resuspension control with visor; sensitive to debris; limited to shallow sites
Hydraulic dredge	Moderate volumes; rake to remove debris; good precision; 8-meter depth
Air-suction	Small to large volumes; screens to operate with debris; depth to 8 meters; good precision
Suction dredge	Small volumes; debris sensitive

Table 3.1.2
Applicability of Regulatory Requirements to Dredge, Disposal and Reuse Options

	Section 404	Section 401	MPRSA	CZMA	McAteer-Petris Act	Porter Cologne	California Public Resources Code
Dredge Operations	N/A	Certification required of applicant	N/A	BCDC consistency required of applicant	BCDC permit required of applicant	N/A	State Lands Commission lease/ Determination required of applicant under various provisions of the Code
In-Bay Disposal	404(b)(1) Guidelines compliance required of applicant	Certification	N/A	BCDC consistency required of applicant	BCDC permit required of applicant	N/A	N/A
Ocean Disposal	N/A	N/A	Section 103 compliance required of applicant	N/A		N/A	N/A
Upland Wetland Reuse	Guideline compliance, if existing site is jurisdictional or decant to water of U.S. Permit required of site operator	Certification required of site operator, if existing site is jurisdictional or decant to water of U.S.	N/A	BCDC permit may be required of applicant	BCDC permit may be required of applicant	Discharge permit required of applicant because of potential impacts to groundwater	N/A
Upland Landfills	N/A	Certification required of fill operator	N/A	N/A		Discharge permit required of applicant if dewatering	N/A

Source: Draft LTMS Management Plan 2000
Note: MPRSA= Marine Protection, Research, and Sanctuaries Act, CZMA= Coastal Zone Management Act

Table 3.1.3
LTMS Transition Volume Targets for In-Bay Disposal

Years	Target Volume (mcy)
2001-2003	2.80
2004-2006	2.41
2007-2010	2.03
2010-2013	1.64
After 2013	1.25

Table 3.1.4
Total and Average Annual Maintenance Dredging Volumes (1991-1999), cubic yards

Project Category	Total Volume Dredged 1991-1999	Annual Average Volume 1991-1999
Small Dredgers	2,095,842	232,871
Medium Dredgers	6,745,814	749,535
USACE projects	12,302,512	1,366,946
Total	21,144,168	2,349,352

Source: Appendix H, Table H-1, Final LTMS Management Plan, July 2001.

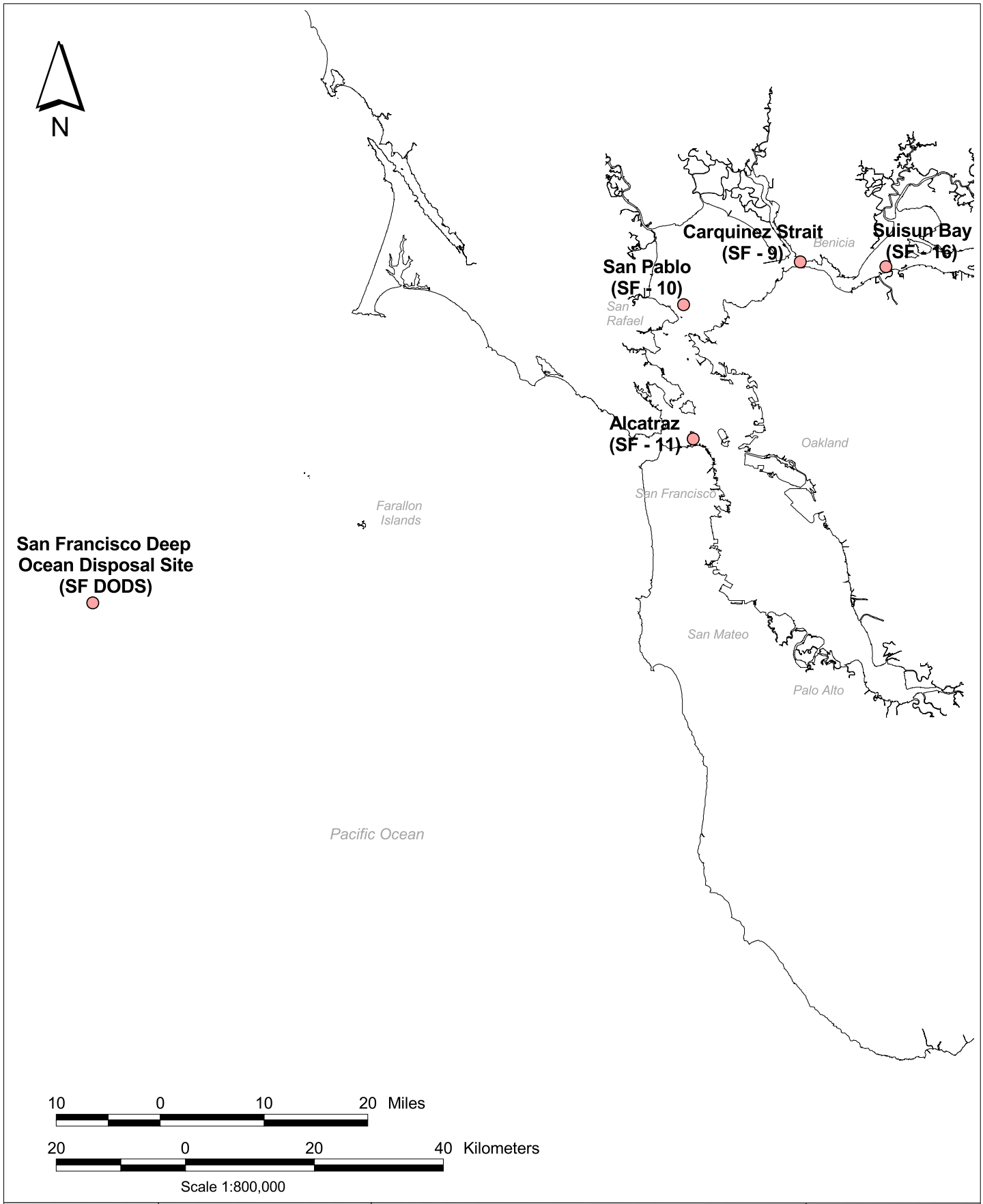
Table 3.1.5
Existing and Potential Dredge Material Reuse and Disposal Sites

Reuse/Disposal Site	Comments
In-Bay	
Alcatraz (SF-11)	Site presents seasonal volume disposal constraints. May accept SUAD material.
Carquinez Strait (SF-9)	Site has volume limits and seasonal restrictions on disposal capacity. May accept SUAD material.
San Pablo Bay (SF-10)	Site has volume limits and seasonal restrictions on disposal capacity. May accept SUAD material.
Suisun Bay (SF-16)	Site is used exclusively for Suisun Bay Channel material disposal.
Bay Farm Island	Site does not currently exist and has low feasibility of being built.
Middle Harbor Enhancement Areas	Site will be constructed as part of 50' project for placement of Port of Oakland material; site priority is for Port of Oakland materials. No need for sediments from other projects.
Ocean	
S.F. Bar Channel (SF-8)	Site is used exclusively for Bar Channel material placement.
S.F. DODS	Site is designated (Marine Protection, Research, and Sanctuaries Act Section 102 permit); sufficient volume for SUAD material under EPA rulemaking limit.
Reuse/Non Tidal	
Airport Borrow Pits, Solano	Site does not currently exist as a UWR site. May accept NUAD (material not suitable for unconfined aquatic disposal) for rehandling.
Alameda Naval Air Station, Alameda	Site has feasibility study for golf course underway; it has been proposed for the Port's 50' project use and has a priority for that project. Environmental documentation and project planning underway but not complete.
Blackpoint, Marin County	Site does not currently exist as a UWR but has potential to be restored. Property is owned by State Lands Commission. Site will require environmental review, permitting, and wetland design. Environmental issues at this site include historic structures, endangered species, and seasonal wetlands.
Bel Marin Keys, Marin	Project in SEIS/R stage. Site does not yet ready for reuse/disposal; it may be incorporated into Hamilton restoration project. Will require permitting, and wetland design.
Cargill Salt Evaporator Ponds, Solano and Napa	Site does not currently exist for reuse/disposal; opposition from owner makes construction unlikely.
Cargill Salt Crystallizer Ponds, Solano and Napa	Site does not currently exist as a UWR site; would require land acquisition, environmental review, permitting, and wetland design.
Cullinan Ranch, Napa and Solano	Site does not exist for reuse/disposal; restoration concepts call for tidal marsh restoration using natural processes. Dredged materials are not being sought.
Galbraith Golf Course, Alameda	Site capacity has been utilized by Port of Oakland 42' project. No additional capacity.
Hamilton Airfield, Marin	CEQA/NEPA process started March 1998. Final EIR/EIS completed 1999.

Reuse/Disposal Site	Comments
Landfills Examples: Redwood Altamont Vasco Road	Upland confined disposal can accept clean cover material (SUAD) as well as NUAD materials.
Leonard Ranch, Sonoma	Site does not exist as a UWR site; may face opposition from owner. Site requires land acquisition, environmental review, permitting and design. Site requires construction of a 1-2 mile pipeline for offloading.
Mare Island, Solano	Reuse plan includes confined disposal and capping.
Marin County Flood Control District	Site does not yet exist as UWR site. Would require environmental review, permitting, and wetland design.
Moffett Field, Mountain View	Site does not currently exist. Property owner has no plans for wetland creation. Wetland development may conflict with current and planned land use. Would require a 3-4 mile pipeline for offloading.
Montezuma, Solano	Site's Final EIR/EIS was issued in July 1998. Site is planning to accept both SUAD and NUAD (non-wetland cover) material.
Napa River, Napa	Site is used exclusively for federal channel material disposal.
North Point Property, Sonoma	Site does not currently exist as a UWR site but has potential to be restored. Would require environmental review, permitting and wetland design. Would require a pipeline for offloading.
Petaluma Drying Ponds, Sonoma	Site is used exclusively for federal channel material disposal.
Pierce Island, Solano	Site is used exclusively for federal channel material disposal.
Port of Oakland Berth 10, Alameda	Site's rehandling facility may be available. Not a reuse/disposal site.
Port of Richmond Shipyard No.3, Contra Costa	Site's rehandling facility may be available. Not a reuse/disposal site.
Port of S.F. Pier 94, San Francisco	Currently used as rehandling facility for Pier 35 material.
Port Sonoma Drying Ponds, Sonoma	Site is used for marina materials only.
Port Sonoma- Hwy 37, Sonoma	Site is used for Port Sonoma materials only.
Praxis-Pacheco, Contra Costa	Site does not exist as a reuse/disposal site; it has been proposed for commercial development. Site development could affect existing wetlands and endangered species. Would require environmental review, permitting, and wetland design.
San Leandro, Alameda	Site is used exclusively for materials from the San Leandro Marina.
Sherman Island Scour Pond, Sacramento	Site does not exist; salinity impacts are a concern. Would require permitting, environmental review, and rehandling of material to reduce salinity.
Skaggs Island, Sonoma	Site's reuse plan contemplates disposal.
Sonoma Baylands, Sonoma	Site's capacity has been reached with Port of Oakland 42' project.
Treasure Island, San Francisco	Site's landfill at site 11 is undergoing remediation. No current plans that would use dredged materials.

Reuse/Disposal Site	Comments
White Slough Project, Route 29/37 Interchange, Solano County	Tidal wetland improvement project may require fill material. Feasibility study has been completed and construction may start in 2003.
Winter Island, Contra Costa	Site is available for dredged material to be used in levee repair and maintenance. Salinity of the Bay sediment is an issue in freshwater areas due to potential degradation of water quality.

Source: BCDC and LTMS 1998; Tetra Tech EMI, January 1999; Port of Oakland 1999; URS 1999, USACE website.



URS	Water Transit Authority Program EIR Project No. 43-00066890	Dredge Materials Disposal Sites	Figure 3.1.1

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Source: LTMS 2001

URS	Water Transit Authority Program EIR Project No. 43-00066890	Beneficial Reuse Sites Identified in the LTMS	Figure 3.1.2

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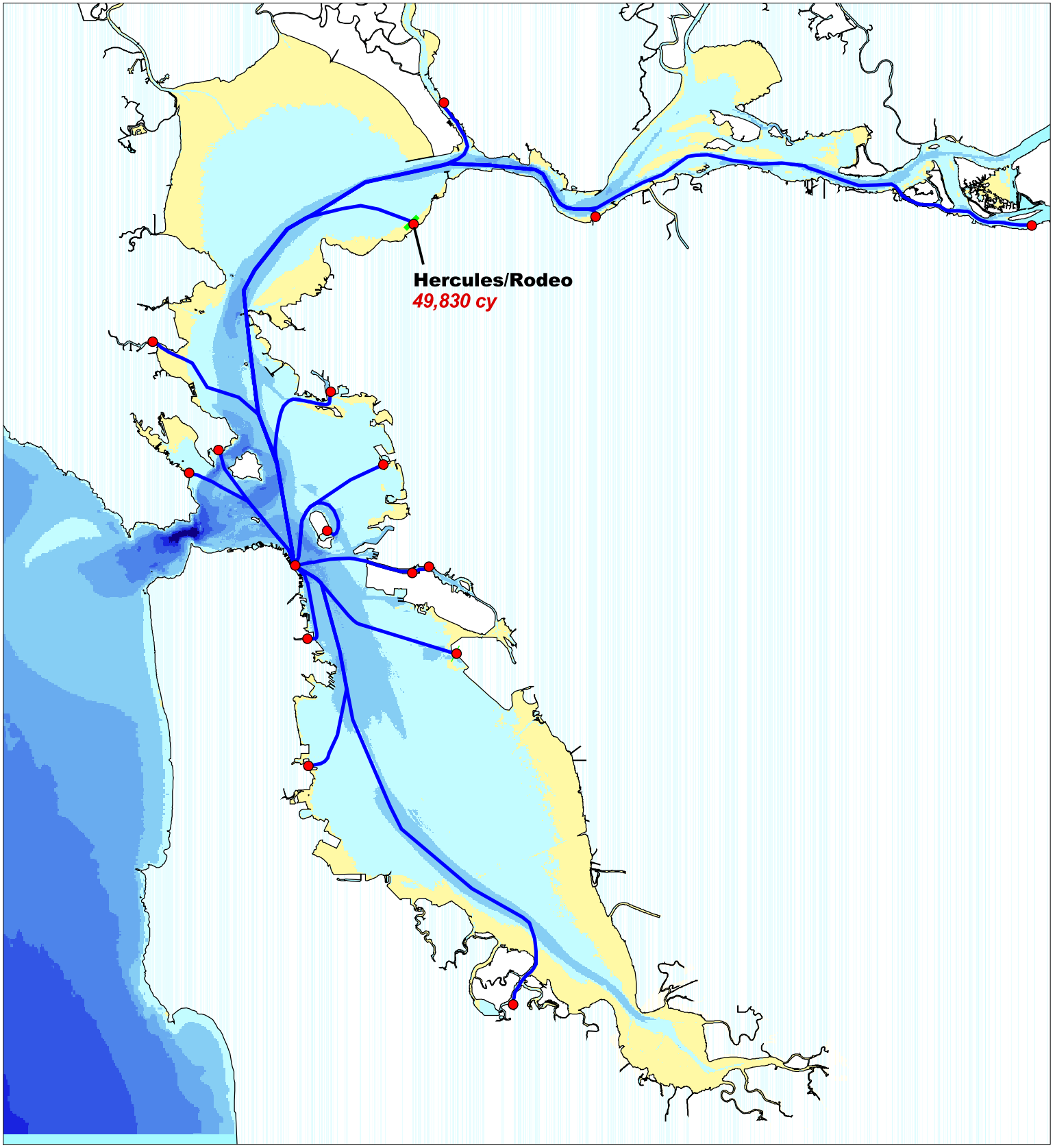

URS	Water Transit Authority Program EIR	PROPOSED PROJECT DREDGING AREAS AND DREDGING VOLUMES	Figure 3.1.3
	Project No. 43-00066890		

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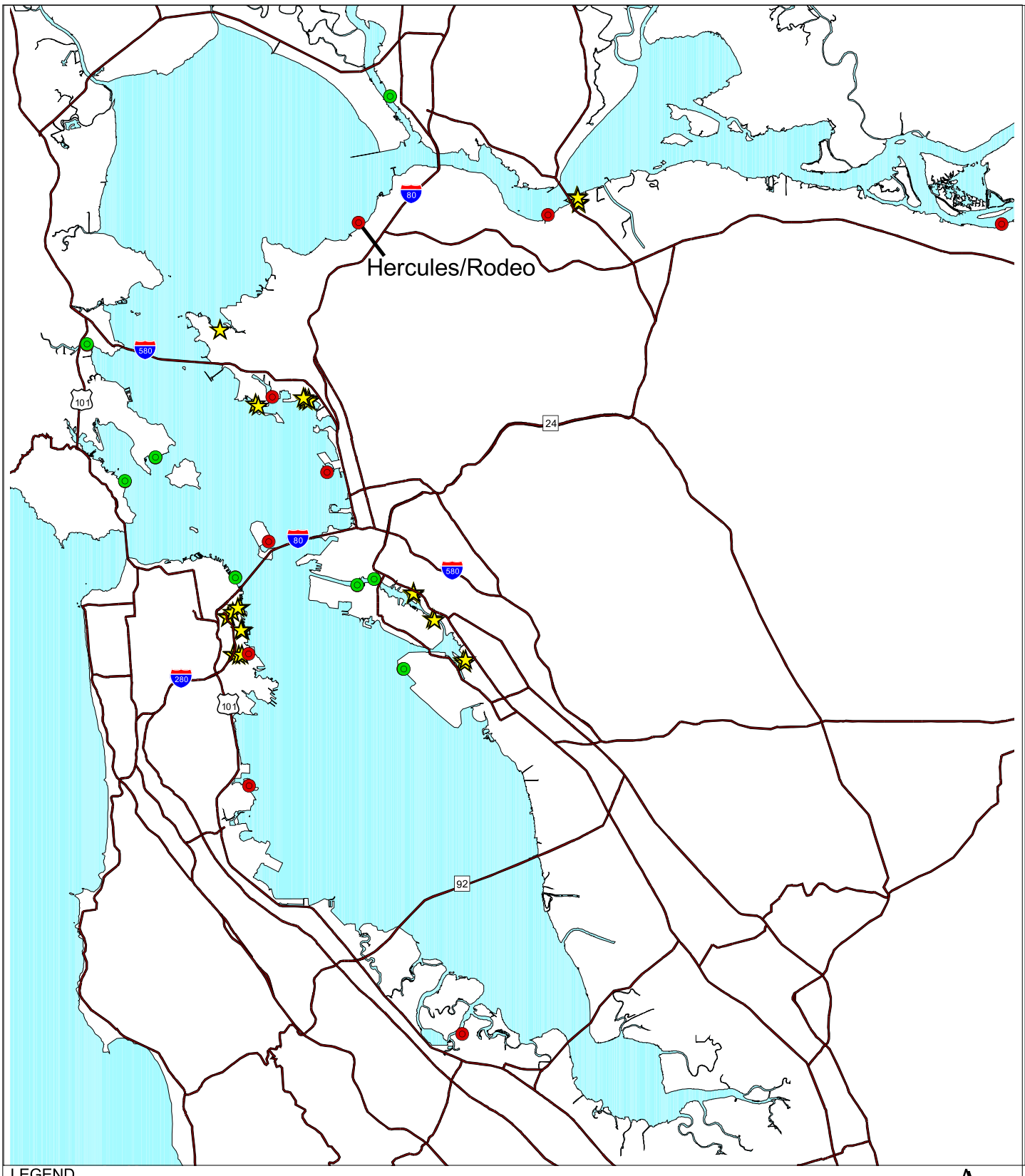

LEGEND

Primary Roads

Proposed Ferry Terminal

Existing Ferry Terminal

Candidate Toxic Hot Spots for the Bay Protection Toxic Hot Spots Cleanup Program

3 0 3 6 Miles

Scale 1:350,000

N

URS

Water Transit Authority Program EIR

Project No. 43-00066890

TERMINALS REQUIRING DREDGING AND TOXIC HOT SPOTS

Figure 3.1.4

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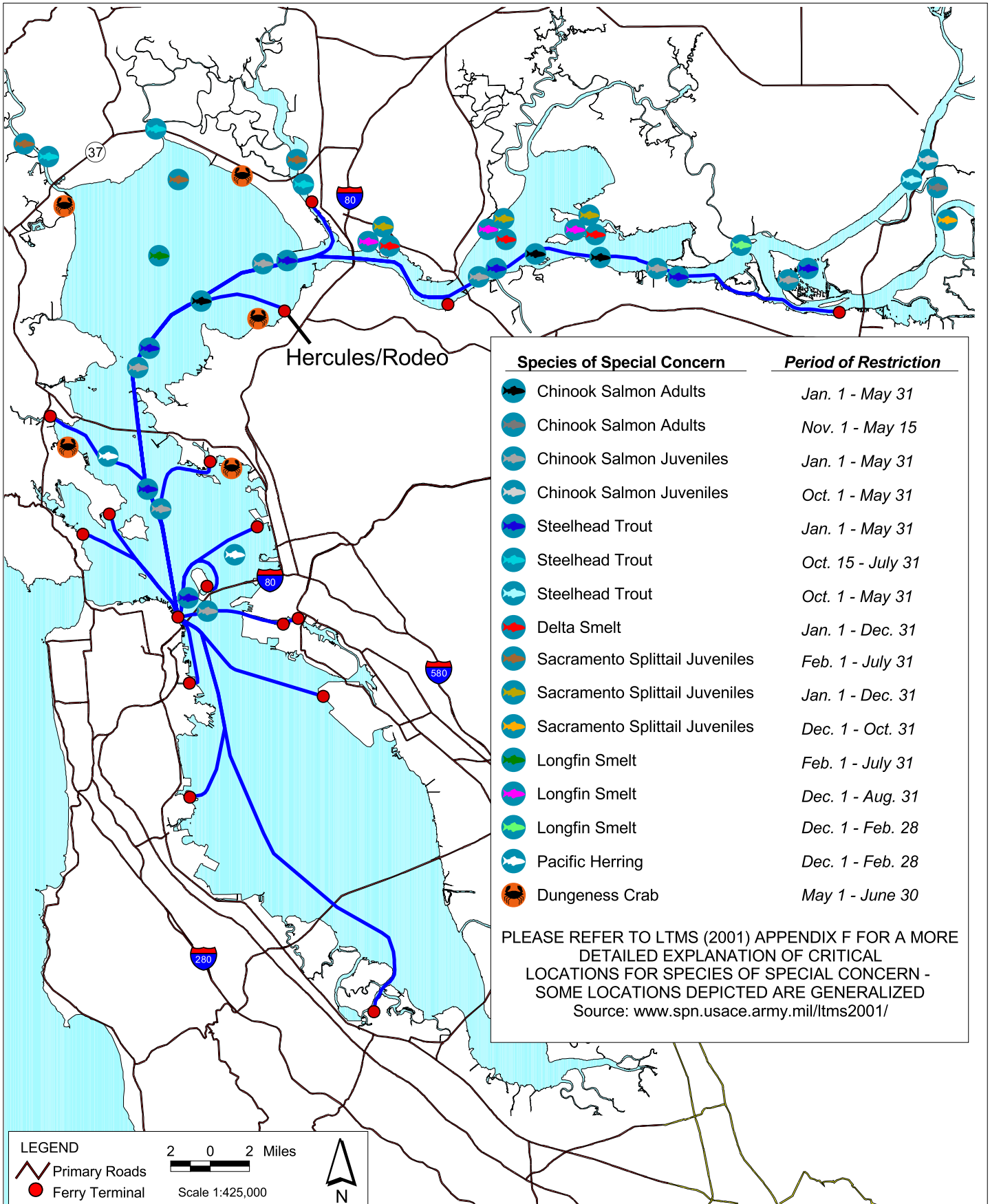

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Program EIR

Project No. 43-00066890.12

FERRY TERMINALS REQUIRING DREDGING AND AREAS AND TIMES OF RESTRICTED DREDGING ACTIVITY FOR SPECIES OF SPECIAL CONCERN

Figure
3.1.5

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3.2 NAVIGATION

This section provides an overview of navigation in San Francisco Bay and its importance from the environmental and regulatory perspectives. The existing ferry systems in the Bay make over 80,000 trips annually, primarily to and from San Francisco. The ferries share the Bay waters with commercial, military, and recreational users. The natural harbor of the Bay serves the shipping and fishing industries. The shipping industry is a particularly vital part of the Bay Area economy. Approximately 100,000 jobs are dependent upon the shipping industry. Located within the Bay are eight ports and twenty-one marine terminals, as well as facilities at Concord Naval Weapons Station and Moffett Field. Because much of the Bay shoreline is urbanized, recreational boating is very popular, with an estimated 20,000 boat berths around the Bay, exclusive of the Sacramento and San Joaquin Rivers. Other water sports, such as boardsailing, represent a growing recreational use of the Bay.

3.2.1 Environmental Setting

3.2.1.1 Study Area

The study area for navigation impacts encompasses the Bay and its embayments, Carquinez Strait, and Suisun Bay to Antioch at the San Joaquin River, as well as the portion of the Pacific Ocean along the shoreline from Half Moon Bay to the entrance of San Francisco Bay at the Golden Gate. The 548-square-mile Bay has an irregular 1,000-mile shoreline composed of a variety of urban and suburban areas, marshes, and salt ponds. Several significant islands are within the Bay, including Angel Island, Alcatraz Island, Yerba Buena Island, and Treasure Island.

3.2.1.2 Navigation Into and Within San Francisco Bay

Vessel traffic in the Bay consists of a complex variety of inbound and outbound vessels and wholly in-Bay vessel movements within a series of bays, channels, and rivers that comprise the San Francisco Bay Estuary. This traffic includes tugs, government vessels, passenger ferry ships, recreational boats, commercial and sport fishing boats, board sailors, and personal watercraft.

West of the Golden Gate Bridge, in the Gulf of the Farallones, approach lanes to the entrance of San Francisco Bay have been established from the north, west, and south. Each approach lane is composed of a 1-mile-wide inbound traffic lane and a 1-mile-wide outbound traffic lane with a 1-mile-wide separation zone between the traffic lanes. Outside these lanes, the U.S. Navy has designated areas for submarine operations within which barge operations are precluded. The approach lanes lead to the precautionary area centered on the San Francisco Approach Lighted Horn Buoy that marks the beginning of the main channel to the Golden Gate Bridge. The lighted horn buoy, which is located 10 miles west of Point Bonita, is in the center of a precautionary area where all ships leaving and entering port converge. This is the area where San Francisco Bar Pilots embark and disembark ships and other vessels requiring pilots.

Piloting in and out of the Bay and adjacent waterways is compulsory for all vessels of foreign registry and U.S. vessels under enrollment not having a federally licensed pilot on board. San

Francisco Bar Pilots provide these services for vessel movements to and from all terminals in the Bay and tributaries to the Bay, including the Carquinez Strait.

Ships bound for San Francisco Bay proceed in an easterly direction toward the Golden Gate Bridge through a narrow channel, which consists of 600-yard-wide inbound and outbound traffic lanes with a 150-yard separation zone between them. The channel is marked on either side with a series of buoys through a shoal area, approximately halfway between the lighted horn buoy and a line drawn from Point Bonita to Point Lobos. The water is usually more than 90 feet deep throughout this area, with the exception of shoal areas. A navigation channel through the shoal is maintained at a depth of 55 feet. Shoal waters less than 30 feet deep exist on either side of this narrow channel. Standard aids to navigation such as horns, bells, and lights are provided at appropriate locations near submerged rocks and points of land.

Regulated Navigation Areas

Within San Francisco Bay, the U.S. Coast Guard (USCG) has established Regulated Navigation Areas (RNAs) shown in Figure 3.2.1. The RNAs increase navigational safety by organizing traffic flow patterns; reducing meeting, crossing, and overtaking situations between large vessels in constricted channels; and limiting vessel speed. The RNAs, which were established in 1993 with input from the Harbor Safety Committee, modified the previous voluntary traffic routing measures to better conform to International Maritime Organization (IMO) traffic routing standards. The 1993 modifications added a Golden Gate precautionary area, a deep-water traffic lane separation zone north of Harding Rock, and an expanded Central Bay precautionary area. It also eliminated the former traffic lanes in the North Ship Channel and the San Pablo Strait.

RNAs apply to "large vessels" (defined as power-driven vessels of 1,600 or more gross tons, or tugs with a tow of 1,600 or more gross tons). Ferries do not present that tonnage. When navigating within the RNAs, large vessels follow specific guidelines. They must have their engines ready for immediate maneuver, operate their engines in a control mode and on fuel that allows for an immediate response to any engine order, and not exceed a speed of 15 knots through the water.

San Francisco Bay RNA

The San Francisco Bay RNA extends from the precautionary zone east of the Golden Gate Bridge to Alcatraz Island. Because of the large number of vessels entering and departing San Francisco Bay, traffic lanes were established under the Golden Gate Bridge and in the Central Bay to separate opposing traffic and reduce vessel congestion. The lanes are located where voluntary traffic lanes previously existed. Use of these lanes and adherence to the indicated direction of travel is required by the USCG for large vessels, and recommended for all other vessels.

Because vessels converge and cross in such a manner that one-way traffic flow patterns could not be established, two precautionary areas were established in this RNA. These are the Golden Gate Precautionary Area, which encompasses the waters around the Golden Gate Bridge between the Golden Gate and the Central Traffic Lanes; and the Central Bay Precautionary Area, which encompasses the large portion of the Central Bay and part of the South Bay.

Oakland Harbor RNA

The Oakland Harbor RNA encompasses the Oakland Bar Channel, Oakland Outer Harbor Entrance, Middle Harbor, and Inner Harbor Entrance channels (Figure 3.2.1). A power-driven vessel of 1,600 or more gross tons, or tug with a tow of 1,600 or more gross tons, cannot enter this RNA while another vessel or tug meeting these same criteria is navigating within its boundaries, if such an entry would result in meeting, crossing, or overtaking the other vessel.

North Ship Channel RNA and San Pablo Strait Channel RNA

The North Ship Channel and San Pablo Strait Channel RNAs consist of the existing charted channels and delineate the only areas where the depths of water are sufficient to allow the safe transit of large vessels (Figure 3.2.1). The strong tidal currents in these channels severely restrict the ability of large vessels to safely maneuver to avoid smaller vessels.

Pinole Shoal Channel RNA

The Pinole Shoal Channel RNA is a constricted waterway that extends from approximately Light 7 to Light 13 of the Pinole Shoal Channel (Figure 3.2.1). Its use is restricted to vessels with a draft greater than 20 feet, or towboats with tows drawing more than 20 feet.

Southern Pacific Railroad Bridge RNA

The Southern Pacific Railroad (SPRR) Bridge RNA consists of a small, circular area, 200 yards in radius, centered on the middle of the channel under the SPRR Bridge (Figure 3.2.1). The limited horizontal clearance results in a greater chance of vessel collisions with the bridge, which is significantly increased when visibility is poor. Large vessels are precluded from transiting this RNA when visibility is less than 1,000 yards.

Hazards to Navigation

Hazards to navigation in general can be divided into five categories: (1) shoals and islands; (2) bridges and other structures; (3) fog and inclement weather; (4) vessel traffic; and (5) tides and currents. The Bay has a number of hazards to navigation, such as strong tides and currents and variable bottom depths, which confine large vessels to specified shipping lanes within the Bay. Navigating the Bay becomes more difficult during periods of restricted visibility due to winter storms, and fog.

The San Francisco Bar Pilots Association regularly compiles recommended guidelines for safe navigation, entitled "Port Safety Guidelines for Movement of Vessels of San Francisco Bay and Tributaries." The 1992 edition recommended guidelines are currently being updated and revised. The guidelines are sent to members of the shipping industry and are based on a general consensus among pilots as to recommended navigational practices.

Shoals and Islands

There is a shoal area just west of the Golden Gate Bridge and north of the main entry channel to the Bay. This area, commonly known as the 4-fathom bank or Potato Patch Shoals, is a potential navigational hazard for any vessel with a draft greater than 24 feet. Once inside the Golden Gate, shallow areas around such islands as Alcatraz, Angel Island, Treasure Island, and Yerba

Buena Island are hazards to navigation, and when combined with other elements including fog, traffic, or malfunctioning radar equipment, can present extreme hazards.

Weather

Meteorological conditions that contribute to navigational difficulties include fog during the warmer months and storms in the winter. Fog occurs much of the time during the summer months, blowing in through the Golden Gate in the late afternoon and typically burning off by late morning. Some types of commercial vessels, including tankers carrying hazardous materials such as fuel oil, have been restricted from transiting the Bay during periods of intense fog. Fog by itself does not pose a serious problem if ship navigation radar is in good condition, but combined with other vessel traffic, the strong tides and currents in the Bay, and the possibility of other ships straying from the traffic lanes, navigation can be extremely difficult.

Vessel Traffic

The greatest hazard to vessel navigation is other vessel traffic. Large commercial and naval vessels are required by USCG regulations to use designated traffic lanes when traveling in inland waterways. Ferry boats and other small commercial vessels (i.e., tugboats and private vessels) often do not navigate within specific traffic lanes, but rather travel in the most direct route. These vessels can pose hazards to navigation, particularly if other circumstances such as fog are present. Private vessel traffic is heaviest during weekend days and can pose hazards to dredge scows under tow. Tugboats may have trouble controlling their tows. Sporadic incidents, such as towing bridles that break and barges that run aground, can be found in USCG vessel traffic reports.

A risk assessment conducted for Washington State Ferries (WSF), which services Puget Sound, showed that interactions between ferries are less likely to lead to a collisions than interactions between ferries and non-ferry vessels (van Dorp et al. 2001). In this study, several risk reduction measures were ranked by their percentage of reduction in the statistical frequency of collisions. The most effective risk reduction measures for the Washington State Ferries included:

- Fleetwide implementation of the International Safety Management code with a 16 percent reduction in the risk of collisions;
- Implementation of mechanical failure reducing measures (11 percent risk reduction); and
- Implementation of traffic separation rules for high speed ferries (6 percent risk reduction).

The remaining four risk reduction measures evaluated, all indicating less than 5 percent reduction in collisions, include weather and visibility restrictions, high speed ferry rules and procedures, traffic control for deep draft traffic, and increasing the time available for response which is aimed at reducing the consequences if a collision occurs. In the risk assessment summary, it was recommended that the WSF continue to implement safety management and training programs, provide adequate relief crews as necessary to accomplish training, and coordinate with the USCG to minimize the likelihood of an accident. In terms of minimizing the potential consequences of accidents, the risk assessment recognized that the skills of the ferry crew were crucial in an emergency situation and strongly recommended enhancing these emergency skills through training, certification, drills, and exercises. It was finally concluded that the most cost-effective way to minimize the risk of potential accidents was to invest in

Washington State Ferry people and systems and to make improvements and changes to policies, procedures, and management systems rather than to merely invest in capital equipment such as survival craft.

Currents and Tides

Tidal action causes extremely strong currents throughout the Bay, especially during periods of maximum ebb and maximum flood tides. Currents above 2 knots are considered strong and potentially hazardous if not properly "corrected for" during slow-speed maneuvering. The greatest currents occur at the Golden Gate, with the average maximum flood being 3.3 knots and the maximum ebb being 4.5 knots. There are also strong currents all along San Francisco's city waterfront from the Golden Gate Bridge to the Bay Bridge, and around Treasure Island on the east and west sides. These currents, combined with the strong winds, make maneuvering large vessels at slow speed hazardous without the aid of tugboat assistance. Even as far south as Hunters Point, there are currents up to 2.2 knots.

3.2.1.3 Existing Recreational Uses

The potential impact to recreational uses of the Bay was raised as an important concern during scoping meetings. Bay Area residents enjoy using the Bay itself for waterborne recreational activities and water contact sports, including boating, fishing, kayaking, swimming, jetskiing, and windsurfing. This section provides background information about these recreational activities, and describes the popular access points to the Bay within the study area.

Numerous interest groups in the Bay Area have formed to share information, promote safety, and protect the Bay resources for activities they value most. Examples include the Yacht Racing Association of San Francisco Bay, United Anglers, San Francisco Bay Swimming Association, Bay Area Sea Kayakers, and the San Francisco Boardsailing Association. Many dive clubs also exist in the Bay Area, but they do not normally dive in San Francisco Bay because the Bay's turbidity makes it difficult to see underwater. Many of these groups organize special events such as races on the Bay or festivals. Below is a description of the marinas and windsurfing sites within the study area.

Marinas

Figure 3.2.2 shows the locations of marinas along the San Francisco Bay shoreline in Marin, San Francisco, San Mateo, Alameda, Contra Costa, Napa, and Sonoma Counties. All of these marinas have permanent berths, and many also have trailered boat storage facilities and public ramps that can be used to launch small sailboats, kayaks, rowboats, personal watercraft, or jetskis, etc. Once these vessels are launched, they can be used to travel virtually anywhere in San Francisco Bay, San Pablo Bay, and even the Sacramento River Delta, depending on the capabilities of the vessel and the operator.

Table 3.2.1 lists the number of berths at each of the 51 marinas identified.[1] These marinas have a total of more than 16,000 berths, with approximately half of the berths located on each side of the Bay.

[1] This list may not be comprehensive. It was composed though searches of various boating databases.

Windsurfing Sites

Windsurfers typically do not use the existing marinas. Rather, different launching facilities have developed in the Bay Area because of the need for particular site amenities for that sport, such as shore accessibility and parking, and to take advantage of particular wind and water conditions. The desire to avoid conflicts with other user groups also plays a role in the selection of launch sites. Table 3.2.2 presents currently used launch sites, their locations, the season with best conditions, and the rating level of their users. Figure 3.2.3 shows the approximate location of the launch sites. No accidents involving windsurfers and ferries have been documented. Ferry operators at the Larkspur terminal report no known accidents since windsurfing has become a popular recreational activity in the area, especially since ferries are travelling at slow speeds (10 knots) near the terminal and can stop relatively quickly if a windsurfer has fallen in the path of the ship (David Clark 2002). No written navigational rules exist for windsurfers, but windsurfers are reported to honor the ferries' approach and departure route since ferries are restricted to the dredged channel. Ferries occasionally pick up windsurfers who drift too far from shore. The navigational situation and relationship between ferry operators and windsurfers is currently agreeable, and each group is said to "look out for each other" (David Clark 2002).

3.2.1.4 San Francisco Bay Transit and Incident Data

Ship traffic density in San Francisco Bay has increased greatly in the past two decades (Black 2002). In 1987, there were approximately 87,000 vessel transits in the Bay. Coast Guard data show that total annual transits increased to 97,683 in 1996 and to 127,704 in 2000. Along with the increase in the total number of vessels transiting the Bay, the number of ferry/passenger trips has increased from 66,290 in 1996 to 88,469 in 2000 (Table 3.2.3). In both these years, ferry/passenger vessel traffic represented approximately 68 percent of the total traffic.

Vessel Traffic Service in San Francisco Bay

The Coast Guard's Office of Vessel Traffic Management (VTM) maintains the Vessel Traffic Service (VTS) for the San Francisco Area. The VTS is a mandatory system that applies to all vessels of 40 meters or more in length, all vessels certified to carry 50 or more passengers, and all commercial vessels 8 meters or more in length engaged in towing another vessel. The VTS may issue directions to enhance navigation and vessel safety and protect the marine environment. During conditions of vessel congestion, restricted visibility, adverse weather or other dangerous conditions, the VTS may manage vessel traffic by specifying times of entry, movement, or departure to, from, or within the VTS area. The San Francisco VTS area "begins" at the outer limit of the Offshore Sector, a 38.7-nautical-mile radius around Mount Tamalpais, which is 10 miles north of the Golden Gate. The Offshore Sector includes the Traffic Separation Scheme in the approaches to San Francisco Bay, the busy Central San Francisco Bay, and the southern part of San Francisco Bay, ending at the Port of Redwood City in the south. To the north and east, it extends to the entrance to the Petaluma River, into the Napa River as far as the Mare Island Causeway Bridge, and upriver to Sacramento and Stockton. Deep draft ships as large as 760 feet in length overall, 60,000 gross tons, and 35 feet draft call in these two river ports. Central San Francisco Bay is the busiest part of the VTS area. It must be traversed by each tanker, container ship, and other large vessel inbound to any of the Bay Area's ports, and also by almost every scheduled ferry route in the Bay Area. Finally, it is also one of the most popular recreational

sailing areas in the United States, resulting in a challenging transit for large ships on busy summer weekends.

The San Francisco VTS area is divided into two sectors. Sector 1, the offshore sector, is controlled through communications and reporting in VHF frequency Channel 12. Sector 2, the inshore sector including the Bay, is controlled through VHF Channel 14. Portions of the San Francisco VTS are covered by radar and close circuit television surveillance. The VTS receives reports regarding defects in aids to navigation, involvement in casualties, pollution incidents, and hazardous conditions. It also provides advisories on traffic, weather, and status of aids to navigation, as well as information on harbor operations, including ferry routes and dredging, and anchorage availability.

Vessel Incidents

The VTS collects detailed reports of every vessel incident in the Bay. The VTS records indicate that from 1991 through 2001 the annual number of reported incidents averaged 61, with a low of 33 reported incidents in both 1994 and 2001, and a high of 87 incidents reported in 1995. The categories of incidents include collisions, near-misses, vessel grounding, noncompliance (not listening to the VTS or acting contrary to their instructions), non-participation (turning the vessel radio off), hindering navigation (e.g., a sail boat passing in front of a commercial vessel confined to narrow channels or fairways), and loose barges (the tow line breaks and the barge is set adrift or the tugboat loses power).

Baseline statistics for incidents on the Bay were obtained from the VTS website for 1997, 1998, and 1999. The data were evaluated to determine the number of incidents per 1,000 transits. The total average yearly transits and the incidents per 1,000 transits were compared to other ports of both larger and smaller size than San Francisco Bay. These ports include Berwick Bay, Houston/Galveston, New York, Sault Sainte Marie, and Los Angeles/Long Beach (Table 3.2.4). This comparison shows that the number of vessel incidents varies widely and independently of the number of vessel transits. On San Francisco Bay, the average number of collisions per 1,000 transits is 1. Four near misses, 2 groundings, and 5 allisions (an allision occurs when a moving vessel strikes an inanimate object such as a pier) occur on average for every 1,000 transits on the Bay. Vessel incidents are recorded and reported as "casualties," a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage.[2]

San Francisco Bay ferry boat casualty data for years 1996-2001 are presented in Table 3.2.5 (USCG 2002). Approximately 70 percent of ferry "casualties" were due to equipment failure, while the remainder were attributed to one collision, 8 allisions, and two of each of the

[2] Approximately 31 vessel casualties occur for every 1,000 transits, Title 46 Code of Federal Regulations (CFR) Part 4 defines a reportable marine casualty as: (1) groundings - whether intentional or not; (2) bridge strikes; (3) loss of main propulsion, steering, or associated components, which resulted in a reduction of a vessel's maneuverability; or (4) occurrences affecting seaworthiness or fitness for service (fire, flooding, lifesaving equip, bilge pumping, etc.); (5) loss of life; (6) injury: (a) beyond first aid or (b) to a crew-member on commercial vessel unfit for routine duties; (7) damage to property greater than $25,000; (8) alleged misconduct or negligence by Coast Guard licensed, certified, or documented members of the Merchant Marine; (9) damage to aids to navigation; (10) certain recreational boating deaths, waterfront facility casualties, and others as directed; (11) reports of load line violations; and (12) marine pollution: discharges of oil, hazardous materials, or garbage into the navigable waters of the United States.

following: groundings, floodings, fires, and structural failures. It is important to note that this table represents a six-year sampling of data and may not accurately represent all vessel incidents to date.

Ferry Incident Rates Compared to Other Transit Modes

A preliminary risk assessment performed for the WTA by ABS Consulting found ferries in San Francisco Bay to be the "safest federally subsidized transit mode in the Bay Area." The analysis compared fatality and injury rates for patrons, employees and others. The ferry safety record showed no fatalities while the 5-year average for rail and roadway transit were 0.004 fatalities per 1 million passenger miles. Ferries had less than one-fourth the patron injury rate of the rail and roadway transit modes, with only 0.28 injuries per 1 million passenger miles (ABS 2002).

3.2.1.5 Regulatory Setting

Federal

In the United States, two sets of regulations govern navigation. The Inland Navigational Rules Act of 1980 (Title 33, Chapter 34, Subchapter I, Part A) became effective on December 24, 1981. These rules, more commonly known as the Inland Rules, govern many rivers, lakes, harbors, and inland waterways. The International Regulations for Preventing Collision at Sea, also known as the Rules of the Road or International Navigation Rules, or 72 COLREGS, govern open bodies of water in which foreign shipping traffic is possible, and are a set of statutory requirements designed to promote navigational safety. These rules include requirements for navigation lights, dayshapes, and steering, as well as sound signals for both good and restricted visibility. The most recently adopted version of these regulations took effect on July 15, 1977. The boundaries between where the Inland Rules and the International Rules apply are displayed as Demarcation Lines on navigational charts. These boundaries are commonly identified on charts as purple dashed lines containing the label COLREGS DEMARCATION LINE. The COLREGS line in the regional area is found outside the Golden Gate.

Directly applicable to the navigation of ferries in San Francisco Bay is Inland Navigation Rules Part B – Steering and Sailing, including Section 1 – Conduct of Vessels in Any Condition of Visibility; Section II – Conduct of Vessels in Sight of One Another; and Section III – Conduct of Vessels in Restricted Visibility. Requirements for the interaction between power-driven vessels and between power-driven and sailing vessels are delineated in Rule 18.

The Ports and Waterways Safety Act of 1972 (Title 33, Chapter 25, Section 1221) authorized the USCG to establish, operate, and maintain vessel traffic services for ports, harbors, and other waters subject to congested vessel traffic. As a result, in 1972 the Coast Guard established the VTS for San Francisco Bay and designated traffic lanes for inbound and outbound vessel traffic, specified separation zones between vessel traffic lanes, and set up rules to govern vessels entering and leaving ports. The VTS, which is located on Yerba Buena Island, controls marine traffic throughout the Bay Area. Although some small and private vessels are not required to coordinate their movements by contacting the VTS, the Coast Guard monitors all commercial, Navy, and private marine traffic within San Francisco Bay and local coastal waters.

State

The California Harbors and Navigation Code vests authority with the Department of Boating and Waterways to regulate matters of navigational safety for the state's boating public. The California Department of Boating and Waterways was formed in 1979 through the consolidation of functions previously held by a number of divisions in the Departments of Natural Resources, Motor Vehicles, and Parks and Recreation. By the end of the 1950s, boating had become one of California's most popular forms of recreation. Under the authority of the Federal Boating Act of 1958, the State Harbors and Navigation Code was amended to provide registration of vessels by the State instead of the USCG. Also, the Code established a comprehensive set of state laws and regulations governing the equipment and operation of vessels on all waters of the state. A system for reporting boating accidents was initiated. California accident statistics are compiled under state law, Section 656 of the California Harbors and Navigation Code, which requires a boater who is involved in an accident to file a written report with the Department of Boating and Waterways when:

- A person dies, disappears, or is injured requiring medical attention beyond first aid; or
- Damage to a vessel or other property exceeds $500, or there is complete loss of a vessel.

Department staff review reported accidents, determine the causes, and identify preventative measures and specific safety-related problems. Safety education and public information program staff incorporate these safety problems and related solutions into updated course materials, promotional activities, and brochures. Law enforcement staff also communicate these safety problems during Department-sponsored training sessions for law enforcement officers.

Local

Harbor Safety Committee of the San Francisco Bay Region

In 1990, the California state legislature enacted the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act (OSPRA) (California Government Code Chapter 7.4). The goals of OSPRA are to improve the prevention, removal, abatement, response, containment, and cleanup and mitigation of oil spills in the marine waters of California. OSPRA created Harbor Safety Committees for the major harbors of the state of California to prepare Harbor Safety Plans, encompassing all vessel traffic, for the safe navigation and operation of tankers, barges, and other vessels within each harbor. The Harbor Safety Committee of the San Francisco Bay Region was officially sworn in on September 18, 1991, and held its first meeting on that date. The original Harbor Safety Plan for San Francisco, San Pablo and Suisun Bays was adopted on August 13, 1992. OSPRA also mandates that the Harbor Safety Committee must annually review its previously adopted Harbor Safety Plan and recommendations and submit the annual review to the Oil Spill Prevention and Response Administrator for comment. The most recent available San Francisco Bay Region Harbor Safety Plan is for 2001.

The full committee for the Harbor Safety Committee holds regular monthly public meetings. The committee chairperson appoints a series of work groups to review the mandated components of the Harbor Safety Plan (e.g., weather and tides; harbor depths, channel design, and dredging; contingency routing; communications; and vessel traffic patterns, pilotage, etc.) and other timely issues. Public notices are published prior to all committee and work group meetings. Public comments are received throughout discussions of the various issues, which results in full public

participation in developing the Harbor Safety Plan recommendations for the San Francisco Bay Region.

Regulatory Context for Recreational Water Uses

Policies relating to the development, operation and protection of water-related recreational facilities are found both in laws and in different types of planning documents pertaining to recreation in general. At the federal government level, legislation has been passed to protect recreational facilities and prevent their conversion to other uses. State, regional, and county parks and recreational facilities typically have a General or Master Plan guiding their development and usage. For cities within the San Francisco Bay Area, goals and policies for recreational facilities are typically found in the Recreation or Open Space Element of each city's adopted General Plan.

San Francisco Bay Plan

The San Francisco Bay Plan (Bay Plan) was adopted by the San Francisco Bay Conservation and Development Commission (BCDC) in 1968 and incorporated by the California Legislature into the McAteer-Petris Act in 1969, thereby giving the plan the force of law. The Bay Plan contains findings about the value of the Bay, policies to guide future uses of the Bay, and maps that apply these policies to the Bay and its shoreline. Part Four of the Bay Plan contains findings and policies pertinent to development of the Bay and shoreline. Policies from the "Recreation" and "Public Access" subsections are described below.

Bay Plan - Recreation (last amended March 1986). This section states that, as the population of the Bay region increases, more people are expected to use their leisure time in water-oriented recreational activities. It predicts that many more water-oriented recreational facilities will be needed to accommodate the needs of Bay Area residents and visitors. The Bay Plan maps include about 5,800 acres of potential new parks along the approximately 1,000-mile shoreline, as well as 4,400 acres of parkland that could be created if military use of the properties (particularly near the Golden Gate) ceases. The Bay Plan states that water-oriented recreational facilities should be well distributed around the shores of the Bay, to the extent consistent with criteria specified elsewhere in the Bay Plan. Recreational facilities should not, however, preempt sites needed for ports, waterfront industry, or airports, but efforts should be made to integrate recreational uses into these facilities to the extent that they might be compatible. The Bay Plan also advises that waterfront land needed for parks and beaches by the year 2020 should be reserved now to preserve them from being used for other purposes. These facilities need not be built all at once, however.

Bay Plan - Public Access (last amended March 2001). This section states that, although public access to the Bay shoreline has increased since adoption of the Bay Plan in 1968, additional public access is still needed. Public agencies have limited funds for providing or improving shoreline access, but private capital can provide public access in association with a wide variety of shoreline developments. Any proposed fill project should enhance public access to the Bay to the maximum extent feasible in accordance with Bay Plan policies. In addition to the public access provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, including airport development. In those cases where public access is inconsistent with the project because of public safety

considerations or significant use conflicts (such as significant adverse effects on wildlife), in-lieu public access should be provided, preferably near the project site.

Public access as a condition of development should be permanently guaranteed and should be consistent with the development project, as well as with the physical environment of the Bay and shoreline. Access to and along the waterfront should be provided by walkways or trails and should be convenient to parking and/or public transit. In addition, the BCDC, special districts, and federal, state, regional, and local jurisdictions should cooperate to provide new public access areas, especially to link the entire series of shoreline parks, regional trail systems, and existing public access areas to the extent feasible, without additional Bay filling or adversely affecting natural resources. BCDC's *Public Access Design Guidelines* should be used in siting and designing public access associated with a proposed project. The Design Review Board should advise the BCDC on the adequacy of the public access proposed.

3.2.2 Impacts and Mitigation

3.2.2.1 Significance Criteria

Impacts would be considered significant if they would:

- Affect the safe navigation of the Bay (including commercial shipping), resulting in substantial increases in the number of incidents reported by the Vessel Traffic Service (VTS); and/or
- Interfere substantially with the recreational water uses in San Francisco Bay through increases in the number of accidents involving the interaction of ferries and recreational vessels.

3.2.2.2 Impacts and Mitigation

Impact NAV-1 **Existing ferry service results in some navigational incidents, including accidents involving collisions, allisions, and groundings. There is a potential for an increase in these incidents with expansion of water transit service.**

Bay Area ferries currently serve terminals in San Francisco Bay. Most ferry trips are within the Central Bay. Expanded ferry service would add ferry traffic throughout the Bay, involving new trips to and from terminals in localities not currently accessed by ferries. This could lead to a potential increase in navigational incidents.

Three passenger service companies currently provide daily ferry service from 5:30 a.m. to 12:30 a.m. In 2000, ferry traffic reached a volume of 88,469 trips, or approximately 68 percent of the total vessel trips reported by the USCG VTS in San Francisco Bay for that year. The Proposed Project involves expansion of ferry service and would increase the number of ferry transits in the Bay. The year 2025 ferry trips were derived from projections prepared for WTA as of April 2002. Ferry traffic projections were calculated through modeling and testing of different assumptions and are subject to revision (Bruzzone 2002). 165,850 ferry trips are projected for the year 2025. For the No Project Alternative, the number of trips is assumed to remain constant at the levels reported in 2000.

Available data for San Francisco Bay and other heavily used harbor areas in the United States (presented in Tables 3.2.1 and 3.2.2) suggest that there is no direct correlation between the number of vessel transits and the number of reported incidents (Law 2002). This lack of correlation is also depicted on Figure 3.2.4. For example, despite having the lowest number of transits compared to other U.S. ports, the total number of incidents reported in Prince William Sound was larger than four of the six other ports. Similarly, there appears to be no relationship solely between higher traffic and reports of near misses, groundings, allisions, or other vessel casualties for the main U.S. harbors.

The comparison of number of transits and number of navigational incidents between different harbors could indicate that some harbors are more navigationally dangerous than others, regardless of the number of trips. However, evaluation of navigational incidents within San Francisco Bay over time also does not show a clear correlation of any increase in incidents with an increase in transits. USCG incident statistics for the Bay for 1996-2001 are presented in Table 3.2.6. The trend indicated is that both ferry and total transit trips by all vessel types generally increase over time. However, over the same period, the number of incidents does not change in a consistent pattern.

This comparison of recorded navigational incidents and vessel traffic statistics does not appear to associate an increase in trips directly with an increase in the probability of incidents. Other factors appear to affect the occurrence of navigational incidents for any given volume of harbor transits. These may include the condition of mechanical equipment, navigational aids, and training of bar pilots for safety. It is important to note that Puget Sound and San Francisco Bay are among the harbors with the lowest number of incidents. Ferries represent approximately 80 and 70 percent, respectively, of Puget Sound and San Francisco Bay annual vessel trips. This could imply that the familiarity of the ferryboat captains with the navigational conditions and procedures in those harbors account for fewer incidents.

To evaluate the potential significance of increased ferry traffic within the overall vessel traffic in San Francisco Bay, two extreme scenarios were evaluated, as represented in Figures 3.2.5 and 3.2.6. The purpose of this evaluation was to capture the possible range of the contribution of passenger ferry transits to the overall vessel traffic in the Bay. In the conservatively low scenario, all non-ferry traffic was assumed to remain at year 2000 levels. This scenario does not consider any further expansion in waterborne traffic that would naturally occur in response to regional economic demand. Alternatively, in the conservatively high scenario, non-ferry traffic was assumed to continue to grow steadily, based on the rates of increase shown in recent years. This scenario does not consider any logistical constraints or infrastructure limitations on the capacity of the Bay to accommodate waterborne traffic. The number of vessel trips on the Bay in each vessel traffic growth scenario is presented in Table 3.2.7.

Under the No Growth scenario, the proportion of ferry transits as part of the total vessel transits in the Proposed Project would increase to a level of 81 percent of total vessel transits from the current level of 69 percent corresponding to the No Project Alternative. Under the Sustained Growth scenario, the proportion of ferry transits as part of the total vessel transits for the Proposed Project drops to 61 percent. This indicates that ferries would account for between 61 and 81 percent of the total vessel transits in the Bay under the Proposed Project.

Incidents such as collisions and near misses involve the interaction of two vessels. A model was developed by ABS Consulting as part of a preliminary risk assessment for the WTA that counts

vessel interactions (ABS 2002). Any vessel (i.e., VTS-monitored vessel, recreational boater, or another ferry) within 0.5 miles of a ferry was considered an interaction. An interaction also includes situations in which a vessel is within 5 minutes of crossing tracks, and the crossing occurs either within 1 mile ahead or within 0.5 mile behind the ferry. The counting does not define the level of risk related to collision. It only provides a measure of hazardous exposure. The ABS model was used to simulate navigational conditions and produce spatial distribution of vessels for the year 2000 with the ferry fleets and routes corresponding to the project alternatives (Alternatives 1 through 3) and the No Project Alternative (Alternative 4) as the base case. The model results were extrapolated to approximate the growth in vessel interactions for the Proposed Project, compared to the No Project Alternative.

The model predicts that the number of total vessel interactions would increase three-fold. As discussed above, ferry transits constitute the majority of all vessel traffic under the Proposed Project in either the No Growth or Sustained Growth scenarios, accounting for 81 percent and 61 percent of all traffic, respectively. Thus, even under a three-fold predicted increase in total vessel interactions, the interactions between ferries would predominate over the interactions between ferries and other vessels as well as over the interactions between non-ferry vessels. Therefore, attention to safe ferry transit, including proper maintenance of fleets, ferry pilot training, and the use of appropriate navigational aids would be the most important factors to address potential navigational risks created by the additional transits and the increased hazardous exposure created by the increased interactions. As stated before, increased vessel traffic does not correlate with increased navigational incidents in the nation's harbors. Other factors, such as procedures, will continue to be more significant than the number of vessel interactions in determining the level of risk.

The WTA ferry expansion would involve 15 different ferry routes. These routes pose varying degrees of navigational challenge and location-specific navigational concerns. However, ABS modeling results indicate that the majority of the increased interactions would take place northeast of San Francisco, because the city is the origin/destination for a large number of trips.

Summary of Impact NAV-1

- Implementation of the Proposed Project could potentially have impacts on navigational incidents resulting from the increase in the number of ferry transits and service to and from new terminal locations. The level of significance of such impacts is difficult to determine. Therefore, the potential for impacts is potentially significant.

Mitigation NAV-1.1: Implementation of best practices to meet or exceed USCG requirements as recommended by the preliminary risk assessment prepared by ABS (2002) will serve to minimize navigation-related risk. These practices are listed below:

1. Design and implement a preventive maintenance system that meets or exceeds manufacturer's service requirements.
2. Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as master-in-charge. (Note: Program training should meet or exceed the requirements in the USCG National Maritime Center Policy Letter 06-01 subj.: "Qualification for Issuance of Type Rating Endorsements Authorizing Service on High-Speed Craft.")

3. Design the terminal to facilitate docking under both prevailing and seasonal environmental conditions.
4. When conditions make it difficult for the master-in-charge to effectively maintain situational awareness, assign another person to the bridge watch (i.e., another licensed master or a senior deckhand) to share the workload and serve as a safety double check.
5. Design and install gangway systems (1) that help steady the ferry and hold it firmly to its dock, (2) that can be adjusted to accommodate changing environmental forces, and (3) that can be manipulated by crew having different physical abilities.
6. Install, operate, and maintain technology (e.g., portable pilot units, and/or automatic identification system tracking and display) to facilitate communication of intent and to audit conformance with navigational protocols.
7. Install, operate, and maintain a backup radar and separate power supplies for radars.
8. Train/certify all bridge watchstanders in radar operation.
9. Periodically survey the water depth in the vicinity of a terminal to identify shoaling, and set and maintain private markers to identify shoal water.
10. Conduct periodic electrical safety inspections and daily check of ground faults. Install a bridge alarm/indicator that alerts the licensed master of the location of electrical shorts.
11. Install and maintain a fixed fire suppression system that has sufficient capacity to flood the engine room twice with CO_2 or equivalent fire suppression agent.
12. Eliminate or minimize hazardous materials used in maintenance and repair.
13. Use a closed gauging system for checking fuel levels.
14. Develop company policy and standard procedures for emergencies and adverse weather and normal operating conditions. Implement and enforce procedures through training and company communications. Audit conformance. Provide job aids for critical procedures.

    Note: Policy and procedures manual and an operational training program should be developed using the guidance in the USCG Navigation and Vessel Inspection Circular 5-01 subj.: "Guidance for Enhancing the Operational Safety of Domestic High-Speed Vessels."

    14a. Develop, communicate, and enforce standard operating procedures for ferry startup and shutdown.

    14b. Develop, communicate, and enforce navigational protocols for routes.

    14c. Identify areas/conditions in which meeting, crossing, or overtaking may significantly increase the risk of collision and develop/enforce a "no passing" policy for those areas.

    14d. Develop and exercise vessel mutual assistance plans.

    14e. Develop and exercise emergency response protocols to facilitate communication and ferry traffic control during emergencies.

    14f. Determine with emergency care providers (e.g., ambulance services) locations along a route at which the ferry can transfer people in medical distress.

14g. Develop, communicate, and enforce a hot work permit program.

14h. Develop, communicate, and enforce lock-out/tag-out program.

14i. Develop, communicate, and enforce a safe lifting program for deckhands.

14j. Develop and enforce standards for emergency training. Establish a frequency for emergency drills that meets or exceeds USCG requirements. Establish criteria for measuring drill performance. Require all shifts and all crew on each shift to participate. Document training.

Impact After Mitigation: The potential for Impact NAV-1 would be reduced after implementation of Mitigation Measure NAV-1.1. Expansion of service using these mitigation measures would minimize risks. No significant increase in incident occurrence has been identified. However, no system can ensure risk-free navigation conditions in the Bay. This impact is potentially significant because of the remaining risk.

Impact NAV-2 **Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between recreational water users (e.g., windsurfers) and ferries. This raises concerns for public safety, especially where windsurfers launch and sail in close proximity to ferry vessels.**

Windsurfers typically do not enter the Bay from marinas. Rather, different launching facilities have developed in the Bay Area because of the need for particular site amenities for that sport, such as shore accessibility and parking, and to take advantage of particular wind and water conditions. The desire to avoid conflicts with other user groups also plays a role in the selection of launch sites. No accidents involving windsurfers and ferries have been documented to date.

Figure 3.2.3 presents the location of existing windsurfing launch sites relative to existing and proposed ferry terminals. The figure also shows the season during which the best windsurfing conditions prevail at each location, and therefore, when these locations are most heavily used. The following proposed terminals would be located in the vicinity of an existing windsurfing launch site: Benicia, Martinez, Crissy Field, Oyster Point, San Francisco International Airport, and Coyote Point.

Larkspur is the only existing ferry terminal located close to a windsurf launch site. No windsurfing accidents have been reported by ferry operators at the Larkspur terminal, even though windsurfing has been a popular recreational activity in the area for many years. This may be attributed to the fact that ferries travel at slow speeds (10 knots) near the terminal and can quickly stop if a windsurfer falls along their path (Clark 2002). No written navigational rules exist for windsurfers, but windsurfers are reported to honor the ferries' approach and departure route, because ferries are restricted to the dredged channel. Depending on wind and tide conditions, windsurfers generally sail within a 1- to 2-mile radius from their launch sites. Windsurfers require a minimum wind speed of 9 knots, and typically sail with winds ranging from 15 to 30 knots. Consequently, in the areas where interaction between windsurfers and ferries might occur, windsurfers may be sailing at higher speeds than ferries. The navigational situation and relationship between ferry operators and windsurfers is reportedly agreeable, and each group is said to "look out for each other" (Clark 2002).

That view of the situation was corroborated by Tom Lloyd, owner of Boardsports Marin, located at Larkspur Landing, and an experienced windsurfer in the Larkspur channel. Mr. Lloyd noted that "ferries usually honk their horn to alert a windsurfer who has either not noticed the ferry is approaching or who has lost control of their board so that they can get out of the ferry's way. As long as the two groups communicate and stay aware of their surroundings, there shouldn't be any problems" (Lloyd 2002). The North Bay Chapter of the San Francisco Boardsailing Association monitors the activities between windsurfers and other vessels, including ferries, near Larkspur Landing to ensure a safe recreational environment for their members.

Summary of Impact NAV-2

- The Proposed Project would increase the number of ferry transits in the Bay and expand service to and from new terminal locations. Some of those proposed terminals could be located in the vicinity of windsurf launch sites. Because no incidents between ferries and windsurfers have been reported, it is not possible to determine the effect of additional transits. Lacking information to the contrary, the impact of increased ferry traffic on windsurfers is considered potentially significant.

Mitigation NAV-2.1: Appropriate training of crew of ferry vessels servicing new terminals located near existing windsurfing launch sites could reduce the risk of incidents involving ferries and windsurfers. Training shall include awareness of windsurfing locations and specific windsurfing events. The San Francisco Boardsailing Association should be encouraged to participate in the development and delivery of such training.

Mitigation NAV-2.2: Specific ferry employees shall be designated to stand watch on the bridge of ferries on select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) to reduce the risk of incidents involving ferries and windsurfers.

Impact After Mitigation: Impact NAV-2 would be reduced after implementation of Mitigations NAV-2.1 and NAV-2.2. As exemplified by the case of the Larkspur terminal, windsurfers and ferry crews will "look out for each other" and develop a relationship that will serve to minimize incidents. Based on the lack of previous incidents, and the implementation of mitigation specific to windsurfing, there is no expectation of a significant increase in incidents. However, no system can ensure risk-free navigation conditions in the Bay, and this impact remains potentially significant.

Impact NAV-3 **Increased numbers of ferry transits in the Bay may lead to an increased risk of collision between recreational boaters and ferries.**

As the population of the Bay region increases, more people are expected to use their leisure time in water-oriented recreational activities. According to USCG information, California had 904,863 registered boats in 2000 and ranks second (after Michigan) among the states in the number of registered recreational vessels (motor and non-motor watercraft). Accident statistics indicate that in 2000, a total of 900 boat accidents took place in California, involving 49 deaths and 519 injuries, and totaling $3 million in property damages. One third of all California boat accidents that year involved collisions with other recreational vessels. A similar proportion was observed nationwide, with 2,706 accidents out of a total 7,740 involving collisions with other

vessels (www.uscgboating.org). The majority of accidents between recreational boats are caused by improper control of the vessels due to operator recklessness. National and state statistics of boating accidents do not indicate that there were any accidents involving ferries and recreational boats. The 1996-2001 record of ferry accidents indicates only one collision during that period, and it did not involve a recreational boat.

Figure 3.2.2 presents the locations of marinas along the San Francisco Bay shoreline, where local recreational water users berth or store their vessels. While most marinas are concentrated in the Central Bay, once vessels are launched, they can travel virtually anywhere in San Francisco Bay, San Pablo Bay, and the Sacramento-San Joaquin River Delta, depending on the capabilities of the vessel and the operator. Therefore, there is potential for interaction between ferries and recreational boaters along any of the existing and potential future ferry routes.

Requirements for the safe interaction between power-driven vessels and between power-driven and sailing vessels are delineated in the International Regulations for Preventing Collision at Sea, Inland Navigation Rules Part B – Steering and Sailing, Rule 18. These regulations govern open bodies of water in which foreign shipping traffic is possible and provide a set of statutory requirements designed to promote navigational safety. These rules include requirements for navigation lights, dayshapes, and steering, as well as sound signals for both good and restricted visibility.

General public education and specific boat operator training in regard to safe operation of boats, appropriate rescue and life-saving equipment, boating under the influence of drugs and alcohol, and other key topics is widely recognized as an important tool to prevent and reduce watercraft accidents. The Federal Boating Safety Act of 1971 (recodified under Title 46 of the United States Code) gave the USCG authority to administer two separate grant programs aimed at recreational boating safety. These programs are a State Grant Program to assist U.S. states and territories, and an award program for nonprofit public service organizations to support recreational boating safety activities.

Boating activities in the Bay Area are well organized. Sail races are scheduled and planned well in advance of the events. USCG, the California Department of Boating and Waterways, marina associations, yacht clubs, and community-based entities such as Boat U.S. Foundation have collaborated extensively in matters of boating education and improving recreational navigation safety in Northern California.

Summary of Impact NAV-3

- The Proposed Project would increase the number of ferry transits in the Bay and expand service to new terminal locations. The increase in the potential for incidents between recreational vessels and increased ferry traffic is potentially significant.

Mitigation NAV-3.1: Additional training, education, and public advisory programs for recreational watercraft users related to navigational safety requirements could reduce the risk of incidents associated with expanded ferry service in the Bay. The project proponent could work with the Harbor Safety Committees (which include recreational boaters) and could fund or sponsor new education and advisory training programs and strengthen existing ones. Potentially affected recreational users, especially those docking at marinas located in the vicinity of proposed new ferry terminals, shall be reached through public notices.

Mitigation NAV-3.2: Designating specific ferry employees on selected ferries/routes to stand watch on the bridge for navigational hazards (i.e., during periods of high recreational use, such as weekends or race events, or when weather hazards exist) could reduce the risk of navigational incidents.

Impact After Mitigation: Impact NAV-3 would be reduced after implementation of Mitigations NAV-3.1 and NAV-3.2. No system can ensure risk-free navigation conditions in the Bay. This could remain a potentially significant impact.

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Table 3.2.1
San Francisco Bay Marinas

	# Berths
Marin County:	
1. Loch Lomond Marina, San Rafael	505
2. Marin Yacht Club, San Rafael	116
3. Lowries Y. Harbor, San Rafael	100
4. San Francisco Yacht Club, Belvedere	189
5. Kappas Yacht Harbor, Sausalito	220
6. Clipper Yacht Harbor, Sausalito	650
7. Schoonmaker Point Marina, Sausalito	161
8. Marina Plaza Harbor, Sausalito	103
9. Pelican Harbor, Sausalito	90
10. Paradise Cay Harbor, Tiburon	*
11. Presidio Yacht Club, Sausalito	190
12. San Rafael Yacht Harbor, San Rafael	*
13. Sausalito Yacht Harbor, Sausalito	*
San Francisco County:	
14. San Francisco Marina - East Harbor (Gashouse Cove), San Francisco	
15. San Francisco Marina - West Harbor, San Francisco	700
16. Pier 39 Marina, San Francisco	300
17. South Beach Harbor, San Francisco	700
18. Treasure Isle Harbor, San Francisco	117
San Mateo County:	
19. Brisbane Marina, Brisbane	570
20. Oyster Cove Marina, South San Francisco	235
21. Oyster Point Marina, South San Francisco	570
22. Coyote Point Marina, San Mateo	580
23. Peninsula Marina, Redwood City	420
24. Pete's Harbor, Redwood City	280
25. Port of Redwood City Yacht Harbor, Redwood City	183
26. Pillar Point Harbor, Half Moon Bay	400
Alameda County:	
27. San Leandro Marina, San Leandro	455
28. Alameda Marina, Alameda	530
29. Grand Marina, Alameda	402
30. Fortman Marina, Alameda	486
31. Ballena Isle Marina, Alameda	455
32. Marina Village Yacht Harbor, Alameda	750
33. Embarcadero Cove Marina, Oakland	152
34. Oakland Yacht Club, Oakland	226
35. Oakland Harbor - Union Point, Oakland	92
36. Jack London Square Marina, Oakland	124
37. Oakland Harbor – North Basin, Oakland	113
38. Emery Cove Yacht Harbor, Emeryville	430
39. Emeryville City Marina, Emeryville	409
40. Berkeley Marina, Berkeley	1,100
41. Fifth Ave. Marina, Oakland	107
42. Aeolian Yacht Club, Alameda	90
Contra Costa County:	
43. Richmond Marina Bay, Richmond	750

Table 3.2.1 - Continued
San Francisco Bay Marinas

44. Richmond Yacht Club, Richmond	250
45. Brickyard Yard Cove, Richmond	250
46. Point San Pablo Yacht Harbor, Richmond	210
47. Antioch Marina, Antioch	310
48. Pittsburg Marina, Pittsburg	460
Napa County:	
49. Benicia Marina, Benicia	321
50. Clen Cove Marina, Benicia	209
Sonoma County:	
51. Petaluma Marina, Petaluma	190

*No Data Available

Table 3.2.2
Bay Area Windsurf Launch Sites

Launch Site	Location	Best Season	Rating
South Bay			
Candlestick Point	San Francisco	May - August	Beginner – Intermediate
Oyster Point	South San Francisco	March – October	Intermediate - Advanced
Genentech	South San Francisco	March – October	Intermediate – Advanced
Flying Tigers at Haskins Way	South San Francisco	March – October	Intermediate - Advanced
Embassy Suites	Burlingame	March - October	Intermediate - Advanced
Coyote Point	San Mateo	March - October	Beginner – Advanced
Seal Point	San Mateo	March - October	Intermediate - Advanced
Third Avenue	Foster City	April - September	Beginner – Advanced
Central Bay			
Point Isabel	Richmond	June-August	Intermediate
Berkeley Marina	Berkeley/ Emeryville	Late June – Mid August	Beginner – Advanced
Marine Park	Emeryville	Late June – Mid August	Beginner – Advanced
Crissy Field	San Francisco	April - October	Intermediate - Advanced
Crown Beach	Alameda	June - August	Beginner – Intermediate
Larkspur Landing	San Rafael	Mid-June to Mid-August	Beginner – Intermediate
Rod and Gun	San Rafael	Late April - June	Intermediate - Advanced
North Bay			
Benicia	Benicia	June - August	Beginner – Intermediate
Sherman Island. *(This location has several launch sites along the levees)*	Near Antioch	June - August	Beginner – Advanced

Table 3.2.3
Routine San Francisco Bay Vessel Trip Statistics

Vessel Type/ Year	Tanker	Freighter	Tug/ Tow	Ferry/ Passenger	Public	Other	TOTAL
1996	3,045	5,262	15,682	66,290	3,911	3,673	97,863
1998	3,136	7,128	19,239	76,421	2,179	3,168	111,273
2000	3,763	9,086	21,478	88,469	2,436	2,472	127,704

Source: All data from U.S. Coast Guard Vessel Transportation Service (VTS) electronic monthly activity reports.
Notes:

- Tanker: self-propelled vessels carrying flammable or hazardous materials in bulk as cargo or residual;
- Freighter: bulk dry cargo, container, break bulk carriers, roll-on/roll-off, lighter aboard ships, etc;
- Tug/Tow: vessels designed for towing one or more vessels;
- Ferry/Passenger: passenger lines or cruise ships; ferry movements calculated from published schedules or counted (actually observed),
- Public: police or fire;
- Other recreational vessels, fishing, etc.

Table 3.2.4
Vessel Transits and Incidents for Various Ports[1]

Port	Total Transits	Collisions	Near Misses[2]	Groundings	Allisions	Vessel Casualties[3]	Total Collisions & Near Misses Per 100,000 Transits	Total Incidents Per 100,000 Transits
Berwick Bay	97,032	1	0	0	0	0	1.03	1
Houston/Galveston	248,935	8	0	67	15	69	3.21	64
Prince William Sound	4,336	0	0	0	0	3	0.00	69
Puget Sound	217,030	5	12	9	9	237	7.83	125
San Francisco	**127,704**	**0**	**8**	**2**	**5**	**31**	**6.26**	**36**
Sault Ste Marie	62,433	0	0	7	5	22	0.00	54
New York	88,109	5	4	18	21	36	10.21	95

Notes:
1) Year 2000 data from www.uscg.mil/vtm/pages/reports
2) "Near Miss" information is not collected uniformly at each port.
3) "Casualties" is a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage.

Table 3.2.5
San Francisco Bay Ferry Boat Casualty Data 1996-2001

Date	Nature of Casualty*	Total Damage	Vessel Name	Location
03/25/97	Allision	$5,500	Sonoma	Point Blunt
10/06/97	Allision	$850	Zelinsky	Larkspur Ferry Terminal
03/02/98	Allision	-	Zelinsky	Pier 41
06/17/98	Allision	$500	Mare Island	Larkspur Terminal
01/27/00	Allision	$500	Jet Cat Express	San Francisco Bay
03/04/00	Allision	$54,000	M/V Catamarin	Tiburon Ferry Dock
04/10/01	Allision	-	Sonoma	Larkspur Channel
07/05/01	Allision	-	Encinal	Alameda
08/24/00	Collision	$5,000	Golden Gate	San Francisco Bay
08/18/96	Equip. Failure	$8,800	Encinal	San Francisco Bay Pier 1
08/23/96	Equip. Failure	$0	Bay Breeze	Pier 41
09/23/96	Equip. Failure	$6,000	Del Norte	Larkspur Terminal Berth
10/02/96	Equip. Failure	$7,000	Bay Clipper	San Francisco Bay
10/27/96	Equip. Failure	-	Golden Gate	Aquatic Park
11/11/96	Equip. Failure	$12,000	Encinal	Off Blossom Rock
01/03/97	Equip. Failure	$50	Bay Breeze	San Francisco Pier 39
03/07/97	Equip. Failure	$300	Golden Gate	San Francisco Ferry Terminal
04/18/97	Equip. Failure	$26,000	Sonoma	Oakland Estuary Buoy #8
06/05/97	Equip. Failure	$0	San Francisco	San Francisco Bay Pier 1
06/10/97	Equip. Failure	$12,000	Del Norte	Anchorage Eight
09/27/97	Equip. Failure	$5,000	Golden Gate	San Francisco Pier 9
09/29/97	Equip. Failure	$5,000	Bay Breeze	San Francisco Ferry Terminal
11/12/97	Equip. Failure	$50	San Francisco	San Francisco Bay
11/18/97	Equip. Failure	-	Jet Cat Express	South of Alcatraz Island
03/05/98	Equip. Failure	$1,500	Jet Cat Express	San Francisco Bay
05/31/98	Equip. Failure	-	Intintoli	Marin Boat House
01/14/99	Equip. Failure	$22,000	Sonoma	Larkspur
01/19/99	Equip. Failure	$0	Bay Breeze	1/4 mile off San Francisco Ferry Bldg.
03/09/99	Equip. Failure	$250	M/V Intintoli	San Francisco Bay Pier 1
04/10/99	Equip. Failure	$0	Oski	Vallejo
06/01/99	Equip. Failure	$2,000	Jet Cat Express	Marine Terminal, Pier 41
09/23/99	Equip. Failure	-	M.S. Marin	
10/19/99	Equip. Failure	$2,500	Bay Clipper	San Francisco Bay
01/03/00	Equip. Failure	$50,000	Bay Breeze	San Francisco Ferry Terminal
03/28/00	Equip. Failure	$4,000	Sonoma	San Francisco Pier 41
04/24/00	Equip. Failure	$1,200	The Real McCoy	San Francisco Bay
06/14/00	Equip. Failure	$0	Bay Flyer	Half mile N of Pt. Pinole
07/19/00	Equip. Failure	$142,000	M/V Golden Gate	San Francisco Bay
08/17/00	Equip. Failure	$0	Bay Flyer	San Francisco Bay
08/21/00	Equip. Failure	$200	Encinal	
09/02/00	Equip. Failure	$1,000	Intintoli	San Francisco Bay
09/03/00	Equip. Failure	$500	M.S. San Francisco	San Francisco Bay
10/02/00	Equip. Failure	$75,000	Royal Star	San Francisco Bay Pier 48
10/30/00	Equip. Failure	$0	Bay Clipper	San Francisco Bay
11/01/00	Equip. Failure	$150,000	Intintoli	San Rafael
03/01/01	Equip. Failure	$50	Zelinsky	San Francisco Ferry Terminal
11/12/01	Equip. Failure	-	Sonoma	Tiburon Ferry Landing
11/30/01	Equip. Failure	-	Mare Island	Steam Boat Slough
12/03/01	Equip. Failure	-	Sonoma	Alcatraz Island
12/05/01	Equip. Failure	$200	Mare Island	Btwn. Sausalito and San Francisco
09/29/98	Fire	$1,000	San Francisco	Cache Slough
01/18/00	Fire	$0	San Francisco	Vallejo

Table 3.2.5 - Continued
San Francisco Bay Ferry Boat Casualty Data 1996-2001

Date	Nature of Casualty*	Total Damage	Vessel Name	Location
03/18/96	Flooding	-	Sonoma	Inbound San Francisco Bay
09/22/96	Flooding	$5,000	Royal Star	San Francisco Bay
09/02/99	Grounding	$0	M/V Encinal	San Francisco Bay
12/12/00	Grounding	$100	Del Norte	Entrance to Larkspur Channel
07/26/96	Struct. Failure	$0	Royal Star	San Francisco Bay
09/08/96	Struct. Failure	$0	Zelinsky	Basin at San Francisco Ferry Bldg.

Notes:
* "Casualty" is a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage

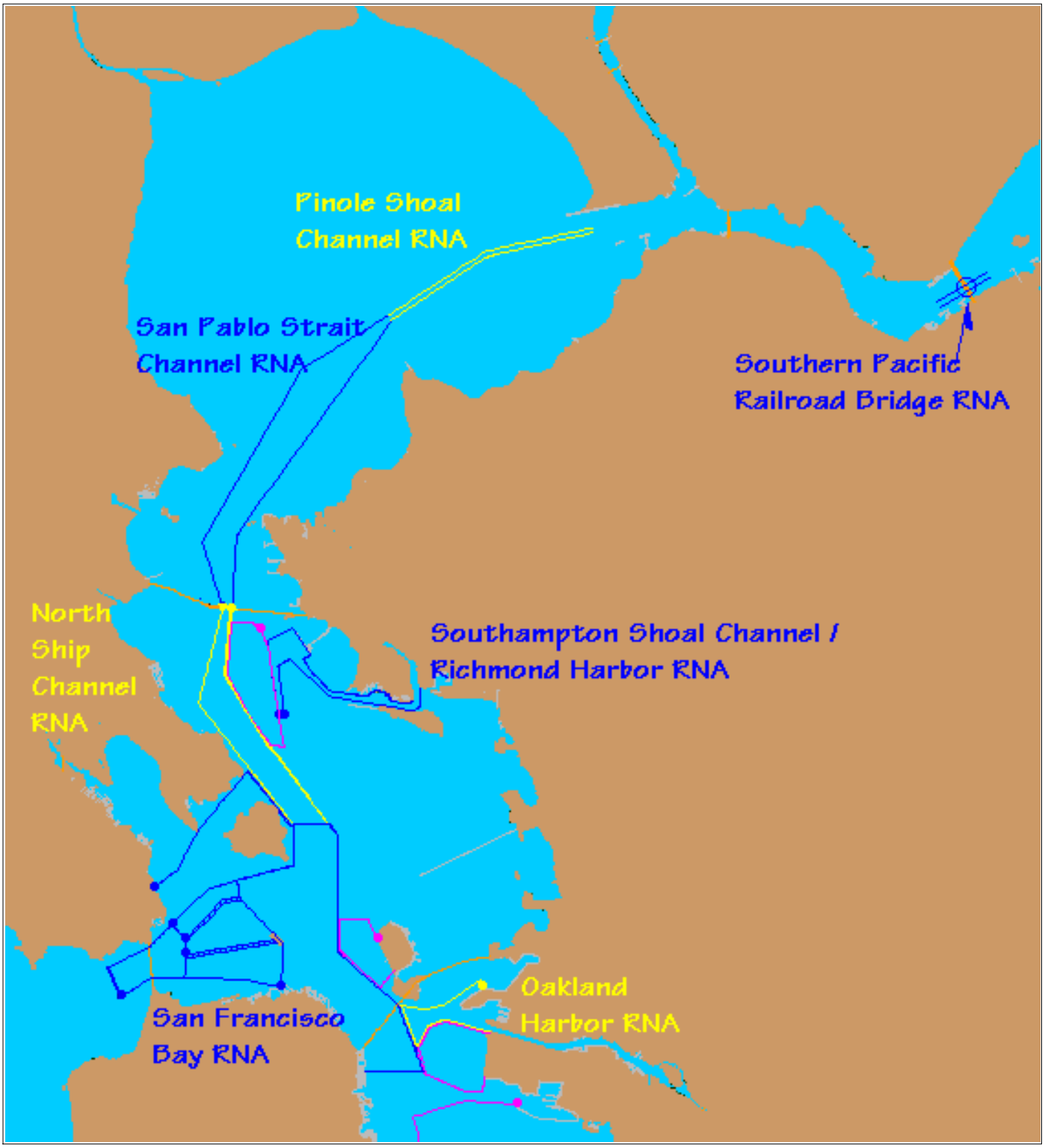
Table 3.2.6
San Francisco Vessel Transits and Incidents (1996-2001)

Year	Ferry Transits	Total Transits	No. of Incidents[1]
1996	66,290	97,863	21
1997[2]	66,198	95,708	47
1998	76,421	111,273	50
1999[3]	73,694	107,826	46
2000	88,469	127,704	42
2001	78,751	118,165	33

Notes:
1) Data include all vessels in San Francisco Bay. Incidents include: collisions, groundings, near misses, vessel casualties, allisions, and pollution events.
2) No data were available for the month of April 1997
3) No data were available for the month of September 1999

Table 3.2.7
Projected 2025 Annual Vessel Transits in San Francisco Bay

	2025 Non-Ferry No Growth				2025 Sustained Non-Ferry Growth		
	Ferry Transits	Non-Ferry Transits	Total Transits	% Ferry Transits	Non-Ferry Transits	Total Transits	% Ferry Transits
Proposed Project	165,850	39,235	205,085	81	103,962	269,812	61



URS	Water Transit Authority Program EIR	Regulated Navigation Areas (RNAs) in San Francisco Bay	Figure 3.2.1
	Project No. 43-00066890.12		

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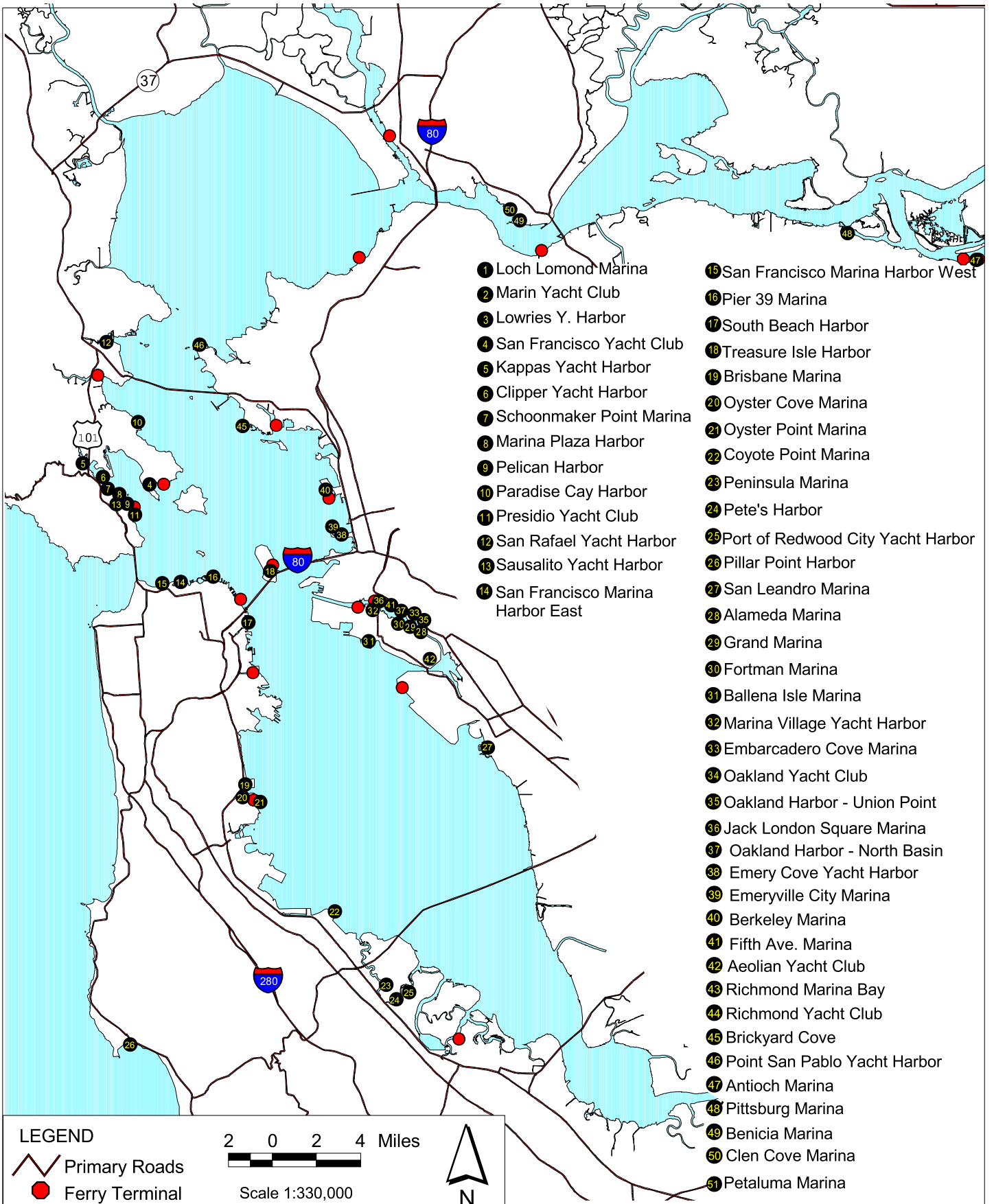

URS	Water Transit Authority Program EIR Project No. 43-00066890.12	LOCATION OF MARINAS AND FERRY TERMINALS	Figure 3.2.2

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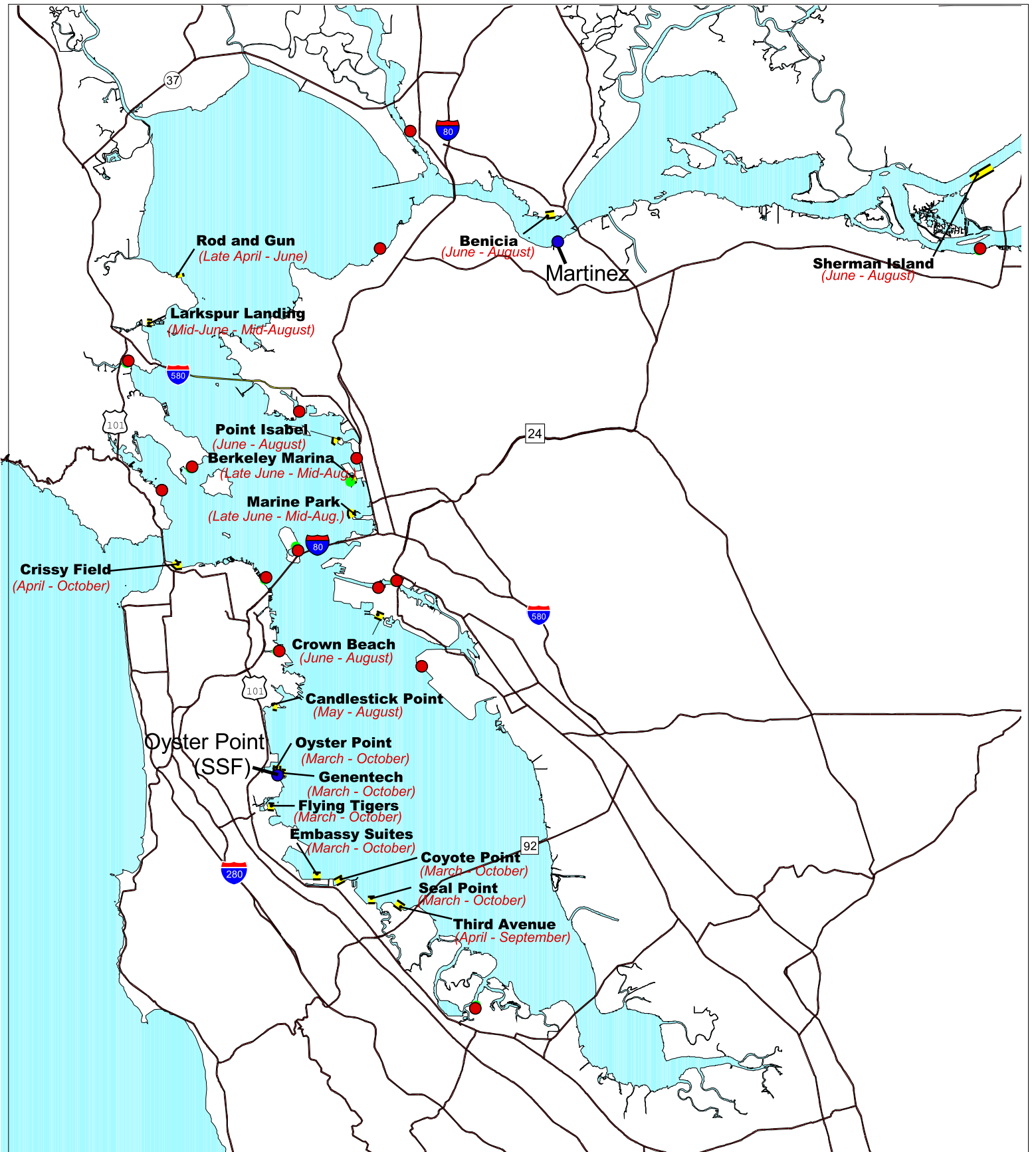

LEGEND

- Windsurfing Launch Zone
- Primary Roads
- Ferry Terminal
- Ferry Terminal located near Windsurfing Launch Site

3 0 3 6 Miles

Scale 1:380,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

WINDSURFING LAUNCH SITES AND SEASONAL USE

Figure 3.2.3

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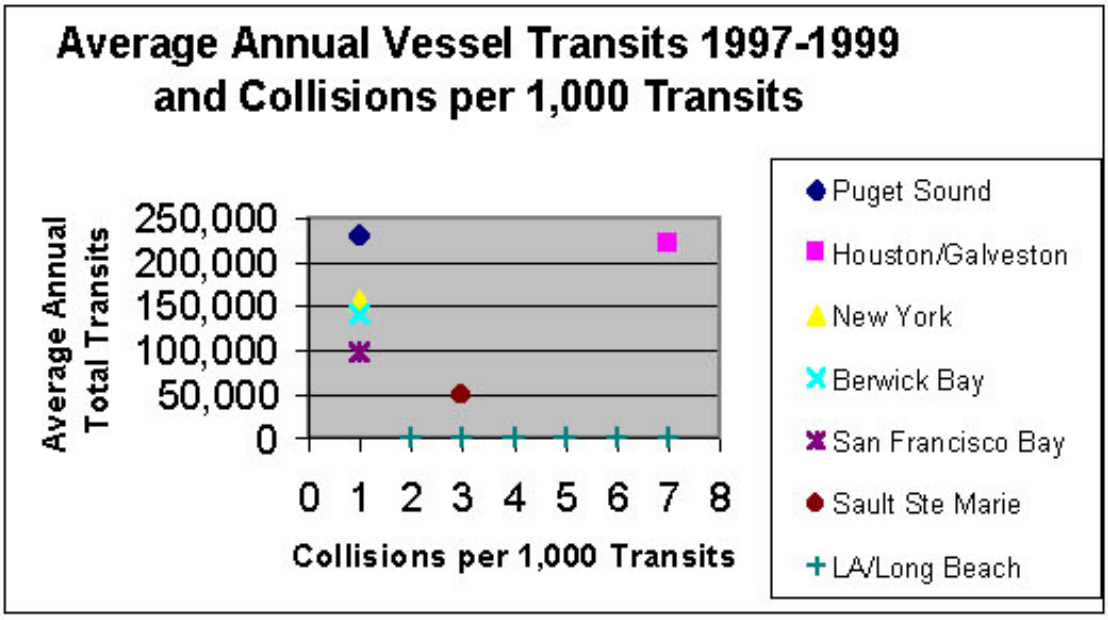

URS	Water Transit Authority Program EIR Project No. 43-00066890	AVERAGE ANNUAL VESSEL TRANSITS (1997-1999) AND COLLISIONS PER 1,000 TRANSITS FOR MAIN U.S. HARBORS	Figure 3.2.4

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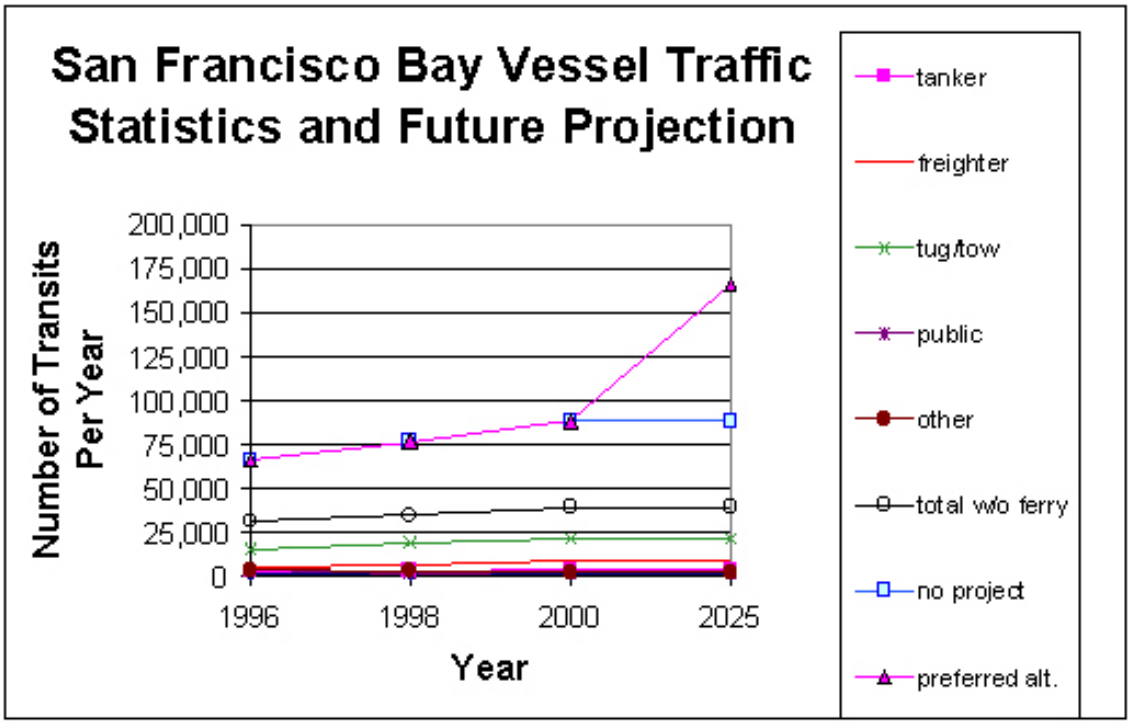
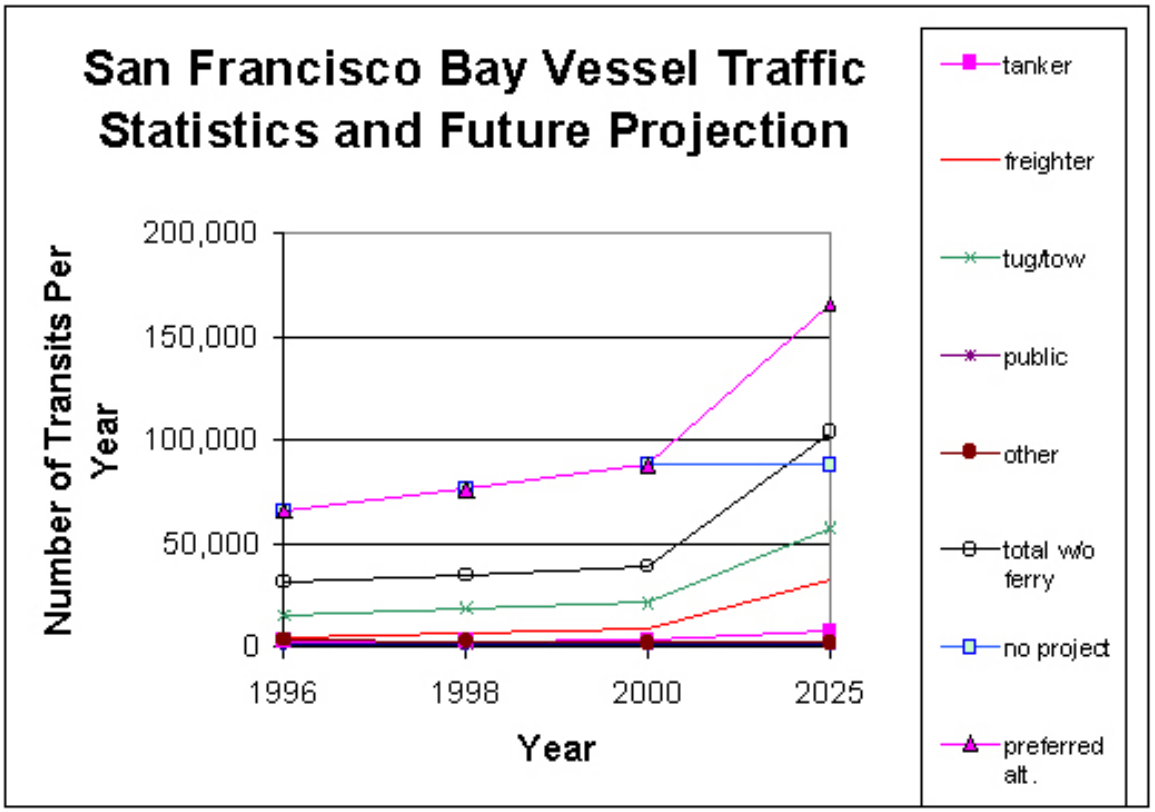


URS	Water Transit Authority Program EIR Project No. 43-00066890	YEAR 2025 FERRY TRANSIT PROJECTIONS AND NO GROWTH IN NON-FERRY VESSEL TRIPS	Figure 3.2.5



URS	Water Transit Authority Program EIR	YEAR 2025 FERRY TRANSIT PROJECTIONS AND SUSTAINED GROWTH IN NON-FERRY VESSEL TRIPS	Figure 3.2.6
	Project No. 43-00066890		

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3.3 WAKE ANALYSIS

This section describes the existing San Francisco Bay shoreline, the overall wave and wake setting, and the potential impacts from additional wake wash created by expanded ferry service.

Waves occur in the natural environment as the result of energy, usually from wind, being transferred to the water surface. Seasonal variations in wave energy account for significant seasonal variations in shorelines.

Vessels with submerged hulls also create waves, referred to as vessel wake or wake wash. Vessel wake results from water being pushed aside, or displaced, by the hull and the resistance of the water to hull movement. The waves move outward from the hull. Depending on the water depth and type of shoreline, they may either dissipate harmlessly or cause undesirable impacts. The characteristics of wake wash that reaches the shoreline depend on the size and shape of the hull, vessel speed, vessel direction, and water depth.

If wake-generated waves have significantly greater wave heights or energy at the shoreline than natural wind waves, the wake wash can lead to excess resuspension of shoreline sediments and shoreline erosion or damage shoreline development.

Wake wash is of concern where wetlands, other sensitive habitats, and marinas are close to ferry routes. For example, the existing high-speed ferry service out of Larkspur and Vallejo are both subject to speed restrictions in their approach channels. In Larkspur, the primary concerns are impacts to Corte Madera marsh and to the marina at Paradise Cay, while in Vallejo, the concern is for impacts to houses and private slips built close to shore along the mouth of the Napa River.

3.3.1 Environmental Setting

3.3.1.1 Shoreline Types

Existing shoreline environment types in the Bay Area are described in detail in the Goals Project (Goals Project 2000). They can be grouped into five general categories: tidal marsh, bay flats, sandy beach, rocky shoreline, and armored shoreline (seawalls, riprap, etc.). Habitats along the San Francisco Bay shoreline are shown on Figure 3.3.1.

Geographically, the Bay Area shoreline can be broadly divided into three subregions, which are defined as the following:

- North Bay – North of the Richmond Bridge including San Pablo Bay, Carquinez Strait, Suisun Bay and the west Delta
- Central Bay – Richmond Bridge to the Bay Bridge east of the Golden Gate Bridge
- South Bay – South of the Bay Bridge

The majority of the San Pablo Bay portion of the North Bay shoreline consists of bay flats. Bay flats are sparsely vegetated intertidal areas that provide protection to banks and upland shoreline from wave energy and sediment. During low tide, bay flats provide foraging and roosting areas for numerous shorebirds that utilize the Bay during spring migration. In San Pablo Bay, bay flats generally border tidal marsh and farmed bayland areas. Tidal marsh can be salt marsh or brackish marsh, depending on its salinity. Tidal marsh vegetation specially adapted for saline

conditions provide special foraging and roosting habitats for several species that could potentially be affected by wake wash.

Further east toward the Suisun Bay portion of the North Bay, the shoreline near potential ferry terminal sites mainly consists of marinas and armored shoreline (i.e., riprap). In Suisun Bay, the shoreline consists primarily of tidal marsh, muted tidal marsh, and managed marsh. There is also a limited area of bay flats along the northwestern shoreline.

Most of the shoreline in the Central Bay consists of rocky shoreline or manmade structures (i.e., marinas, piers, and riprap). Some bay flats exist along the Central Bay shoreline, mostly near the Larkspur, Berkeley, and Oakland areas. These bay flats are generally near small areas of tidal marsh and undeveloped fill. Towards the southern part of the Central Bay, a strip of sandy beach exists along the San Francisco shoreline between potential ferry terminal locations in Presidio and Fort Mason.

The northwestern portion of the South Bay shoreline is mainly developed and undeveloped fill. Around and south of the San Francisco Airport, bay flats occur along the shoreline. On the east side of the South Bay, bay flats occur around the Oakland Airport and San Leandro, and to the south along the shoreline all the way to the southernmost part of the South Bay, where there are extensive areas of bay flats, salt ponds, and tidal marsh.

Other types of shoreline habitats in the South Bay include sandy beach areas to the south of Harbor Bay Isle and diked marsh areas to the north of San Leandro.

3.3.1.2 California Clapper Rail Habitat

The California clapper rail (*Rallus longirostris obsoletus)*, an endangered species, was used to represent shoreline habitat impacts from vessel wake. Clapper rail are yearlong residents of emergent salt and tidal marshlands of San Francisco Bay (Goals Project 2000; Avocet Research 1992). They are most abundant in marshes south of San Mateo Bridge and in San Pablo Bay. The known distribution of California clapper rail in the Bay Area is shown on Figure 3.5.12 in the Biology Section (3.5). Disturbances to clapper rail habitat, such as inundation of nests, have potential to cause a negative impact on the endangered species' survivability during the nesting season.

California clapper rail nest between February 15 and June 15, building their nests in marsh vegetation such as bullrush (*Scirpus robustus*) and *Spartina sp.* at the maximum water level for the nest period (Collins et al. 1994; Avocet Research 1992). The whole breeding season for California clapper rail is February 1 through August 31, including courtship, nesting and renesting (Floerke 2002). The nests are generally located at least 100 meters inland from the marshland shoreline and less than 2 meters from small (first-order) channels (Collins et al. 1994). Nests are constructed entirely above mean higher high water (MHHW), with the base typically 10 to 20 centimeters (cm) above the ground (although one was observed built directly on the ground) and the top of the nests 25 to 30 cm above the ground. The nests are fixed to the vegetation and cannot move with the tide or waves. The clapper rail builds its nest only as high as necessary to prevent inundation while maintaining as much overhead cover protection from the surrounding vegetation as possible (Collins et al. 1994).

3.3.1.3 Bathymetry

The North Bay includes San Pablo Bay, Carquinez Strait, and Suisun Bay. San Pablo Bay consists of a 30-foot-deep ship channel surrounded by wide shallow shoals, especially north of the channel. The average depth of San Pablo Bay is approximately 9 feet Mean Lower Low Water (MLLW) and approximately 57 percent of the total area of San Pablo Bay is shallower than about 7 feet (USGS 1984).

Carquinez Strait, which consists of the transitional region between San Pablo Bay and Suisun Bay, has a mean depth and width of 30 feet and 1.6 mile, respectively (USGS 1984). Suisun Bay consists of several deep channels surrounding numerous shoals and islands. It includes two embayments, Grizzly and Honker Bays, with a mean depth of less than 7 feet. Suisun Bay has a total area of 36 square miles and a mean depth of 14.1 feet MLLW. A 30- to 46-foot-deep MLLW main channel connects Carquinez Strait and the Delta (USGS 1984).

The Central Bay is defined as the area between the Golden Gate Bridge to the west, the Bay Bridge to the south, and the Richmond Bridge to the north. The Central Bay has a total area of approximately 103 square miles and a mean depth of 35 feet MLLW. It is the deepest embayment on average of the entire San Francisco Bay and has the smallest percentage of shoal area (20 percent of total area). A ship channel with a depth of at least 29.5 feet originates at the entrance of the Bay and extends through the entire Central Bay, leading to channels in the North Bay and South Bay. The deepest area of the Central Bay is at the Golden Gate constriction (~360 feet), where depth is maintained by the strong tidal currents experienced at this narrow passage (USGS 1984).

The South Bay is defined as the area located south of Oakland Bay Bridge. It has a mean water depth of 17.4 feet MLLW (USGS 1995). A deep channel is located on the southwestern side of the South Bay. Its depth varies from about 35 to 40 feet MLLW north of the Dumbarton Bridge to 20 feet MLLW south of the Dumbarton Bridge (USGS 1984). The shoal areas located on either side of the channel are on average less than 10 feet deep south of the San Mateo Bridge and less than 5 feet deep south of the Dumbarton Bridge.

3.3.1.4 Tides and Currents

The maximum rise and fall of tide in San Francisco Bay is 2.4 meters. Currents vary considerably throughout the Bay with the strongest currents in the central Bay and weaker currents toward the southern extremities. The strongest outgoing (ebb tide) currents, exceeding 4 knots, occur in the Golden Gate and in the approaches to the Golden Gate such as Raccoon Strait (between Alcatraz and the Tiburon Peninsula), and between Treasure Island and the Ferry Terminal in San Francisco. Incoming (flood tide) currents are similar in strength. Currents near the mouth of the Sacramento and Petaluma Rivers are strongly influenced by fresh water run-off from these rivers, and vary with rainfall.

3.3.1.5 Sediment Sources and Transport

The San Francisco Bay is a very dynamic regime and the sediment movement and distribution within the Bay reflects the energy of the system. Short-term tidal fluctuations, mid-term seasonal patterns, and long-term historical changes influence sediment distribution. Resuspension and deposition of sediment occurs naturally each tidal cycle, in particular, during

the monthly spring tides. Large volumes of sediment enter the Bay from the Sacramento, San Joaquin, and other rivers each spring.

The sediment in the shallow waters and shorelines of the Bay is predominantly fine silts and clays (cohesive sediments). While the sediments entering the North Bay from the San Joaquin and Sacramento Rivers contain coarser sandy material, a natural winnowing process takes place in the deeper channels. The finer silty sediment remains in suspension longer and hence is transported to shallower waters while the heavier material is carried by currents along the channel bottoms.

Studies have shown that tidal currents, large tidal variations, wind-wave resuspension, outflow from the Sacramento-San Joaquin River Delta (Delta), and transport are the most important process governing dynamics of sediment movement in the Bay (Schoellhamer 1996; McDonald and Cheng 1994). Throughout the Bay, the spring-neap tide cycle is an important factor in suspending and transporting sediment.

The Bay mudflat and marsh areas of the shoreline are in long-term dynamic equilibrium with effects of wave, tide and current action. Dynamic equilibrium means that in some areas mudflats and marshes are accreting sediment, whereas in other areas, marshes are being undercut and mudflats are eroding. Whether an area is accreting or eroding is a function of the supply of sediment.

In the North Bay, sediment transport is dominated by input from the Delta and outflux through the Golden Gate. The Delta is the predominant source of sediment to San Francisco Bay as a whole, supplying up to 86 percent of the total fluvial sediment (Krone 1996). The remaining sediment is contributed from local tributaries. Most of the sediments entering the Bay are silts and clays in suspension (Conomos and Peterson 1977).

The South Bay is characterized by large areas of broad shallows that are incised by a main channel 10 to 20 meters deep. Bottom sediments are typically composed of clays and silts (Thompson et al. 1981), with mixtures of silts with sand and shell fragments in the eastern shallow areas (Nichols and Thompson 1985).

3.3.1.6 Net Sediment Accretion and Erosion in the Bay

The Bay bottom contours (bathymetry) and, hence, the position of the Bay shoreline, is not constant but changes in response to sediment entering the Bay from rivers and exiting the Golden Gate. General regional patterns of accretion (deposition) and erosion for the Bay have been developed, but even these patterns are subject to local variations.

Hydraulic mining in the Sierra Nevada Mountains started in the mid-1800s. As a result, large amounts of sediment have entered the North Bay. The area continues to be a significant sediment source. As well as historic mining sediments, the Sacramento and San Joaquin Rivers naturally discharge sediments. The California Department of Water Resources (DWR) calculated the average annual inflow of sediment from the Sacramento and San Joaquin Rivers between 1956 to 1990 to be 7.8 million cubic yards (mcy). In addition, an estimated 0.89 tons of sediment enters Suisun, San Pablo, and San Francisco Bays from local tributaries (Ogden Beeman and Krone 1992).

The sediment inflows and outflows can be combined to develop a sediment budget. For 1960, the most recent available evaluation, a total of 10.5 mcy of sediment entered the Bay, 1 mcy

were dredged and disposed on land, 5.5 mcy accumulated in the Bay, and 4.0 mcy exited through the Golden Gate (Krone 1996). This budget indicates that, overall, the Bay is accumulating sediments.

There are regional variations within the Bay, with the North and Central Bays being depositional and the South Bay erosional. Based on computed bathymetric changes from 1955 to 1990, Ogden Beeman and Krone (1992) concluded that the Central and North Bays were accretional over the 35-year period, with highest rate of deposition occurring in the Central Bay (0.2 to 0.4 inch per year) followed by Suisun Bay (1 to 0.3 inch per year). San Pablo Bay was almost neutral although the northern portion of San Pablo Bay showed slight erosion. The South Bay north of San Mateo Bridge was primarily erosional in the eastern and depositional near San Bruno Shoals. The largest sediment accumulation was located south of Dumbarton Bridge.

Other studies (Jaffe et al. 2000; Cappiella et al. 2000) have reached different conclusions on the rates of erosion and deposition in subregions of the Bay. However, this brief review of the sediment patterns indicates that the Bay is dynamic and that bathymetry and shorelines are not static. Hence, changes in sediment movement resulting from ferry operations needs to be considered in the context of a dynamic system that has daily, seasonal and long-term temporal variations.

3.3.1.7 San Francisco Bay Area Winds

Local geographic features strongly influence wind patterns and as such, the wind regimes for San Francisco Bay can be split up into three main regions: North, Central, and South Bays. The San Bruno Gap, located north of San Francisco Airport, is one of the most important features influencing Bay Area wind patterns. During the spring and summer, west to northwest winds are funneled through the gap, resulting in stronger westerly winds.

3.3.1.8 Wave Climate in San Francisco Bay

Naturally occurring waves within San Francisco Bay are predominantly those created by local winds. Swells, which are produced by storm systems far away, generally do not contribute significantly to the wave climate within the most of the Bay. However, long period swells from wind forces hundreds of miles to the west coming through the Golden Gate can mix with long fetch northeast wind-driven waves in the shallow South Bay to create, at times, steep and complex wave patterns. In San Pablo Bay (North Bay), short period wind-driven waves and the tidal effects of the Sacramento and Petaluma Rivers create a different wave pattern. The northerly winds in San Pablo Bay cause short wavelength "choppy" waves, while in the South Bay, these same waves, coming on the shallow waters of the south end, often break into steeper waves. These two systems come together at the Golden Gate.

Wind-Driven Wave Height and Energy Calculations

Because there are no comprehensive measurements of waves in San Francisco Bay, wave "hindcasting" was conducted using computer models for 15 representative locations throughout the Bay. This technique allows wave characteristics such as wave height and energy to be calculated using empirical equations based on past meteorological conditions. The calculations are described in detail in Appendix Wake-A.

Analysis of wind data from Oakland and San Francisco airports indicates that the 1992-1993 year was a typical or representative wind year. Therefore, the 1992-1993 wind records from these airports and data from a wind station in San Pablo Bay were used in this analysis.

Table 3.3.1 presents maximum sustained wind wave heights (in meters) for wind-driven waves reaching the shore for the 15 representative Bay locations. These values were calculated using the 1992-1993 wind data as presented in Appendix Wake-A. Table 3.3.2 presents monthly wave energy (MJ/m) reaching the shore for the same locations. Considerable seasonal variation is evident. The locations with the greatest wind wave heights are those with the longest fetch lengths across the Bay. While the Petaluma Wetland location has the longest fetch length and hence the largest wind-driven waves, in reality, much of that energy will dissipate on the mudflats. Wave breaking, refraction, and diffraction were not considered in the computations.

3.3.1.9 Wake Wash Climate in San Francisco Bay

When a vessel with a submerged hull moves through the water, it displaces water and meets resistance, some of which is transformed into wave energy. The displaced water first moves up whereupon gravity acts upon it, resulting in the familiar form of an undulating wave with predictable shape and properties. These waves appear similar to wind-driven waves.

The waves move toward the shoreline, where, depending on the water depth and type of shoreline, they may either dissipate harmlessly or may cause undesirable impacts, such as erosion. The detailed characteristics of wake wash when it reaches the shoreline depend on the size and shape of the vessel hull, vessel speed, vessel direction, and water depth (Stumbo et al. 1999).

If vessel wake results in waves at a shoreline that have significantly greater wave heights or energy compared to natural wind waves, the wake wash can lead to excess resuspension of shoreline sediments and erosion or cause damage to shoreline development.

The wake wash characteristics of existing conventional and high-speed ferry vessels operating on the six services in San Francisco Bay were measured over a 3-day period in February 2002 for this assessment. Details of the measurements and calculations are presented in Appendix Wake-B. The technical aspects of wake wash, as well as the wake assessment methodology utilized, are described in more detail in Appendix Wake-D.

Existing Vessel Traffic on San Francisco Bay

In recent times, ferry service has been offered on the Bay since the early 1970s when commuter service restarted in response to increasing congestion on regional highways. Service increased in response to a number of natural and manmade disasters including the Loma Prieta earthquake, the landslide on U.S. 101 in Marin County, and the BART tunnel fire. Existing conventional and high-speed ferry traffic is therefore a component of the environmental setting.

There are currently six major ferry routes on the Bay, with an average of 78 daily one-way transits. They include routes from San Francisco to Larkspur, Sausalito, Tiburon, Vallejo, Harbor Bay, Oakland, and Alameda. The service from San Francisco to Oakland and Alameda is a circular route owned by the Alameda Oakland Ferry Service (AOFS) and operated by Blue & Gold. Harbor Bay Maritime runs the San Francisco/Harbor Bay route. The San Francisco to

Vallejo route is owned by Vallejo and run by Blue & Gold. Golden Gate runs the remaining routes. Existing ferry traffic in San Francisco Bay is shown in Table 3.3.3.

Other vessel traffic on the Bay includes tugboats, other public vessels, pleasure craft, and tankers, container vessels, roll-on/roll-off vessels, and bulk carriers calling in the Ports of Oakland, San Francisco, and ports up the Sacramento River. Table 3.3.4 presents the traffic in San Francisco Bay in a typical month. The total number of trips for the month shown (September 2001) was 6,078. Of these, 4,146 were by ferries, or approximately 68 percent.

Wash From Existing Vessel Traffic

The wake wash measurements from ferries observed in Francisco Bay for this analysis is presented in Table 3.3.5. The wake wash data are presented using the following quantities:

- **Energy "packet" size:** The height (cm), period (s), and energy (Joules/m) of the tallest wave in the vessel's wave train at the distance from the sailing line of the area of concern. These values are generally reported at a standardized distance of 300 meters.
- **Energy from one transit's wave train:** Determined from a single vessel's wash characteristics at the point of measurement.

Table 3.3.5 lists conventional monohulls ("Spaulding" class ferries and pusher tugs), intermediate speed (25 knot), and high-speed catamarans (35+ knot "Mare Island" class ferries). The conventional 725-passenger Spaulding class monohulls, which operate at 20 knots, show the largest wake heights and energies (up to 58 cm and 16,400 J/m respectively). The 149-passenger 35-knot vessels show the lowest wake heights and energies for high-speed ferries at operational speeds (20 cm and 800 J/m). The wave heights and energies are also shown for two of the high-speed vessels (350 passengers, 35 knots; 149 passengers, 35 knots) when they are operated at a reduced speed of 10 knots. The 149-passenger 35-knot vessel shows a slight increase in wake wash energy at reduced speed.

There is no standard wash pattern for nonferry traffic in the Bay. Table 3.3.6 summarizes available wake wash characteristics of other types of vessels. As a general rule, the large container vessels and bulk carriers move slowly, either under their own power or by tug, and they create very little wash. However, when large container vessels or tankers travel in constricted straits or narrow channels, they can create a very large wake as they displace a significant volume of the water in the channel. Tugs produce significant short-period high-energy wash as they move from location to location at their maximum speed, which is typically at the hump speed, or the highest energy peak in their speed/power profile. The dinner vessels are generally of the same hull configuration as the monohull ferries. While their wake profile at top speed is significant, they seldom operate at top speed and they do not travel standard routes.

The contribution of the nonferry traffic to Bay Area wake wash is estimated to be less than one-third of the Bay-wide total. In some areas such as the Carquinez Straits, nonferry vessel traffic causes the majority of total wake. This estimate is based on conversations with U.S. Coast Guard (USCG) personnel based at the Vessel Traffic Center on Yerba Buena Island, and a month of vessel traffic data supplied by the USCG. Data was supplied for the month of September 2001, which the USCG indicated was a typical month for vessel traffic.

3.3.1.10 Regulatory Setting

There are currently no federal, state, or local wave wash regulations. However, a search of information available on the Internet was conducted to identify legislative criteria or operational guidelines for wave wash generated from high-speed ferries around the world.

For the majority of areas, specific criteria for wave wash generated from high-speed ferries was not identified within legislation, regulations, or guidelines. However, the issue is assessed in some areas during the Environmental Impact Assessment process (in particular in Denmark, Australia, New Zealand, Italy, and United Kingdom). Areas with specific criteria are summarized below and discussed in more detail in Appendix Wake-C.

Washington State Ferries

The Washington State Ferries (WSF) system currently operates two high-speed catamaran passenger-only ferries, the *Chinook* and *Snohomish*, from Bremerton to Seattle. The route passes through Rich Passage, which is approximately 3 miles long and ½ mile wide at the narrowest point. The vessel wake wash specifications (28 cm wave height measured at 300 meters) were based on a wake study (Hartman 1990) to determine the minimum design criteria that would not cause significant harm to the shoreline.

The *Chinook* began service in May 1998 and was generally run at 34-35 knots. A second high-speed ferry, the *Snohomish,* was scheduled to begin service in September 1999. In April 1999, Bainbridge Island landowners along Rich Passage filed a lawsuit, charging that wake wash from the ferries was damaging their waterfront bulkheads, eroding beaches, and harming marine life.

In August 1999, as a result of the lawsuit, WSF was ordered to reduce the speed of the ferries to 12 knots in the vicinity of Rich Passage. The decision was appealed and the court-ordered slowdown was lifted in April 2000 (Kucera vs. State).

The *Snohomish* began operations in November 1999. In 2000 and 2001, a wave action study was performed to form the basis for further recommendations (RPWAST 2001). Some of the study sites showed no evidence of POFF wave impacts. One stretch of shoreline, however, experienced substantial erosion.

Starting October 1, 2001, state ferry officials enacted a slowdown to 12 knots in a section of Rich Passage, lengthening the crossing by 10 minutes (Pritchett 2001). The slowdown did not extend the entire length of Rich Passage as the previous slowdown had but was based on the results of the Rich Passage Wave Action Study (RPWAST 2001).

Europe

The Danish Maritime Authority (DMA) established wake wash regulations in 1997 (DMA 1997). Before a shipping company establishes a high-speed ferry route operating in a Danish port or puts a new high-speed ferry into service on an existing route, the operator must present documentation that the waves generated by the high-speed ferry do not constitute an unnecessary risk to navigation safety and to leisure activities in coastal areas based on a calculation of maximum wave height.

In the United Kingdom, the Maritime and Coastguard Agency is currently working with Marinetech South Limited on the Ships Wash Impact Management (SWIM) Research Project Collaboration. The objectives of the SWIM Project, which is due for completion in 2003,

include development of techniques for predicting wave generation, identifying the impact of hull form, trim, speed, and water depth on wash characteristics, development of methodologies to quantify ecological impacts of wash, and proposal of guidelines for managing wash impacts. The project is supported by the Maritime Safety Committee of the International Marine Organization (IMO).

New Zealand

In the Marlborough Sounds in New Zealand, 35-knot fast ferries began operating in 1994. Based on a risk assessment and the results of a continuing ferry wash monitoring program, the Marlborough District Council (MDC) approved a bylaw (The Navigation Bylaw 2000) imposing an 18-knot speed restriction on high-speed craft in December 2000. It includes an exemption if ferry operators can demonstrate that waves generated by their vessels will not exceed prescribed levels (MDC 2002). MDC is continuing to assess potential controls for high-speed vessels to be included in an updated *Marlborough Sounds Resource Management Plan* (MDC 2001).

3.3.2 Impacts and Mitigation

The following section describes the potential impacts that wake wash from expanded ferry service could have on the environment. This is an evaluation of potential impacts from the overall ferry service expansion program. Therefore, the discussion addresses the overall potential for impacts, and, where applicable, the mitigation measures that can be adopted to avoid or minimize these effects.

3.3.2.1 Significance Criteria

Qualitatively, impacts to the shoreline from wake wash from new ferry service would be considered significant if they would:

- Cause a significant increase in wave height (energy) at a shoreline receptor compared to that of natural wind-driven waves and existing wake; or
- Cause a significant increase in shoreline erosion or loss of wetland habitat; or
- Impact special-status species such as California clapper rail (a threatened species) or Pacific harbor seal (a protected species).

Physical Shoreline Significance Criteria

To enable quantitative assessment of potential impacts to shorelines, specific criteria for San Francisco Bay were developed as described in Appendix Wake-D. The significance criteria include a 16-cm wake wash wave height at the shoreline and a 1,500-meter distance from sensitive shorelines to ferry routes. Potentially sensitive shorelines include mudflats, salt marshes, narrow channels, and sandy beaches. Potential impacts from increased ferry service would not be significant for rocky or armored shorelines. Erosion at rocky shorelines is a consequence of cumulative extreme storm events and armored shorelines are designed to resist the waves occurring during extreme storm events. The 16-cm criterion is based on an analysis of daily average wind waves. The 1,500-meter criterion is based on the distance required for the wake from a vessel with a design wake wave height of 27 cm (measured at 300 meters) to attenuate to the 16-cm shoreline criterion. (The 27-cm wake height design criterion is based on

the largest anticipated vessel that would be used for the increased ferry service – a 350-passenger, 35+ knot vessel.) The rationale for these criteria is described in detail in Appendix Wake-D.

However, even if the 16-cm and 1,500-meter criteria are not met, wake wave impacts may not be significant at the shoreline. Comparison with site-specific data would be necessary to make such a determination. If predicted wake waves at the shoreline are less than 50 percent of the average sustained wind wave height on a monthly basis, significant impacts are not anticipated because the wake wash waves would be indistinguishable from the natural variation of the wind-driven waves.

With these criteria, impacts to the shoreline would be considered significant if:

- A ferry route passes within 1,500 meters of a potentially sensitive shoreline and the predicted wake wash wave at the shoreline is greater than the 16-cm shoreline wave height criterion; and
- Predicted wake waves at the shoreline are greater than 50 percent of the average sustained wind wave height on a monthly basis.

To aid in the impact assessment for individual ferry routes and shoreline areas, a decision tree was developed (Figure 3.3.2) that includes a series of questions to determine whether impacts to shorelines would be significant.

Biological Significance Criterion for Clapper Rail Nest Inundation

As described in Appendix Wake-D, in discussion with area biologists and resource agencies, California clapper rail, an endangered species, was selected as a surrogate for sensitive biological receptors. Specifically, being protective of clapper rail habitat is considered to be protective of sensitive bio-receptors.

Impacts to California clapper rail nesting sites could be considered significant if:

- Ferry routes were within 50 meters of known or potential nesting sites.

It is important to note that a clapper rail nest within 50 meters of a route will not necessarily be impacted, but would only potentially be impacted.

3.3.2.2 Potential Impacts to Shorelines

Impact WW-1 **New routes and increased frequency of ferry trips across the Bay could increase the wave height (energy) at some shorelines, potentially causing increased erosion.**

Shorelines tend to be in dynamic equilibrium with the "typical" or average wind wave energy reaching them. Erosion could be increased or altered due to additional ferry service if wake wave heights and energy were significantly greater than those of existing wind-driven waves (see Appendix Wake-D for discussion).

For shorelines at a distance greater than 1,500 meters from a proposed ferry route, impacts are not anticipated to be significant because of the attenuation of wave height with distance. Impacts could potentially be significant for sensitive shorelines (tidal marshes and mudflats) that are within 1,500 meters of a ferry route. Impacts are not anticipated at rocky or armored shorelines

as these shorelines can withstand extreme weather events, which subject them to conditions only experienced every 50 or 100 years. Figure 3.3.3 shows areas of potentially sensitive shoreline that are within 1,500 meters of a ferry route for the Proposed Project. If a potentially sensitive shoreline is within 1,500 meters of a route, it does not indicate that there would be impacts, only that there is a potential for significant impacts.

The highlighted shoreline areas are based on an approximate 1,500-meter measurement from the proposed routes. When exact terminal locations and routes are identified, they will need to be accurately plotted on navigational charts. Potentially sensitive shoreline areas within 1,500 meters of those routes could then be identified with more precision.

A decision tree (Figure 3.3.2) was developed to help evaluate whether impacts to shorelines could be significant.

As shown on Figure 3.3.3, potentially impacted shorelines for the Proposed Project in the North Bay include the shorelines from Antioch to Martinez in New York Slough and Suisun Bay, areas in the Carquinez Strait near Martinez and Vallejo, and south of Point Pinole. In the Central Bay, potentially sensitive areas include shorelines near the terminal locations (Larkspur, Richmond, and Harbor Bay Isle). In the South Bay, the shoreline along the approach to Redwood City could potentially be impacted by wake wash.

Summary of Impact WW-1

- For the Proposed Project, potentially impacted areas in the North Bay include the shorelines from Antioch to Martinez in New York Slough and Suisun Bay, areas in the Carquinez Strait near Martinez and Vallejo, and south of Point Pinole. In the Central Bay, potentially sensitive areas include shorelines near the terminal locations (Larkspur, Richmond, and Harbor Bay Isle). In the South Bay, the shoreline along the approach to Redwood City could potentially be impacted by wake wash. This is a potentially significant impact.

The decision tree (Figure 3.3.2) can be used to determine whether impacts would be significant. Appendix Wake-E presents example analyses for representative shoreline types.

Mitigation WW-1.1: To meet the criteria evaluated for Impact WW-1, ferry routes and service may need to be modified such that:

1. The route alignments are maintained at more than 1,500 meters from potentially sensitive shorelines (e.g., mudflats, unprotected tidal marshes). This should maintain wake impacts at a less than significant level.
2. Operation of the vessels (primarily speeds) are maintained such that predicted wake wave heights at the shoreline would be less than 16 cm. This would also reduce this impact to a less than significant level.
3. Operation of vessels are maintained such that predicted wake waves at the shoreline would be less than 50 percent of the average sustained wind wave height on a monthly basis.

If resulting ferry routes meet one or more of the above criteria, impacts would be less than significant.

Mitigation WW-1.2: New ferry routes could potentially be modified to redirect energy away from sensitive habitats, to reduce or eliminate increased wake energy. Adjustment to routes can be used to focus wave energy on rocky or armored shorelines or to direct energy away from

sensitive areas. Detailed wave refraction, diffraction, and reflection analysis would be required to predict the efficacy of wave energy focussing. This mitigation measure would only be feasible and effective on portions of routes where the operation of the vessel can incorporate these adjustments. For example, the approach routes to terminals near sensitive areas could be designed such that wake wash is directed away from sensitive tidal marsh environments, and turning movements are not permitted at a speed and/or direction that exceeds criteria 2 or 3, listed above. Route bending could, however, involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

Mitigation WW-1.3: Use of existing low-wake vessel technology could reduce both the total wake wash energy and heights of individual waves. As shown in Figure Wake-D-2 (in Appendix Wake-D) existing light-weight high-speed vessels have 25 percent or better wave height and wave energy characteristics than the 350-passenger high-speed vessels presently operating on the Bay. For example, if a vessel with a wave height profile such as the *Bravest* (Appendix Wake-D) were specified (which has an operating design wave height of 22 cm measured at 300 meters) the 16-cm shoreline wave height criterion would be met at a distance of 780 meters, almost half the 1,500 meter distance for vessels with a 27-cm design wave height. Because wave energy is proportional to the square of wave height, slight reductions in design wave heights are equivalent to significant reductions in wave energy, and hence equivalent to significant reductions in wave heights at distance. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

Mitigation WW-1.4: Operational adjustments, such as slowing down vessels, could be implemented to reduce wake energy near sensitive tidal marsh habitat. Note, as shown in Figure Wake-D-2 (in Appendix Wake-D), a considerable reduction in vessel speed is required with an efficient high-speed vessel before the wake wash height is less than that at design operational speeds. For example, for the Mare Island class of high-speed catamaran currently operating on the Bay, the normal operating speed of 34 knots (40 mph) would need to be reduced to 10 knots (11 mph) or less in order to achieve a reduction in wave height. The change in wave form (and hence wave period) would also need to be considered as high-speed ferries generate a different wave patterns at high (operating) and low (motoring) speeds. At high speed when the vessel is planing, a divergent wave pattern is generated, while at slow speeds, the transverse stern wave dominates the wave pattern.

Since speed reduction could have a substantial impact on high-speed routes, this measure would only be practical in specific areas that cannot be mitigated by any of the other measures. However, these mitigation measures could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

To ensure that ferries do not exceed any slow speed limits that are set, a monitoring and enforcement program should be developed to ensure compliance with routes and speeds. This mitigation could provide funding for the Department of Fish and Game to monitor routes and speeds on a random basis.

Impact After Mitigation: Impact WW-1 would be less than significant with successful implementation of one or more of the above mitigation measures (or other site-specific

mitigations such as shoreline protection[1]). However, if there are situations where it is not possible to implement the mitigation measures, impacts would be potentially significant. The proposed routes with potentially significant erosional wake wash impacts could be removed from consideration or terminal locations could be changed. Until final routes and terminal locations are determined, this impact is considered potentially significant.

The routes that are most likely to have unmitigable wake wash impacts are those traversing the Carquinez Strait to Pittsburg/Antioch. These routes are within 1,500 meters of the shoreline and adjacent to long stretches of tidal marsh. Site-specific studies of the existing natural wave climate and wake wash from existing vessels would be required to determine whether impacts would be significant. Use of low-wake vessels may be feasible for this route, but site-specific study would be required to make that determination.

3.3.2.3 Potential Impacts to Marinas

Impact WW-2 **Increased frequency of ferry trips across the Bay could increase the wave heights at surrounding marinas, potentially damaging moored vessels and interfering with recreational users.**

Individual wave height is the primary factor of concern for impacts at unprotected marinas, due to the potential for damage to moored vessels, docks, etc., or potential safety issues for users of the marina.

For the Proposed Project, unprotected marinas could potentially be impacted throughout the Bay if individual wave heights from wake due to additional ferry service were significantly higher than existing waves. Marina locations are shown on Figure 3.2.2 in the Navigation Section.

Summary of Impact WW-2

- The Proposed Project would involve expansion of ferry service and increased numbers of ferry transits, thereby potentially increasing wave heights impacting nearby marinas. It also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. Different routes or vessels could result in larger wave heights from wake wash reaching the shoreline. Unprotected marinas could potentially be impacted throughout the Bay if individual wave heights from wake due to additional ferry service were significantly higher than existing waves.

Mitigation WW-2.1: The mitigation measures for impacts to marinas are the same as for Mitigations WW-1.1 through WW-1.4.

Impact After Mitigation: Impact WW-2 would be less than significant after implementation of one or more of the mitigation measures.

[1] Shoreline protection may be feasible for some types of shorelines, but would require site specific evaluation to determine whether it would be environmentally appropriate.

3.3.2.4 Potential Impacts on Indicator Species

Impact WW-3 **Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.**

California clapper rail (*Rallus longirostris obsoletus*), an endangered species, was used to represent shoreline habitat impacts from vessel wake. As previously described, being protective of clapper rail habitat is considered to be protective of sensitive bio-receptors. As discussed in Section 3.5.1 (Biology), clapper rail are yearlong residents of emergent salt and tidal marshlands in the Bay Area, primarily in marshes south of San Mateo Bridge and in San Pablo Bay. The known distribution of California clapper rail in the Bay Area is shown on Figure 3.5.12 in Section 3.5 (Biology). Clapper rail have been observed near Martinez, Richmond, and Redwood City.

Nests are typically constructed with their bases 10 to 20 cm above the ground and their tops 25 to 30 cm above the ground. Inundation of nests by wake wash has the potential to cause a significant negative impact on the endangered species' survivability during the nesting season (between February 15 and June 15). The nests are generally located at least 100 meters inland from the marshland shoreline.

Wake from passenger ferries near clapper rail nesting sites would not be likely to have detrimental impacts on nests located more than 50 meters from a healthy marsh fringe (see Appendix Wake-D). Wake wash could have significant impacts on nest sites located within 50 meters of the marsh fringe. It is also possible that wake wash could impact nesting areas less than 50 meters from a marsh fringe, under conditions of high wake energy and no wake attenuation (degraded marsh habitat).

Summary of Impact WW-3

- The Proposed Project would involve expansion of ferry service and increased numbers of ferry transits, thereby potentially increasing wake wash impacts to California clapper rail nesting sites. The Proposed Project also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. Nesting sites could be within 50 meters of ferry routes in areas near Martinez and Richmond in the North Bay and along the shoreline near the Redwood City terminal in the South Bay. This impact could be potentially significant.

Mitigation WW-3.1: For any shoreline areas that have potential clapper rail nesting habitat within 50 meters of the edge of a marshland (or within marshland that does not appear healthy and could limit attenuation of wave energy as a result) and are along a proposed ferry route, habitat surveys should be conducted to determine whether nesting sites exist. If nesting sites or suitable nesting habitat do exist within 50 meters of the edge of the marshland, site-specific measurements of wake attenuation should be performed at the potential site to determine whether wash will be an issue. An analysis such as that provided as part of the documentation for the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model could be used to predict wave propagation and decay at high water (FEMA 1988). If the measurements/calculations indicate that nest inundation could potentially occur, one of the following additional mitigation measures may be necessary. For nesting sites more than 50 meters inland from the edge of the marshland, no significant impacts would occur.

Mitigation WW-3.2: Use of existing low-wake vessel technology could reduce both the total wake wash energy and height of individual waves. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels.

Mitigation WW-3.3: New ferry routes could be adjusted to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

Mitigation WW-3.4: Operational adjustments, such as slowing the vessel down near sensitive areas, could be performed during ferry operation to reduce wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less-than-significant levels. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

Impact After Mitigation: Impact WW-3 would be less than significant after successful implementation of one or more of the above mitigation measures (or other site-specific mitigations). However, if no mitigation can be implemented to reduce impacts to less than significant levels, impacts to clapper rail could be potentially significant. Until final routes and terminal locations are determined, allowing site-specific analysis and mitigation, this impact is considered potentially significant. Mitigation for any final specific routing that may cause a potentially significant impact should require a Biological Opinion from the U.S. Fish and Wildlife Service under the federal Endangered Species Act.

Impact WW-4 Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites.

Pacific harbor seals (*Phoca vitulina*) are common year-round in San Francisco Bay and are protected by the Marine Mammal Protection Act of 1972. Harbor seals haul out in groups ranging in size from a few individuals to several hundred seals. As discussed in the Biology Section, harbor seal habitats used as haul-out sites include tidal rocks, bay flats, sandbars, and sandy beaches and tend to be relatively consistent from year to year. Known locations of haul-out sites are shown on Figure 3.5.14 in the Biology Section. Haul-out sites that support some of the largest concentrations of seals include Corte Madera Marsh and Castro Rocks in the Central Bay, Mowry Slough south of the Dumbarton Bridge, and Yerba Buena Island. Ferry routes in the Proposed Project are generally well away from most haul-out sites in the Bay. Existing routes pass near Yerba Buena Island and Castro Rocks, two major haul-out sites in the Bay.

Ferries passing near sensitive areas such as haul-out sites could potentially disturb seals using these areas. As discussed in the Biology Section, seals react to both visual and acoustic disturbances from boats, kayaks, jet skis, aircraft, foot traffic, and dogs in the vicinity of haul-out sites. Disturbances that occur closer to the animals tend to provoke a stronger negative response.

Green et al. (2001) found that watercraft, especially those that exhibit erratic movements, are a common disturbance to seals on San Francisco Bay. Green et al. (2001) conducted studies of disturbances at Castro Rocks and Yerba Buena Island. They found that the average distance at which watercraft caused animals to flee the site (flush) was approximately 183 meters at Castro Rocks and approximately 133 meters at Yerba Buena Island. Larger boats such as tugboats and

ferries tended to cause a flush at greater distance than smaller watercraft such as jet skis and kayaks. For example, at Castro Rocks, larger watercraft caused a flush at an average of approximately 264 meters (ranging from 121 to 511 meters) while jet skis and kayaks caused a flush at an average of approximately 150 meters (ranging from 10 to 500 meters). Watercraft that exhibit erratic movements such as sudden changes in speed or direction were more likely to cause a disturbance than those traveling at steady speeds, slow speeds and constant direction (Green et al. 2001; Kopec and Harvey 1995).

Because seal haul-out sites tend to be in rocky areas that experience significant natural wave action, and individual wake wash wave heights are smaller than those generated by average or normal winds, it is unlikely that wake wash from ferries would significantly impact seals. As described in the Biology Section, a greater concern for seals is the startle effect caused by sudden changes in vessel direction or location.

Summary of Impact WW-4

- The Proposed Project would involve expansion of ferry service and increased numbers of ferry transits, thereby potentially increasing wake wash impacts to seal haul-out sites. It includes routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. Passing too close and disturbing marine mammals at these locations would be considered significant. The Proposed Project also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. This impact could potentially be significant.

Mitigation WW-4.1: As discussed in Mitigation B-14.1 in the Biology Section, the National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters (this distance, however, does not take vessel speed or wash into account).

Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Given the site-specific information available for San Francisco Bay (Castro Rocks), it is recommended that ferry routes should be at least 100 to 250 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations (see Biology Mitigation B-14.1).

Impact After Mitigation: Impact WW-4 would be less than significant after successful implementation of the above mitigation measure.

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Table 3.3.1
Monthly Sustained Wind Wave Heights (m) for Selected Locations in San Francisco Bay 1992-1993

Location	Month												Avg.	Max
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Petaluma Wetlands	1.6	1.5	1.0	1.1	1.3	1.3	1.3	1.4	1.2	1.2	0.88	1.4	1.3	1.6
Hercules (Martinez)	0.86	0.84	0.96	0.96	1.1	1.1	0.94	0.85	0.74	0.69	1.0	0.90	0.91	1.1
Gallinas Creek	0.82	0.96	0.59	0.52	0.55	0.31	0.21	0.26	0.21	0.86	0.64	0.79	0.56	1.0
Corte Madera Marsh	1.6	0.84	0.78	0.99	0.69	0.58	0.29	0.20	0.46	0.99	0.49	0.89	0.73	1.6
Paradise Cay	1.6	1.1	1.0	1.2	0.77	0.62	0.28	0.24	0.44	0.96	0.50	0.87	0.80	1.6
Sausalito	1.3	1.1	1.0	0.76	0.76	0.60	0.33	0.33	0.31	0.96	0.49	0.84	0.73	1.3
Yerba Buena	0.94	1.4	2.6	1.4	1.0	0.82	0.55	0.63	0.91	0.72	0.64	0.94	1.04	2.6
Oyster Point	0.87	0.82	0.56	0.70	0.51	0.51	0.34	0.25	0.25	0.59	0.52	0.79	0.56	0.9
Redwood City Channel	0.64	0.64	0.42	0.34	0.31	0.31	0.37	0.28	0.25	0.25	0.37	0.52	0.39	0.6
Coyote Creek	0.36	0.39	0.41	0.41	0.42	0.40	0.45	0.44	0.42	0.37	0.40	0.36	0.40	0.5
Alameda Creek	0.89	0.84	0.90	0.90	0.93	0.91	1.0	0.99	0.93	0.78	0.87	0.85	0.90	1.0
San Leandro Channel	1.2	0.83	0.89	0.97	1.0	1.1	1.2	0.95	0.83	0.62	1.0	0.86	0.95	1.2
Berkeley	0.62	0.82	1.2	0.64	0.68	0.68	0.68	0.62	0.58	0.49	0.68	0.68	0.69	1.2
Point Pinole	1.1	0.77	0.78	0.86	1.1	0.99	0.87	0.78	0.77	0.61	1.1	1.0	0.89	1.1
New York Slough	0.36	0.40	0.27	0.28	0.22	0.21	0.21	0.22	0.18	0.32	0.22	0.36	0.27	0.4

Table 3.3.2
Monthly Wave Energy (MJ/m) Reaching the Shore for Selected Locations in San Francisco Bay 1992-1993

Location	Month												Avg.	Max
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Petaluma Wetlands	197.7	268.1	298.5	157.7	1178	1541	2445	2907	1671	528.0	56.2	463.3	975.9	2907
Hercules (Martinez)	393.4	106.6	164.7	606.0	288.7	391.3	87.6	58.7	61.9	70.2	279.3	357.7	238.8	606.0
Gallinas Creek	599.7	212.5	52.4	7.6	12.3	1.0	0.5	2.0	1.6	26.3	198.6	545.5	138.3	599.7
Corte Madera Marsh	114.9	201.6	81.7	29.6	29.7	7.8	0.7	0.5	1.7	23.1	24.0	137.4	54.4	201.6
Paradise Cay	159.2	232.6	111.4	37.0	48.4	11.8	3.2	1.9	3.7	29.8	34.8	165.1	69.9	232.6
Sausalito	56.0	111.6	86.3	45.4	71.4	48.5	33.5	23.2	21.3	30.1	15.4	66.6	50.8	111.6
Yerba Buena	90.2	129.3	128.5	124.8	175.7	143.5	104.2	88.1	65.4	59.9	43.3	91.1	103.7	175.7
Oyster Point	77.7	108.5	32.0	20.3	24.7	8.1	5.0	3.9	4.8	10.9	34.8	121.5	37.7	121.5
Redwood City Channel	38.7	36.5	14.1	10.2	12.6	10.7	10.6	8.9	10.0	8.8	19.4	48.3	19.1	48.3
Coyote Creek	10.0	9.2	35.7	73.8	75.8	91.9	102.8	121.7	104.5	51.6	34.9	12.0	60.3	121.7
Alameda Creek	100.0	88.6	239.1	550.9	634.8	823.0	798.6	860.4	682.8	316.8	236.3	129.8	455.1	860.4
San Leandro Channel	77.7	111.7	186.2	438.9	512.2	688.1	512.3	348.4	202.2	114.7	79.5	119.1	282.6	688.1
Berkeley	30.9	52.4	122.0	239.5	268.2	325.5	258.6	209.0	162.2	103.8	59.1	31.8	155.3	325.5
Point Pinole	1020.9	251.6	184.4	490.9	397.0	540.0	256.6	153.3	131.6	110.8	435.7	877.9	404.2	1021
New York Slough	3.5	6.0	4.0	4.3	5.6	7.0	10.7	13.8	7.9	2.6	1.9	7.7	6.2	13.8

Table 3.3.3
Major Existing Ferry Routes in San Francisco Bay

Operator	Route	Vessel(s)	Distance (nm)	Average # of Daily One-Way Transits	Trip Miles per Day (nm)
Golden Gate	Larkspur/SF	*Mendocino, Del Norte, San Francisco, Marin, Sonoma*	10.9	42	462
Golden Gate	Sausalito/SF	*Golden Gate, San Francisco*	5.7	18	103
Blue & Gold	Tiburon/SF	*Zelinsky, Encinal*	5.8	15	86
Blue & Gold	Vallejo/SF	*Intintoli, Mare Island*	23.3	22.4	522
Blue & Gold	Oakland/Alameda/SF	*Peralta, Encinal, Zelinsky*	4.4	24.4	108
Harbor Bay Maritime	Harbor Bay/SF	*Bay Breeze*	7.6	10.2	78
TOTAL				**81**	**1,411**

Table 3.3.4
Typical Monthly Vessel Traffic in San Francisco Bay[1]

Vessel Name or Type	# of Trips	Route
Bay Breeze	306	San Francisco, Harbor Bay
Bay Clipper	173	San Francisco, Angel Island, Alcatraz, Tiburon
Bay Flyer	278	San Francisco, Oakland, Pac Bell Park, Jack London Sq.
Bay Monarch	140	San Francisco, Sausalito, Tiburon
Del Norte	175	San Francisco, Larkspur
Encinal	912	San Francisco, Clay St. Oakland, Tiburon
Golden Gate	490	San Francisco, Sausalito
Intintoli	322	San Francisco, Vallejo
Mare Island	352	San Francisco, Vallejo
Marin	82	San Francisco, Larkspur
Mendocino	310	San Francisco, Larkspur
San Francisco	317	San Francisco, Larkspur
Sonoma	152	San Francisco, Larkspur
Dinner Tour Boats	373	San Francisco-San Francisco
Zelinsky	681	San Francisco, Tiburon, Sausalito, Pac Bell Park, Angel Island, Alcatraz
Tow Boat/Tug Boat	691	Baywide
Tank Ships	109	Various
Roll On – Roll Off	10	Various
Public Vessels	68	Various
Container Ships	90	Various
Bulk Carriers	47	Various

Notes:
1) September 2001

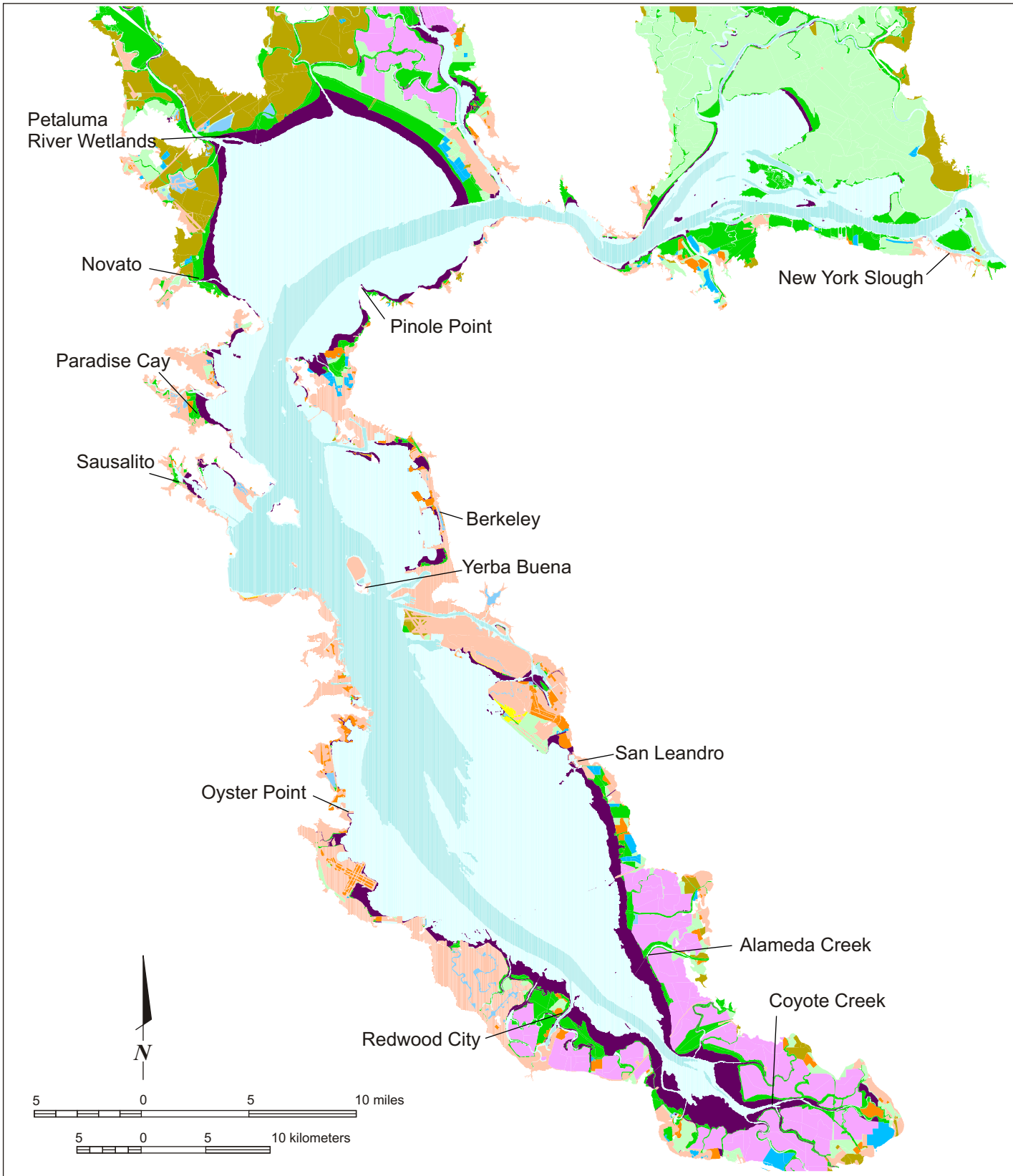
Table 3.3.5
Wake Wash From Existing Ferries

Vessel or Class	Energy Packet Size at 300 Meters			Total Wave Train Energy (KJ/m)
	Height (cm)	Period (s)	Energy (J/m)	
Spaulding Class	51	5.3	14,100	94
San Francisco	44	5.6	11,887	94
Sonoma	57.8	5.0	16,374	94
Mare Island Class (350 pax, 35 kt)	31	4.3	3,500	26
Mare Island Class (350 pax, 35 kt) at 10 kts (consultant database)	24.8	3.0	2,497	17.5 [1]
Mendocino	33.4	4.57	4,584	26
Del Norte	27	4.71	3,140	24
Encinal/Zelinsky (based on sister ship)	45.7	2.72	3,030	18
Pusher Tug without Barge	33	3.72	2,943	22
149 pax, 35 knot vessel (consultant data base)	20	3.2	800	9.95
149 pax, 25 kt vessel (consultant data base)	22	4.6	2,000	20.4
149 pax, 35 kt vessel at 10 kts (consultant data base)	15.4	3.0	832	8.25
Hovercraft	unk	unk	unk	unk

Notes:
1) Total number of waves in train was unavailable for this measurement and therefore total wave train energy was calculated assuming 7 waves per train.

Table 3.3.6
Wake Wash Characteristics of Non-Ferry Traffic

Vessel Type	Wash Height	Wash Period	Wash Energy	Comments
Pusher Tugs without Barges	33	3.72	2,943	This is a frequent daily operation in San Francisco Bay.
<15 kt Deep Draft Merchant Vessels	Not observed	Not observed	Not observed	This is an infrequent operation and generally avoids sensitive areas.
USCG Vessels	Not observed	Not observed	Not observed	This is an infrequent operation and generally avoids sensitive areas.
Dinner & Harbor Cruise Vessels	Not observed	Not observed	Not observed	These vessels are similar in hull form to the monohull ferries. They usually operate at low speed and avoid sensitive areas.



LEGEND

- Deep Bay Channel
- Shallow Bay Channel
- Storage Basin
- Sandy Beach
- Tidal Flat
- Tidal Marsh
- Lagoon
- Salt Pool
- Diked Marsh
- Agricultural Bayland
- Undeveloped Fill
- Developed Bay Fill

Scale
1:400,000

URS

Water Transit Authority
Program EIR

Project No. 28066519

Habitats Adjacent to San Francisco Bay

Figure
3.3.1

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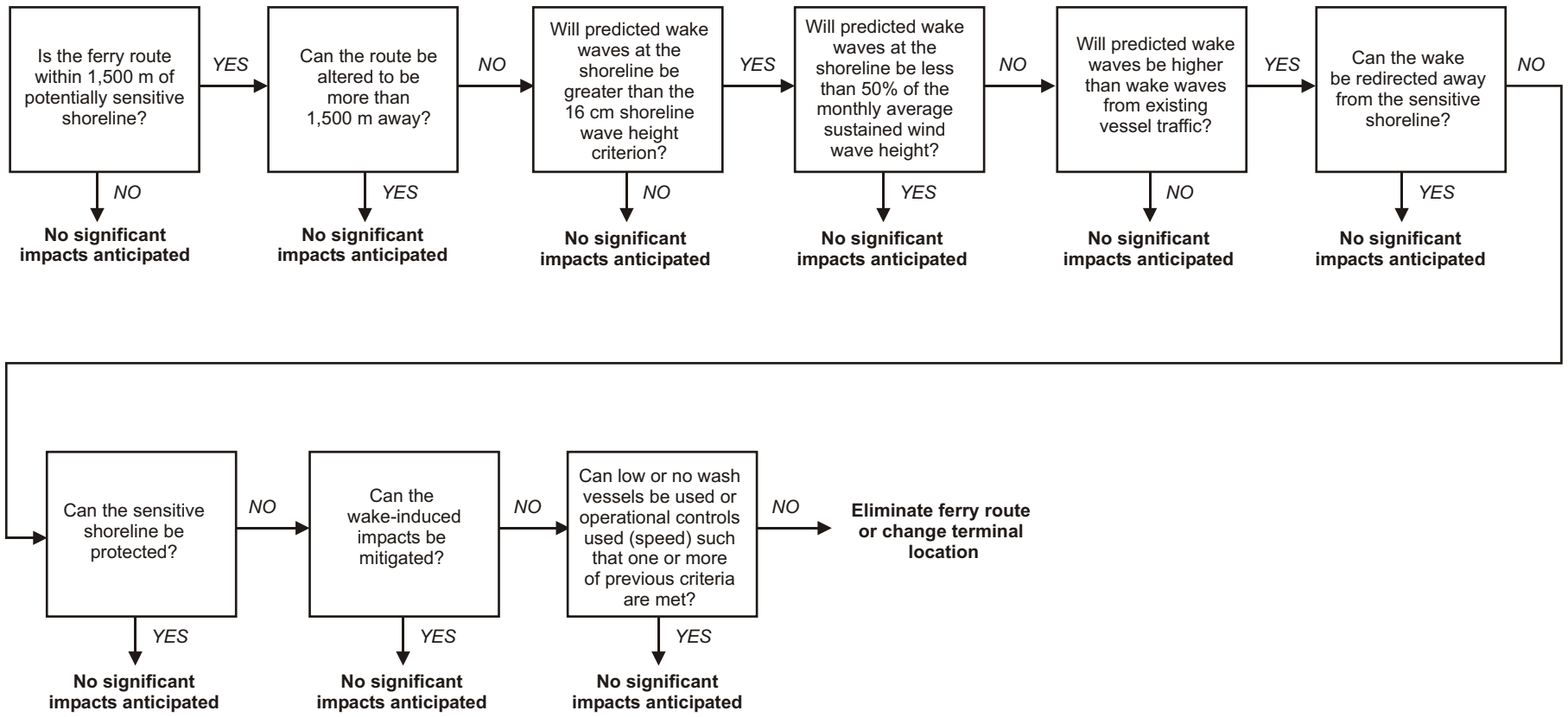

URS	Water Transit Authority Program EIR Project No. 28066519	Decision Tree - Evaluation of Potentially Significant Shoreline Impacts	Figure 3.3.2

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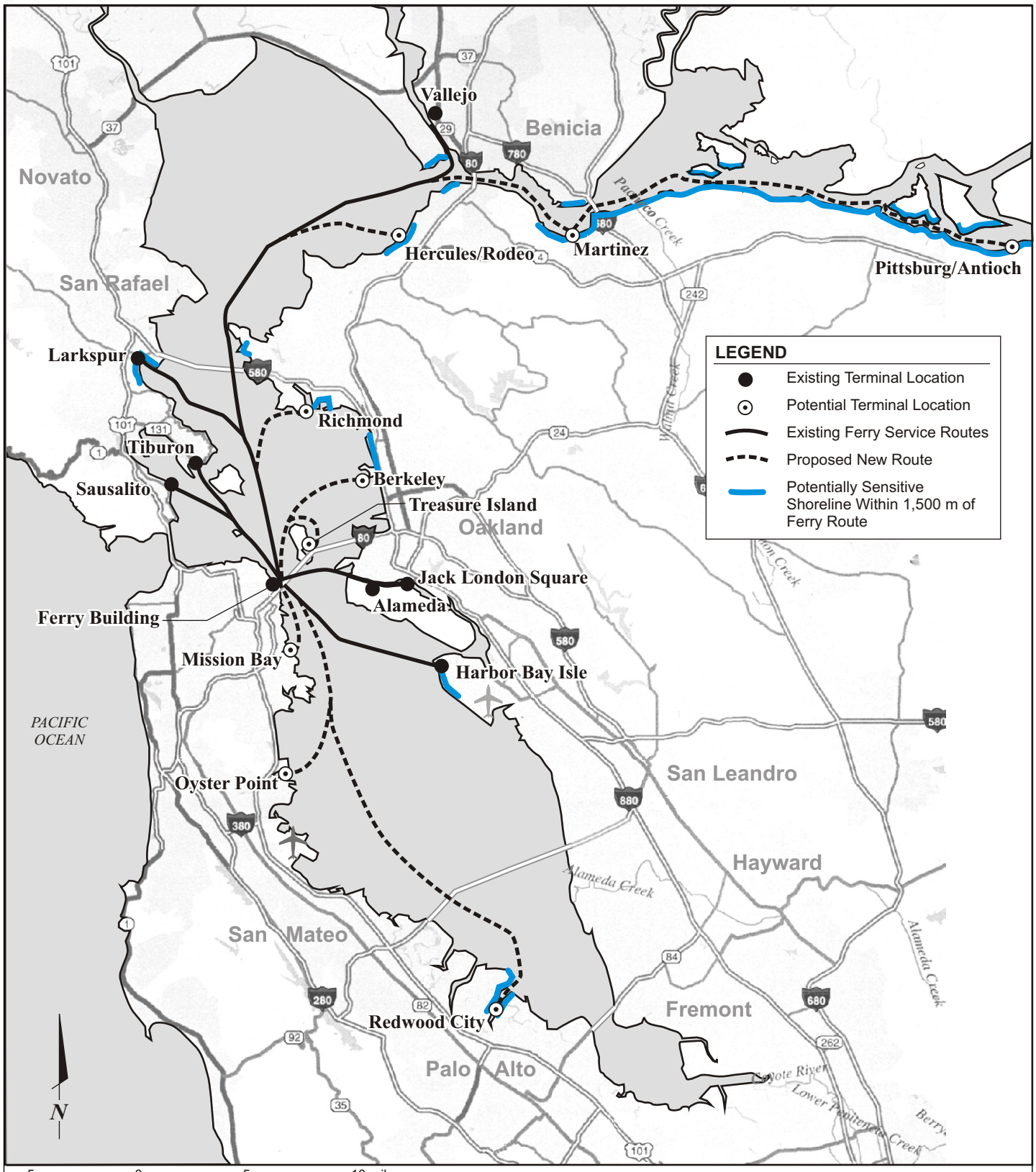

URS	Water Transit Authority Program EIR Project No. 28066519	Potentially Wake Sensitive Shoreline Based on 1,500 m Criterion	Figure 3.3.3

5/09/03 vsa ...\28066519 WTA\F3.3.3 wakeshore_mar03.cdr

3.4 WATER RESOURCES

The waters within San Francisco Bay provide critical sheltered water habitat for a wide variety of ocean and coastal species that are important both ecologically and to commercial and recreational interests such as fisheries and water contact recreation. Ocean and coastal resources are affected by commercial, transit, and recreational activities in the Bay because dredge and fill operations, fuel spills, and pollutants can adversely affect water quality.

This section presents the existing water and sediment quality in the Bay along with current water and sediment quality concerns. These concerns potentially relate to the ferry expansion from potential dredging of new channels for ferry use, potential water pollution from ferries (i.e., fuel spills) due to increased number of transits, stormwater runoff pollution from ferry terminal facilities, and risks associated with building new terminal facilities in a floodplain.

A certain fraction of airborne pollutant emissions from ferry fuel combustion could be deposited on Bay waters. Emissions of nitrogen and sulfur oxides would be deposited as nitrates and sulfates, respectively. A portion of the particulate matter in the diesel exhaust, mostly in the fine fraction ($PM_{2.5}$) would also be deposited. Not all of the exhaust emissions would be deposited on the bay; some would be advected over land by winds. This issue is further addressed in the Air Quality Section, which discusses the potential impact of airborne pollutant deposition in water and proposes mitigation measures.

3.4.1 Environmental Setting

3.4.1.1 Study Area

San Francisco Bay and the San Joaquin-Sacramento River Delta combine to form the West Coast's largest estuary, where fresh water from the rivers and numerous smaller tributaries flows out through the Bay and into the Pacific Ocean. The San Francisco Bay Estuary (Estuary) currently encompasses roughly 1,600 square miles, drains more than 40 percent of the state, and provides drinking water to approximately two-thirds of California (SFEP 1999). The Estuary is composed of three distinct hydrographic regimes: the South Bay, which extends from the Bay Bridge to the southern terminus of the Bay in San Jose, and the Central and North Bays, which connect the Delta and the Pacific Ocean.

The North Bay consists of several small embayments, the two largest being San Pablo Bay and Suisun Bay. The embayments are connected to each other and the ocean by deep, narrow channels ranging from 42 feet deep in San Pablo Bay to over 360 feet deep at the Golden Gate. San Pablo Bay is characterized by a deep channel surrounded by broad shoals. San Pablo Bay is connected to Suisun Bay by the narrow Carquinez Strait. Suisun Bay is a shallow basin consisting of braided channels and shallow shoals.

The Central Bay has a highly complex bathymetry. East of the Golden Gate, the depth is approximately 300 feet, while extensive intertidal mudflats are present at the eastern edge of the Central Bay. In addition, several islands are located within the Central Bay.

The South Bay is characterized by large areas of broad shallows incised by a main channel 30 to 65 feet deep. It has similar bathymetry to San Pablo and Suisun Bays. A relatively deep channel extends along the western side of the South Bay, surrounded by broad mudflats.

Freshwater inflows, tidal flows, and their interactions largely determine variations in the hydrology of the Estuary. Hydrology has profound effects on all species that live in the Estuary because it determines the salinity in different portions of the Estuary, and controls the circulation of water through the channels and bays.

Ninety percent of the freshwater inflow to the Bay comes from the Delta (Cheng et al. 1993) and flows through the northern portion of the Bay, resulting in a partially to well-mixed Estuary (Walters et al. 1985; Uncles and Peterson 1995). The North Bay is hydrologically distinct from the Central and South Bays. The degree of mixing depends on seasonally varying river inflow. The timing and magnitude of the highly seasonal river inflow modulates permanent estuarine circulation, which is largely maintained by salinity-controlled density differences between river and ocean waters.

Very little freshwater flows into the South Bay. It is a tidally oscillating, lagoon-type estuary, where salinity variations are determined by water exchange between the northern reach and the ocean. Water residence times are much longer in the South Bay than in the North Bay.

Beneficial uses of the Bay include commercial and sport fishing, estuarine habitat, industrial water supply, fish migration, navigation, industrial process water supply, preservation of rare and endangered species, contact and non-contact water recreation, shellfish harvesting, fish spawning, and wildlife habitat (RWQCB 1995).

3.4.1.2 Water Quality

The overall goals of water quality regulation according to the Water Quality Control Plan for San Francisco Bay Basin (Basin Plan) (RWQCB 1995) are to protect and maintain thriving aquatic ecosystems and the resources those systems provide to society, and to accomplish these goals in an economically and socially sound manner.

Since 1993, the San Francisco Estuary Institute (SFEI) has administered a Regional Monitoring Program (RMP) for the Regional Water Quality Control Board (RWQCB) and major Bay dischargers. Most dischargers to the Bay are required to participate as a condition of their discharge permit. SFEI conducts monitoring three times a year along the central line of the Bay, from the Delta to the South Bay (Figure 3.4.1). The RMP measures concentrations of trace constituents in water, sediment, and transplanted bivalves at various locations in the Estuary.

The RMP seeks to characterize contaminant concentrations in San Francisco Estuary water, sediment, fish, and shellfish. The ultimate goal is to determine how contaminant concentrations in the estuary are changing in response to pollution prevention and reduction measures, and to provide feedback to water quality management agencies. The five key objectives are:

- To describe patterns and trends in contaminant concentration and distribution;
- To describe general sources and loadings of contamination to the estuary;
- To measure contaminant effect on selected parts of the estuary ecosystem;
- To compare monitoring information to relevant water quality objectives and other guidelines; and

- To synthesize and distribute information from a range of sources to present a more complete picture of the sources, distribution, fates, and effects of contaminants in the estuary ecosystem.

The RMP routinely monitors:

- Conventional water quality (such as salinity, dissolved oxygen, and temperature) and chemistry (such as metals and pesticides);
- Water toxicity (effects on laboratory organisms);
- Sediment characteristics (such as particle size) and chemistry;
- Sediment toxicity (effects on laboratory organisms); and
- Contaminant bioaccumulation in transplanted shellfish.

Regional Monitoring Program Findings

Data collected for the RMP over the past 7 years indicate contamination areas in the Estuary. Top known contamination problems include:

- High levels of mercury and PCBs in fish and water;
- Estuary water is periodically toxic, probably due mainly to pesticides; and
- Estuary sediment is frequently toxic, probably due in part to heavy metals.

According to the 2001 *Pulse of the Estuary*, which summarized the status of chemical contamination in the Estuary using RMP results: "For most well known contaminants, the Estuary is clearly better than in earlier decades. Since the start of the RMP monitoring in 1993, there is some suggestion but no definite indication of continued improvement. If contamination levels are going down, the decrease is very gradual" (SFEI 2001). Sampling sediment at a series of depths indicates that most sediment contaminants have dropped from peak levels seen in the 1960s and 1970s, probably in response to wastewater treatment improvements, product bans, and other regulatory actions. However, the *Pulse of the Estuary* notes that concentrations of lead and other metals in water have changed little in the last 20 years.

Sites of Greatest and Least Concern

Overall, monitoring sites in the lower South Bay, the Petaluma and Napa River mouths, San Pablo Bay, and Grizzly Bay are more contaminated than other sites. The South Bay sloughs are particularly contaminated; however, similar sloughs in other parts of the Estuary are not monitored. Contamination in the Central Bay is lower primarily due to mixing with relatively clean ocean water. The least contaminated site is in the ocean west of the Golden Gate.

Status of Sediment

Concentrations of contaminants in sediments are generally compared to two sets of criteria established by the National Oceanographic and Atmospheric Administration (NOAA) (Long et al. 1995): Effects Range Low (ERL) are numerical criteria indicating *possible* harm to aquatic life. Effects Range Median (ERM) indicate *probable* harm to aquatic life. At most RMP monitoring sites, several trace elements (arsenic, chromium, copper, nickel, mercury) and organic compounds (DDTs, chlordanes, some polynuclear aromatic hydrocarbons [PAHs])

frequently exceed the ERLs. Nickel usually exceeds the ERM; however, many trace elements are naturally at high levels in Estuary sediment, and may not be a problem. Few significant Estuary-wide trends in sediment contamination were discernible over the last 7 years. Chromium and nickel appear to be increasing, but this is thought to be a natural event due to increased rainfall.

Within the Estuary, ambient concentrations of some metals are already at or above criteria or objectives. Of particular concern is chromium in Suisun Bay, Carquinez Strait, and San Pablo Bay; copper, mercury, and nickel in the South, San Pablo, and Suisun Bays, and Carquinez Strait; and lead in San Pablo Bay and Carquinez Strait. At certain times of the year, depending on riverine flows, ambient concentrations of these metals in these embayments have exceeded the criteria (SFEI 1994).

Summary of California 303(d) List and Total Maximum Daily Load Priority Schedule

Section 303(d) of the Clean Water Act (CWA) requires each state to identify waters that will not achieve water quality standards after application of effluent limits. For each water and pollutant, the state is required to propose a priority for development of load-based (as opposed to concentration-based) limits called total maximum daily loads (TMDLs). The TMDL determines how much of a given pollutant can be discharged from a particular source without causing water quality standards to be violated. Priorities for development of TMDLs are set by the state, based on the severity of the pollution and uses of the waters.

This section summarizes the 1998 California 303(d) list and TMDL priority schedule for the Central, Lower, and South Bays as defined by the Basin Plan (note: the Basin Plan subdivides the South Bay into the Lower Bay and the South Bay).

High-Priority Constituents

Constituents that are of high priority for TMDL implementation in the Central, Lower, and South Bays include dioxin compounds, furan compounds, dioxin-like PCBs, and mercury. Dioxins, furans, and dioxin-like PCBs have been listed as high-priority constituents by the U.S. Environmental Protection Agency (USEPA). Mercury is designated as high priority because consumption of fish and wildlife from the Bay is impacted, and a health advisory is in effect for multiple fish species, including striped bass and shark.

Copper and nickel are high-priority constituents in the South Bay. These metals have been prioritized due to exceedances of the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control's California Toxics Rule dissolved metals criteria, National Toxics Rule total metals criteria, elevated water and sediment concentrations, and elevated fish tissue levels.

Medium-Priority Constituents

Diazinon and nondioxin-like PCBs are designated as medium-priority constituents in the Central, Lower, and South Bays. Diazinon has been found to cause water column toxicity. An interim health advisory is in effect for fish due to elevated PCB concentrations. Copper in the Central and Lower Bays, and nickel in the Lower Bay are medium-priority constituents due to exceedances of California Toxics Rule dissolved metals criteria, National Toxics Rule total metals criteria, elevated water and sediment concentrations, and elevated fish tissue levels.

Low-Priority Constituents

Pesticides, chlordane, DDT, and dieldrin have been designated by the Cal-EPA as low-priority constituents in the Central, Lower, and South Bays. Selenium is a low-priority constituent in the Central and South Bays due to adverse effects in one branch of the food chain (the most sensitive indicator is hatchability in nesting diving birds). The introduction of exotic species may have made the food chain more susceptible to selenium accumulation. Moreover, a human health advisory by the RWQCB has been issued for the consumption of scaup and scoter (diving ducks) due to selenium levels in these animals.

Organic Contaminants

Organic contaminants may be flushed into the Bay in stormwater runoff from ferry terminal facilities, and they readily bind to and move with suspended sediment, which has implications for increasing water pollution when channels are dredged.

High concentrations of dissolved and total (dissolved plus particulate) polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) were measured in the Estuary Interface (river monitoring stations on the Guadalupe River, Coyote Creek), Southern Sloughs, and South Bay in 1999. Peak concentrations of dissolved and total PAHs and dissolved PCBs were measured at San Jose in July, with the highest PCB concentration found in the Guadalupe River in April. Dissolved PAHs were generally higher in July at most stations, while dissolved PCBs were typically highest in February. Because dissolved PAHs and PCBs comprise a relatively small portion of the total concentrations of these compounds (approximately 16 percent and 31 percent, respectively), elevated concentrations of total PAHs and PCBs were consistent with high total suspended solids concentrations at several RMP stations: San Jose, Guadalupe River, San Pablo Bay, Davis Point, and Napa River.

The organochlorine pesticides DDT, chlordane, HCH, and dieldrin also had higher concentrations in the southern reaches of the Bay. Dissolved and total concentrations of DDTs, chlordanes, and dieldrin, generally showed spatial gradients decreasing from the Estuary Interface to the Central Bay during all seasons, with high pulses measured in the Napa River in February.

Concentrations of diazinon and chlorpyrifos, two organophosphate insecticides used extensively for agricultural and urban applications, showed spatial gradients decreasing from the River stations in the Delta to the Central Bay during February sampling. Chlorpyrifos concentratons also decreased along a distinct spatial gradient from the Estuary Interface to the Central Bay during February and April sampling, with elevated concentrations measured at Guadalupe River in February and Standish Dam in April. Unlike PAHs and PCBs, dissolved concentrations of diazonon and chlorpyrifos comprised greater than 80 percent of the total concentration averaged over the entire Bay.

3.4.1.3 Sediment Quality

The potential for dredging to accommodate expanded ferry service exists in certain parts of the Bay. Currently, dredging activities within the Bay are conducted for the routine maintenance of desired hydrologic features and navigational depths in existing channels, harbors, and marinas. Dredging and the disposal of sediments directly relate to the health of the Bay and for this reason regulatory controls greatly restrict, if not prevent, new activities that might require dredging.

Processes that govern sediment movement affect the distribution of wetlands, and dredging of new channels may expose and suspend sediment, some of which may be contaminated. An understanding of what contaminants exist within the Bay, how these behave in relation to sediment, and where the contaminated areas of highest concern occur is important in siting any new facilities that might require dredging.

The Bay's sediment can be both a source of and sink for pollutants in the overlying water column. Past and present waste disposal practices from the surrounding land and waste discharges have resulted in the introduction of pollutants into the Bay, some of which have degraded Bay sediments. The overall influx of pollutants can cause increases in sediment pollutant levels. These pollutants are not distributed evenly in the Bay, and localized areas are highly contaminated. Natural resuspension processes, biological processes, other mechanical disturbances, dredging, and sediment disposal can remobilize particulate-bound pollutants. While pollutant loading to the Estuary from point sources has declined dramatically over the past two decades, and surface sediment contamination may be declining from historical highs, Bay sediments are still an important source and sink of pollutants. The mean concentrations of metals in sediments vary according to grain size, organic carbon content, and seasonal changes associated with riverine flow, flushing, sediment dynamics, and anthropogenic inputs. Anthropogenic inputs appear to have the greatest effect on sediment levels of copper, silver, cadmium, and zinc, but may also have elevated concentrations of chromium, nickel, and cobalt above background (RWQCB 1994).

Sediment contamination concerns include:

- Various toxic contaminants found only in barely detectable amounts in the water column can accumulate in sediments to much higher levels;
- Sediments serve as both a reservoir for contaminants and a source of contaminants to the water column and organisms;
- Sediments integrate contaminant concentrations over time, whereas water-column contaminant concentrations are much more variable and dynamic;
- Sediment contaminants (in addition to water column contaminants) affect bottom-dwelling organisms and other sediment-associated organisms, as well as both the organisms that feed on them and humans; and
- Sediments are an integral part of the aquatic environment that provide habitat, feeding, spawning, and rearing areas for many aquatic organisms.

Trace metals were detected in all samples collected at the 24 RMP stations from 1993 to 1998. With the exception of Red Rock, Davis Point, and Yerba Buena Island, whose concentrations were significantly lower than other stations, the concentrations of metals in sediments were very consistent among the 24 RMP stations. Generally, the Napa River, Petaluma River, Coyote Creek, South Bay, Grizzly Bay, and Honker Bay station metal concentrations were higher than those at the other 18 stations. The similarity of the results, however, allows for aggregate regional metal concentrations to be considered by combining results from the 24 stations. The average concentrations of trace metals in this data set do not exceed the Bay Ambient Thresholds. The average concentrations in this data set exceed the ERM for nickel; however, the Bay ambient concentration of nickel is more than 2 times greater than the respective ERM. The

average concentrations in this data set exceed the ERL for arsenic, chromium, copper, mercury, and nickel.

Chlorinated pesticides were detected at low levels in all samples collected at the 24 RMP stations from 1993 to 1998.

Numerous organic contaminants have been measured in Bay sediments. These include three major classes of compounds: PAHs, PCBs, and pesticides. Great differences in PAHs are observed in sediment concentrations between basins and peripheral areas, with the latter often having PAH concentrations 3 to 10 times greater than the former. PCBs were detected in all but 24 samples collected from 1993 to 1998 in the 24 RMP stations in the region. The total concentration of PCBs for each sample was compared to the Bay Ambient Threshold, and the ERL and ERM guidelines. At nine stations, the average total PCB concentration was above the 14.8 parts per billion (ppb) Bay Ambient Threshold. Of these samples, one station (San Jose) was above the ERL and ERM. No dioxin or total recoverable petroleum hydrocarbons (TRPH) analyses were performed on RMP samples collected in the region.

Bay Protection and Toxic Cleanup Program

Sediment "toxic hot spots," where sediment dredging could result in the degradation of water quality, have been identified in San Francisco Bay by the Bay Protection and Toxic Cleanup Program (BPTCP). The Bay Protection and Toxic Cleanup section of the California Water Code (Division 7, Sections 13390-13396.5) established a program to identify and plan remediation of toxic hot spots in bays and estuaries. Figure 3.1.4 in the Dredging Section shows the toxic hot spots identified in the BPTCP. Under this law, the RWQCB has implemented a program to identify potential toxic hot spots, sample and assess biological impacts in areas of unknown condition, confirm the biological impacts in areas that have been previously sampled, and assess the relationship between toxic pollutants and biological effects. In the Bay region, the RWQCB has reviewed existing data and reports; collected and analyzed new water, sediment, and tissue samples; and prepared reports. The *Final Regional Toxic Hot Spot Cleanup Plan* (RWQCB 1999) summarizes the situation in the Bay, and identifies Sites of Concern and Candidate Toxic Hot Spots.

3.4.1.4 Drainage and Runoff

Drainage and runoff from existing and proposed ferry terminals and associated facilities, including parking lots and access roads, are likely to add pollutants to stormwater discharges unless mitigation measures are implemented. Stormwater pollution occurs when rain comes into contact with materials onsite and picks up and washes contaminants into storm drains, creeks, or the Bay. Common sources of pollution include equipment and vehicles that may leak oil, grease, hydraulic fluid or fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil. Stormwater discharges associated with industrial and construction activities are regulated according to CCR Section 402(p) under the National Pollutant Discharge Elimination System (NPDES) Permitting System. The State of California has permitting authority from the USEPA and implements the NPDES permit program.

Typical pollution control measures include Best Management Practices (BMPs) that are designed to reduce quantities of materials used that may produce pollutants, change the way various

products and materials are handled or stored, employ various structural devices to catch and restrict the release of pollutants from the site, and set out appropriate responses to spills and leaks. Some examples of BMPs include temporary silt fences, protection devices such as rock aprons at pipe outlets, stabilized pads of aggregate at points where construction traffic will be entering or leaving an unimproved construction site to or from a public street, temporary drain inlet protection devices such as filter fabric and sand bags, concrete washouts for cement mixers, preservation of existing vegetation, vehicle and equipment cleaning, etc. Site-specific BMPs are described in a stormwater pollution prevention plan (SWPPP). A SWPPP has two objectives:

1. To identify and evaluate sources of pollutants associated with industrial and construction activities that may affect the quality of stormwater discharges and authorized nonstormwater discharges from the facility; and
2. To identify and implement site-specific BMPs to reduce or prevent pollutants associated with industrial or construction activities in stormwater discharges or authorized nonstormwater discharges.

Stormwater NPDES permitting for certain classes of activities, including ferry terminal activity, are regulated under the Industrial Activities General Permit adopted by the SWRCB on April 17, 1997 (WQO 97-03-DWQ NPDES Permit No CAS000001). To comply with the conditions of this permit, facility operators are required to submit a Notice of Intent, develop a SWPPP, and conduct stormwater monitoring, in addition to submitting annual reports by July 1 of each year.

Stormwater discharges associated with construction activities are regulated under the General Construction Activity Stormwater Permit adopted by the State on August 19, 1999 (WQO 99-08 DWQ, NPDES Permit No. CAS000002). Under this permit, owners of land where a construction activity occurs that disturbs more than 5 acres of land must submit a Notice of Intent, develop a SWPPP, conduct monitoring and inspections, retain records of the monitoring, report incidences of noncompliance, and submit annual compliance reports.

3.4.1.5 Floodplain Risk

Some areas of the Bay along the shoreline and drainages leading to the Bay are potential floodplains. Risks associated with building in a floodplain include threats to life and property. The level of risk is determined by the nature of the facility (i.e., parking lots, ticket purchase stations, access roads, docks, etc.), its location, and appropriate mitigation measures specific to each water transit terminal facility. Local city or county government agencies regulate floodplain construction, management, and mitigation through land use controls, based on determinations of flood elevations. The Federal Emergency Management Agency (FEMA) maintains maps of 100-year flood areas in the Bay counties. A "100-year flood" refers to a flood level with a 1 percent or greater chance of being equaled or exceeded in any given year.

3.4.1.6 Groundwater

Groundwater is of concern where it might occur near ferry terminals or dredging areas that could impact a groundwater basin's water quality. Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated. Where groundwater occurs in a saturated geologic unit that contains sufficient permeable thickness to yield significant quantities of water to wells and springs, it can be defined as an aquifer. A

groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers. Water-bearing geologic units occur within groundwater basins in the San Francisco Bay region that do not meet the definition of an aquifer. For instance, there are shallow, low-permeability zones throughout the region that have extremely low water yields. Groundwater may also occur outside of currently identified basins. Therefore, for basin planning purposes, the term "groundwater" includes all subsurface waters, whether or not these waters meet the classic definition of an aquifer or occur within identified groundwater basins.

The areal extent of groundwater basins in the region has been evaluated by the Department of Water Resources (DWR 1980). Of special importance to the region are the 31 groundwater basins classified by DWR that produce, or potentially could produce, significant amounts of groundwater (Figure 3.4.2). This computer groundwater mapping GIS system was developed by the RWQCB and has the capacity to present information on each basin at a much higher level of resolution. The Northern San Francisco Peninsula and East Bay Plain basins have been studied in further detail by the RWQCB and have been divided into proposed groundwater management zones including: (1) significant drinking water resource; (2) limited drinking water resource; and (3) nonpotable water resource. The South Bay is currently being mapped to this level, with the North Bay and Delta region to be mapped in the future by the RWQCB (Bartow 2002). Existing and potential beneficial uses applicable to groundwater in the region include municipal and domestic water supply, industrial water supply, industrial process water supply, agricultural water supply, and freshwater replenishment to surface waters. More detailed information that lists the 31 identified groundwater basins located in the region and their existing and potential beneficial uses can be obtained from the RWQCB Basin Plan. Unless otherwise designated by the RWQCB, all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply.

Groundwater quality can be degraded through the intrusion of saltwater. Degradation of water quality would reduce the groundwater basin yield, diminishing production from existing activities and limiting future groundwater development. In undeveloped coastal areas, saltwater is prevented from migrating landward by the hydraulic head of the fresh water, which must be high enough above sea level to compensate for the greater density of saltwater. Water production from wells located in the vicinity of the shoreline must be monitored. If pumping of the aquifer reaches rates high enough to reduce the freshwater hydraulic head (over-pumping), the denser saltwater will migrate towards the well and will eventually be extracted from the well. For example, when the Oakland estuary was dredged to create Alameda Island between 1880 and 1910, the dredging cut through a mud and sand layer and caused seawater intrusion into the east side of Alameda Island. Saltwater intrusion was then exacerbated by pumping from adjacent water supply wells on the island. Groundwater protection plans are prepared at the local government level.

According to findings of the Final LTMS Management Plan (USACE 2001), dredging may potentially affect groundwater resources. However, for this to occur would require dredging of Bay mud deep enough to strip the "cover" from the top of a freshwater reservoir under the Bay, allowing the saltwater to contaminate the fresh water. Not all groundwater elevations below the Bay have been mapped, but known elevations are well below the maximum dredging depth (about -7 feet) considered in this study.

Dredging Policy 9 of the Amendments to the Bay Plan specifies that "to protect fresh water reservoirs (aquifers): (a) all proposal for the dredging or construction work that could penetrate the mud "cover" should be reviewed by the San Francisco Bay Regional Water Quality Control Board and the State Department of Water Resources; and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir. Applicants for permission to dredge should provide additional data on groundwater conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project."

A concern for saltwater intrusion into underlying aquifers was raised regarding the Oakland Harbor navigation improvement project. The project proposed to deepen and widen portions of the Inner and Outer harbor shipping channels. A hydrogeologic investigation was performed by the Port of Oakland (Todd Engineers 2000) to study the potential for saltwater intrusion into the local groundwater system. The study demonstrated that channel deepening would have a minimal impact on groundwater flow paths, vertical flux of groundwater into the lower aquifer, and changes in total dissolved solids concentrations over time.

San Francisco International Airport conducted a study (URS 2001) to evaluate the potential for saltwater intrusion into freshwater aquifers in the East Central Bay and around the airport (West Central Bay) due to proposed dredging of Merritt Sand and Young Bay Mud (YBM). The primary concern was that groundwater resources would be affected if the removal of low-permeability YBM from alluvial sediments (Merritt Sand in the East Bay, Upper Layered Sediments in the West Bay) were to enhance the hydraulic connection between the Bay and adjacent aquifers with sensitive uses. The evaluation was based entirely on existing hydrogeologic information gathered from public agencies and local consulting firms. It was found that previous dredging has already potentially contributed to saltwater intrusion in the localized Merritt Sand deposit. However, it is noted that the openings in YBM from dredging are self-healing, due to the continuing deposition of YBM.

3.4.1.7 Water Pollution from Vessels

Prevention of fuel spills, through risk reduction and containment measures, has reduced and minimized releases of petroleum products within the Bay. An expanded ferry system would increase transits and ferry operations. This could affect the potential for a fuel or petroleum product release. San Francisco Bay is the largest harbor on the Pacific Coast of the United States and ranks as the fifth largest crude oil handling port in the United States. It is the sixth largest handler of refined oil product in the nation. Extensive foreign and domestic commerce is handled at the port and harbor facilities in San Francisco, Oakland, Alameda, Richmond, and Redwood City. In the most recent year for which statistics have been compiled, 67,119,000 tons of cargo passed through the Golden Gate, of which 47,838,000 tons were either crude oil or refined liquid petroleum products. Because risk of spills is closely associated with the volume of traffic and its proximity to other vessel traffic, the approach to San Francisco Bay is the highest risk area in California. A vessel separation scheme is operative for the approach to San Francisco Bay. A Vessel Traffic Service (VTS) also operates to assist traffic to enter, to depart, and while inside of San Francisco Bay. There is lightering (i.e., transfer) activity at Anchorage 9 inside the Bay. There are numerous marine facilities surrounding San Francisco Bay where the transfer of crude oil and refined product occur on a daily basis. These transfer activities can be potential sources for oil spills.

Marine Fuel Spills

Marine fuel spills can result from leaks or breaks in vessel fueling equipment, vessel collisions or sinkings, mechanical or structural failures, or simple human errors such as leaving valves open or aligning them improperly. Very few spills linked to ferries have occurred and the volumes involved have been minimal. Accidental spills only account for a small fraction, up to 10 percent, of the total fuel contamination of waters. As much as 90 percent of oil in marine waters is from chronic sources that are difficult to identify, such as urban runoff, small craft boating, and improper disposal of used oil products (CDFG 2002). Since 1991, when the California Oil Spill Prevention and Response Act and the Federal Oil Pollution Act (OPA 90) took effect, there has been an 86 percent drop in the volume of oil spilled from oil tankers and barges in the United States[1].

The primary mission of the Marine Environmental Protection (MEP) Division of the United States Coast Guard (USCG) San Francisco Marine Safety Officer (MSO) is emergency response to pollution incidents. This includes containment and cleanup of oil discharges and hazardous substances introduced into the navigable waters of the United States. The MSO coordinates response efforts with other agencies—federal, state, and local—in a joint effort to minimize damage to the environment caused by pollutants.

The MEP Division consists of a total of 18 personnel in the Alameda and Concord offices. Personnel are trained in Incident Command System procedures and carry the qualifications of pollution investigators and Federal On-Scene Coordinators. Actual removal is primarily done by qualified clean-up contractors and supervised by MSO personnel on scene.

The MEP Division is also involved in preparedness planning. The Oil Pollution Act of 1990 mandated that Area Contingency Plans (ACPs) be created to respond to large oil spill incidents. Three ACPs are maintained by the San Francisco MSO: California North Coast, San Francisco Bay and Delta, and Central Coast. The latest update was published in 2000.

Several Oil Spill Response Organizations (OSROs) operate in the Bay and collaborate with the USCG, California Office of Spill Prevention and Response (OSPR), and other organizations in the Unified Command System during drills and spill responses. Response is available to OSRO members, or through the USCG or OSPR for orphan spills. Spill cleanup costs are paid by the party accepting responsibility for the spill. Spills occurring within the Bay can be attended to within one hour or less.

Coastal Fuel Spills

Fuel spills can potentially occur from a wide range of sources within the Bay. Potential incidents may involve spills of magnitudes that would far exceed those of spills from ferry vessels. Over a thousand tankers pass under the Golden Gate each year, along with container ships, recreational boats, and other vessels. In addition, numerous refineries, fuel tanks, and pipelines are found along the shoreline. The Federal Minerals Management Service prepared oil spill risk assessments for the West Coast in 1980 and 1988. According to these studies, for ships bound from Alaska to Los Angeles, there is a 53 percent probability of a spill of 1,000 barrels or more and a 26 percent probability of a spill of 10,000 barrels or more. Oil spills from offshore tankers have damaged California's coastal resources in the past, and continue to pose a threat. Large and

[1] It is important to note, however, that not all spills are necessarily reported.

small oil spills have occurred in the past 25 years. In 1971, two tankers collided under the Golden Gate Bridge in San Francisco Bay, spilling 20,000 gallons of oil. The oil moved out of the Bay and as far south as San Gregorio Beach in the Monterey Bay National Marine Sanctuary (MBNMS) and killed about 4,000 seabirds. Other notable spills involved tankers transiting to and from or docked at local ports. In 1984, the oil tanker *Puerto Rican* spilled between 25,000 to 35,000 barrels of oil (1 barrel equals 42 to 45 gallons oil). The slick reached Pigeon Point in the MBNMS and killed about 2,900 seabirds. In 1986, the *Apex Houston* leaked 616 barrels of oil across several hundred miles from Marin to San Luis Obispo counties, killing over 10,000 birds.

On October 28, 1996, the military reserve vessel SS Cape Mohican spilled an estimated 96,000 gallons of intermediate fuel oil (IFO 180) into a dry-dock structure. Approximately 40,000 gallons of fuel escaped into the San Francisco Bay at Pier 70. The spill allegedly occurred during routine maintenance when an opened valve discharged stored fuel while oil was being transferred from a stabilization tank. The oil impacted many sensitive natural resources including the Gulf of the Farallones and Monterey Bay National Marine Sanctuaries; Golden Gate National Recreation Area (including the Presidio, Alcatraz, and Fort Mason); Point Reyes National Seashore; the San Francisco Maritime National Historical Park; Angel Island State Park; and Fort Point National Historical Site. The spill resulted in physical fouling of artificial structures (such as pier pilings, riprap, and seawalls), sand and gravel beaches, rocky intertidal habitat, kelp beds, mudflats, and wetlands. The spill also caused closures of recreation areas and oiling of marinas and vessels, including historic ships.

Not all serious spills recorded in the Bay have originated in transiting vessels. In October 1996, an oil spill at the San Francisco dry docks poured about 8,000 gallons of bunker C fuel oil into San Francisco Bay. Initial efforts to contain and collect the oil were only partially successful. The spill broke up into many small slicks that spread over much of the Bay, out the Golden Gate, and along the coast.

In addition to the threat of large spills, small oil spills are an ongoing problem. The California Oil Spill Prevention and Response Agency reports that in 1993 alone, 39 lesser spills, mostly less than 1 barrel, occurred between Bodega Bay and Cambria, mostly from fishing vessels and recreational boats.

Ferry Fuel Spills in San Francisco Bay

Ferry refueling and other operations involving the handling of potentially harmful products and materials are carried out under strict U.S. Army Corps of Engineers (USACE) and USEPA regulations prohibiting water pollution. American regulatory bodies treat large vessels, including transit ferries, like major industrial facilities sited on land. All were recognized years ago as potential "point specific" sources of water pollution. Marine oil spills can result from leaks or breaks in vessel fueling equipment, vessel collisions or sinkings, mechanical or structural failures, or simple human errors such as leaving valves open or aligning them improperly. Highly detailed procedures and engineering requirements were then written into public law to prohibit harmful spills and discharges. Severe monetary fines and even criminal penalties are mandated for offenses. This program has been extremely effective. It is also noteworthy that, in addition to federal regulations, industrial and marine facilities and operations are subject to the state and local environmental regulations imposed by water quality boards, departments of fish and game, and other related regulatory agencies.

Data for water pollution from ferry boats in San Francisco Bay are presented in Table 3.4.1. Six incidents of pollution occurred from ferries from 1998 to 2001; the largest spill size was 15 gallons. The total number of ferry transits from 1998 to 2001 was 317,335, which means that less than one percent of transits (0.002 percent) resulted in an incident of pollution.

Current Oil Spill Preparedness and Response Conditions of Ferry Operators

The fuel characteristics of current ferry operators are detailed in Table 3.4.2. The following subsections summarize existing ferry operator fueling operations and contingency planning.

Golden Gate Ferry

All of the Golden Gate Ferry vessels have a fuel capacity less than 250 barrels. Both vessels and terminals are therefore exempt from USCG OPA oversight, except for vessel overflow containment for vents and other standard Title 33 Code of Federal Regulations vessel outfit rules. Vessels are fitted with aircraft-type fuel fittings to help reduce risk of spillage. Golden Gate holds a permit from the California OSPR to operate its "publicly owned/single user/single commodity (D-2)" over-water fuel transfer system. OSPR visits for occasional drill/inspection. Golden Gate has an OSRO (Parker) on retainer as its water responder and another OSRO (PSC) as its shoreside responder. The operator conducts regular drills. It has had a few small spills due to plugged fuel delivery filters, cracked bilge overboard valve seats, etc. GGBHTD posts an annual self-insurance certificate to OSPR.

An annual amount of 1.3 million gallons of fuel are transferred. All fuel is received by truck at the Larkspur fuel farm. Each truck delivers 7,500 gallons. Fueling of vessels is done from the tank farm, but can also be done directly from delivery trucks when the terminal system is down for maintenance. The Spaulding ferries can hold enough fuel for 5 to 7 days. All clean and dirty lube oil is handled by drum directly to and from the vessel using air-lift pumps. Bilge water is pumped ashore to holding tanks for disposal by a licensed hauling company.

Golden Gate ferries carry some response equipment such as absorbent material on all vessels. In addition, the Larkspur, San Francisco, and Sausalito terminals have over-water hydraulic rams and hoses for cleanup purposes. The Larkspur terminal has a fixed boom protecting the shoreline under the terminal, plus two 40-foot deployable booms to seal vessels and/or berths where a spill might occur.

The Spaulding ferries were modified in 1994-1995 to reduce fuel capacity from 252 to 247 barrels (bbls). The operator rarely fuels them to 6,000 gallons (60 percent) to avoid carrying fuel that is not needed and is essentially extra weight. The Catamarans have two 1,750-gallon tanks, which are kept to 90 percent capacity. They require about 1,800 gallons for a full-day schedule. The Sausalito (MVGG) vessel has a 4,800-gallon tank that is filled weekly. It uses 3,700 gallons in winter and 4,150 gallons in summer (Courtois 2002).

Blue and Gold Fleet

Blue and Gold Fleet maintains oversight and training of vessel operators and shore maintenance operators, who have responsibility for initial response to and notification of a fuel spill. The Blue and Gold Fleet maintains booms and absorbent materials at each of their operational locations to respond to spills at the berth and fueling areas. Only absorbent materials are aboard the vessels for spill response. The OSRO for Blue and Gold is Foss Environmental. The fleet

uses approximately 32,000 bbls of diesel in a typical year and the vessels are fueled from an underground facility at Pier 41, San Francisco. Vessels are fueled to 80 percent capacity, usually every other day. Tank sizes range from 1,000 gallons to 2,700 gallons, depending on vessel class, and the vessels have two tanks each. Oil waste is typically collected into an underground facility at Pier 41 and recycled, or directly removed from the vessels by the recycler (Hie 2002).

Vallejo Baylink Ferry

Vallejo Baylink Ferries contracts with Foss Environmental to act as its shoreside and waterside OSRO and to perform cleanup in the event of a spill. All the fueling personnel receive training and are periodically tested in accordance to regulations. The Vallejo Ferry service has had no spills since being operated by the Blue and Gold Fleet. The Vallejo ferry maintains required spill response equipment (bulk absorbent, absorbent boom, absorbent pads, gloves, eye protection, type-x suits, and written inventory). The Vallejo Baylink service consumed approximately 1.2 million gallons of diesel in 2001. Fueling takes place at Berths 3 and 4 in Mare Island, which is the Vallejo Baylink Maintenance Facility. Vessels are fueled daily in the evenings: two vessels have two 1,750-gallon tanks, and one vessel has two 1,500-gallon tanks, which are all filled to 90 percent capacity. Two vessels operate on weekdays and summer weekends, and one vessel operates on winter weekends. Oily bilge water is offloaded to a holding tank shoreside. Artesian, an oil recycler, is hired to process the oily water (Robbins 2002).

3.4.1.8 Regulatory Setting

Water resources are regulated under a variety of federal and state laws. The following summarizes the applicable water quality regulations that apply to San Francisco Bay.

Federal Regulations

At the federal level, two agencies hold key regulatory authority regarding oil spills. The USCG is focused on prevention and response, while National Oceanic and Atmospheric Administration (NOAA) is focused on restoration of oil-damaged resources. The Clean Water Act, Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and Oil Pollution Act (OPA) mandate that parties releasing hazardous materials and oil into the environment are responsible not only for the cost of cleaning up the release, but also for restoring any injury to natural resources that resulted. The National Marine Sanctuaries Act mandates that parties who destroy, cause the loss of, or injure sanctuary resources are responsible for their restoration.

Clean Water Act (33 USC 1251 et seq.)

This is the principal statute governing water quality. The statute's goal is to end all discharges entirely and to restore, maintain, and preserve the integrity of the nation's waters, with an interim goal of providing water that is both fishable and swimmable. The Act regulates both the direct and indirect discharge of pollutants into the nation's waters. It mandates permits for wastewater and stormwater discharges, regulates publicly owned treatment works that treat municipal and industrial wastewater, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as

dredging and the filling of wetlands. The Clean Water Act was enacted in 1977 as a series of amendments to the Federal Water Pollution Control Act of 1948.

Federal Water Pollution Control Act, as Amended by the Clean Water Act of 1977 (33 USC 1251 et seq.)

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific sections of the CWA control the discharge of pollutants and wastes into the marine and aquatic environments. The major sections of the CWA that apply to activities potentially occurring as parts of the proposed project include dredging and disposal activities (Sections 401 and 404) and the National Pollutant Discharge Elimination System (NPDES) (Section 402).

Oil Pollution Act (OPA) of 1990 (33 USC 2701-2761)

This is the principal statute governing oil spills into the nation's waterways. The OPA was passed in the wake of the Exxon Valdez oil spill in March of 1989. The statute establishes liability and limitations on liability for damages resulting from oil pollution, and establishes a fund for the payment of compensation for such damages. In conjunction with CERCLA, OPA mandates a "National Oil and Hazardous Substances Pollution Contingency Plan (NCP)" to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. OPA requires preparation of spill prevention and response plans by coastal facilities, vessels, and certain geographic regions. OPA amended the Clean Water Act and includes the Oil Terminal and Oil Tanker Environmental Oversight and Monitoring Act of 1990.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund) (42 USC 9601 et seq.)

This is the principal statute governing the cleanup of sites contaminated with hazardous substances, and responses to spills of those substances. The statute establishes liability for site cleanup, prescribes a procedure for identifying and ranking contaminated sites, provides funding for site cleanups, reduces uncontrolled releases of hazardous substances, establishes cleanup procedures that provide protection for humans and the environment, and restores injured natural resources through provisions administered by the natural resource trustees. In conjunction with OPA, it mandates a National Oil and Hazardous Substances Pollution Contingency Plan (NCP) to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. The statute was amended by the Superfund Amendment and Reauthorization Act (SARA) in 1986, which adds extensive public "right-to-know" and emergency planning requirements, establishes a fund for leaking underground storage tanks, and imposes worker safety requirements for hazardous materials.

National Marine Sanctuaries Act (NMSA) (16 USC 1431 et seq.)

This is the principal statute governing the designation and management of protected marine areas of special significance. The statute requires NOAA to designate National Marine Sanctuaries in accordance with specific guidelines and to develop and review management plans for these sites. It provides for the continuation of existing leases, licenses, and other established rights in

sanctuary areas, and for the development of research and education programs. The statute also prohibits destruction, injury, or loss of sanctuary resources, and establishes liability for response costs and natural resource damages for injury to these resources. The NMSA was formerly referred to as Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

The Ports and Waterways Safety Act of 1972 (33 USC 1221 et seq.)

The Ports and Waterways Safety Act of 1972 as amended by the Port and Tanker Safety Act of 1978, provides the strongest authority for the Coast Guard's program to increase vessel safety and protect the marine environment in ports, harbors, waterfront areas, and navigable waters. It authorizes VTS, controls vessel movement, establishes requirements for vessel operation, and other related port safety controls.

In addition, a number of other laws call for Coast Guard enforcement. These include the Federal Water Pollution Control Act, which delegates enforcement authority and responsibility to the Coast Guard in cases where oil and hazardous substances are discharged into U.S. waters in harmful quantities. The Act to Prevent Pollution from Ships (33 USC 1901 et seq.) limits the operational discharges of oil from ships and requires reception facilities to receive waste that cannot be discharged at sea. The Marine Protection, Research and Sanctuaries Act of 1972 (33 USC 1401 et seq.) requires Coast Guard surveillance of ocean dumping activities. The Oil Pollution Act of 1990 (33 USC 2701 et seq.) requires increased Coast Guard involvement with vessel traffic service systems, vessel and facility monitoring, and oil spill prevention and cleanup, in addition to amending the Federal Water Pollution Control Act.

NOAA established the Damage Assessment and Restoration Program (DARP) in 1990 to fulfill natural resource trustee responsibilities assigned in the CWA, CERCLA, OPA, and the NMSA and other federal laws. DARP has the mission to restore coastal and marine resources that have been injured by releases of oil or hazardous substances and to obtain compensation for the public's lost use and enjoyment of these resources.

State

Water Quality Control Act (Porter-Cologne Act)(California Water Code Section 13000 et seq.; CCR Title 23, Chapter 3, Subchapter 15)

The Porter-Cologne Water Quality Control Act is the primary state regulation that addresses water quality. The requirements of the Act are implemented by the State Water Resources Control Board (SWRCB) at the state level, and the RWQCB at the regional level. The SWRCB, as authorized by the Act, has promulgated regulations in Subchapter 15 of Title 23 of the California Code of Regulations (CCR) designed to protect water quality from the effects of waste discharges to land. Under Subchapter 15, wastes that cannot be discharged directly or indirectly to waters of the state (and therefore must be discharged to land for treatment, storage, or disposal) are classified to determine specifically where such wastes may be discharged. This classification requirement would apply to dredged material or fill that would be disposed of in an upland environment.

In addition to the provisions contained in the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act, the California Fish and Game Code provides general law regarding water pollution prohibitions and both criminal and civil penalties on discharges of petroleum and other

hazardous materials entering California waters (Sections 5650 et seq.). State Fish and Game wardens enforce these sections.

Further, California Water Code Section 13272 requires any person who knows of any oil or petroleum product discharge into California waters to notify the Office of Emergency Services. Failure to comply is a misdemeanor.

All Oil Spill Prevention and Response regulations are found in Title 14, CCR. Regulations promulgated by the State Lands Commission are found in Title 2, CCR.

California State Lands Commission Marine Facilities Division (MFD) derive legislative authority from the Lempert-Keene-Seastrand Oil Spill Prevention and Response Act of 1990 Division 7.8 of the Public Resources Code. The Act expanded the CSLC's pollution prevention responsibilities.

Local

Water Quality Control Plan for San Francisco Bay Basin

The Basin Plan identifies surface waters in the region as consisting of inland surface water (freshwater lakes, rivers, and streams), estuaries, enclosed bays, and ocean waters. Historical and ongoing wasteloads contributed to the surface water bodies in the region come from upstream discharges carried into the region via Delta outflow, direct input in the forms of point and nonpoint sources, and indirect input via groundwater seepage (RWQCB 1995). The Basin Plan describes the water quality control measures that contribute to the protection of the beneficial uses of the Bay watershed. The Basin Plan identifies beneficial uses for each segment of the Bay and its tributaries, water quality objectives for the reasonable protection of the uses, and an implementation plan for achieving these objectives.

McAteer-Petris Act (Public Resources Code Section 66600 et seq.)

The San Francisco Bay Conservation and Development Commission (BCDC) is responsible for implementing the McAteer-Petris Act. The Act directs BCDC to exercise its authority to issue or deny permit applications for placing fill, extracting minerals, or changing the use of any land, water, or structure within the area of its jurisdiction (the Bay waters and 100 feet above the shoreline). The BCDC also carries out determinations of consistency with the Federal Coastal Zone Protection Act for federally sponsored projects.

3.4.2 Impacts and Mitigation

3.4.2.1 Significance Criteria

Impacts to water resources would be considered significant if they would:

- Substantially reduce ability to achieve water quality objectives consistent with improved habitat conditions;
- Cause a degradation in water quality from on-site stormwater discharges due to construction of new terminal facilities, including buildings, roads, parking lots, and associated structures;

- Cause substantial flood hazards to human safety and property damage due to construction of new terminal facilities within a floodplain; or
- Result in a substantial increase in the incidence of fuel spills from ferries.

3.4.2.2 Impacts and Mitigation

Impact W-1 **Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface at terminal sites, causing an increase in stormwater discharge. If the stormwater came in contact with pollutants or disturbed soil, discharge of the runoff could impact the quality of the receiving water.**

Stormwater pollution occurs when rainwater comes into contact with materials on site and washes contaminants into storm drains, creeks, or directly into the Bay. Sources of pollution during project construction could include oil leaked from heavy equipment and vehicles, grease, hydraulic fluid, fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil.

Stormwater discharges associated with project construction activities are regulated according to CCR Section 402(p) under NPDES. Under the NPDES construction permit, owners of the proposed terminal locations where construction would disturb more than one acre of land would have to submit a Notice of Intent (NOI), develop a SWPPP, conduct monitoring and inspections, retain monitoring records, report incidences of noncompliance, and submit annual compliance reports by July 1 of each year.

The majority of terminals included in the Proposed Project are in developed areas, many of which may already have water quality problems. However, the potential for impacts exists, and this impact is therefore considered potentially significant.

Summary of Impact W-1

- The Proposed Project would involve new terminal facilities. Construction and operation of these facilities could impact water quality due to stormwater discharges. These impacts could be potentially significant.

Mitigation W-1.1: Adoption of BMPs during construction to prevent, minimize, and clean up spills and leaks from construction equipment would reduce the potential for impacts to water quality. Examples of BMPs include refueling and maintenance of equipment only in designated lined and/or bermed areas, isolating hazardous materials from stormwater exposure, and preparing and implementing spill contingency plans in specified areas. Any equipment with a fuel tank or other oil tank, such as heavy excavation machinery, must be considered as a potential source of released oil. Storage and parking of such equipment shall take into account oil spill prevention regulations to ensure that the area is free of drains or other avenues though which spills may escape containment.

Mitigation W-1.2: New terminal facilities shall be designed such that stormwater runoff would be controlled and discharged in an appropriate manner. Construction and industrial stormwater NPDES permits would be required, and BMPs shall be adopted to reduce the chance of pollutants entering surface and groundwater, thereby reducing the potential for impacts to water

quality. Typical pollution control measures include BMPs designed to reduce the quantities used of materials that may produce pollutants, changing the way various products and materials are handled or stored, employing various structural devices to catch and restrict the release of pollutants, and establishing appropriate responses to spills and leaks. Examples of BMPs include temporary silt fencing, protection devices such as rock aprons at pipe outlets, stabilized pads of aggregate at points where construction traffic would be leaving an unimproved construction site to enter a public street, temporary drain inlet protection devices such as filter fabric and sand bags, concrete washouts for cement mixers, preservation of existing vegetation, and vehicle and equipment cleaning.

Impact After Mitigation: Impact W-1 would be less than significant after implementation of Mitigations W-1.1 and W-1.2.

Impact W-2 Construction of new terminal facilities within a 100-year floodplain could expose people to the hazard of flooding and terminal facilities to flood damage.

Some areas along the shoreline and drainages leading to the Bay are potential floodplains. Risks associated with building in a floodplain include threats to life and property. The level of risk is determined by the nature of the facility (i.e., parking lots, ticket purchase stations, access roads, docks, etc.), its location, and the adoption of mitigation measures specific to each water transit terminal facility. Local city or county government agencies regulate floodplain development through land use controls, based on determinations of flood elevations. The Federal Emergency Management Agency (FEMA) maintains maps of 100-year flood areas in the Bay counties. A "100-year flood" refers to a flood level with a 1 percent or greater chance of being equaled or exceeded in any given year.

Existing and proposed water transit terminal locations, not including access roads, have been evaluated for their location within the FEMA 100-year flood boundary, based on published FEMA maps (Figure 3.4.3). None of the potential terminal sites in the Proposed Project lie within the 100-year floodplain as mapped by FEMA. However, base flood elevations in the areas of the proposed facilities should be verified or determined from FEMA Flood Insurance Rate Maps (FIRMs) when specific sites are identified.

Summary of Impact W-2

- None of the potential terminal sites in the Proposed Project lie within the 100-year floodplain as mapped by FEMA. Therefore, the potential for impacts from flooding is considered less than significant and no mitigation is required.

Impact W-3 Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.

Marine oil spills can result from leaks or breaks in vessel fueling equipment, vessel accidents, mechanical or structural failures, or human errors such as valves left open or misaligned. Ferry refueling and other operations involving the handling of potentially harmful products and materials are carried out under strict USACE and USEPA regulations prohibiting water pollution. Existing regulations and codes treat large vessels, including transit ferries, similar to major industrial facilities sited on land. They are recognized as potential "point specific" sources

of water pollution. Detailed procedures and engineering requirements have been written into regulations to prohibit harmful spills and discharges.

Data for water pollution from ferries in San Francisco Bay are presented in Table 3.4.1. Six incidents of pollution occurred from ferries from 1998 to 2001; the size of the largest spill was 15 gallons. The total number of ferry transits during the four years of record was 317,335, which means that approximately two one-thousandths of one percent of transits (0.002 percent) resulted in an incident of pollution. While statistics for the existing ferry system indicate a low-probability and low-volume situation, spills may continue to happen. Spills could occur in transit, as a result of a navigational incident, such as collision or grounding, or due to equipment failure or malfunction. Spills can also take place at a refueling station as a result of accidental releases or malfunctions.

Currently, each of the three Bay Area ferry operators has concentrated its fueling operations at a single company location (i.e., Larkspur, Mare Island, and Pier 41). Current Bay Area ferry service requires approximately 77,000 gallons of fuel weekly to operate. Expansion of ferry service would require additional fuel storage and transfer capacity. This would require the expansion of existing fueling operations at the three centralized locations and/or the construction and operation of new fueling facilities at other locations to be determined. Both the expansion of existing facilities and the construction of new facilities would require permits according to relevant regulations and codes.

NOAA's Hazardous Materials Response and Assessment Division and the Office of Response and Restoration have issued a fact sheet on small diesel spills, which are defined as those in the range of 500 to 5,000 gallons (www.response.restoration.noaa.gov). This would be the general range of potential spills from vessels in the current and proposed ferry fleet. Diesel fuel is a light, refined petroleum product with a relatively narrow boiling range, meaning that, when spilled on water, most of the oil evaporates or naturally disperses within a few days. According to the NOAA fact sheet, this is particularly true for small spills, even in cold water. Consequently, after a few days there is rarely any oil on the surface for oil spill responders to recover.

After spilling on water, diesel oil spreads very quickly to a thin film. Even when the oil is described as a heavy sheen, it is 0.0004 inch thick and contains about 1,000 gallons per square nautical mile of continuous coverage. Diesel has a very low viscosity and is readily dispersed into the water column when winds reach 5 to 7 knots.

Diesel oil is much lighter than water (its specific gravity is about 0.85, compared to 1.03 for seawater). It is not possible for this oil to sink and accumulate on the seafloor as pooled or free oil. However, it is possible for the oil to be physically mixed into the water column by wave action, forming small droplets that are carried and kept in suspension by the currents. Oil dispersed in the water column can adhere to fine-grained suspended sediments, which would eventually settle on the estuary bottom. However, this process is not likely to result in measurable sediment contamination from small spills.

Diesel oil is not very sticky or viscous, compared to black oils. When small spills strand on the shoreline, the oil tends to penetrate porous sediments quickly, but also tends to be washed off quickly by waves and tidal flushing. Shoreline cleanup is usually not needed. Diesel oil is readily and completely degraded by naturally occurring microbes in one to two months.

Diesel is considered to be one of the most acutely toxic oil types. Fish, invertebrates, and seaweed that come in direct contact with a diesel spill may be killed. However, according to the NOAA fact sheet, small spills in open water are so rapidly diluted that fish kills have never been reported. Fish kills have been reported for small spills in confined, shallow water. Crabs and shellfish can be tainted from small diesel spills in shallow, nearshore areas. Small diesel spills can affect marine birds by direct contact, though the number of birds affected is usually small because of the short time the oil is on the water surface. Mortality is caused by ingestion during preening as well as hypothermia from matted feathers. According to NOAA's experience with small diesel spills, few birds are directly affected. However, small spills could result in serious impacts to birds under worst-case conditions, such as grounding of a vessel next to a large nesting colony or transport of diesel sheens into areas of high bird concentrations.

Summary of Impact W-3:

- The Proposed Project would involve expansion of ferry service and increased numbers of ferry transits. It would introduce new routes across the Bay, with the potential to impact areas not currently served by water transit. Based on the historic record, spills associated with ferry operations have an extremely low probability of occurrence. This has likely been due to the procedures followed by the ferry operators. Ferry service expansion should not result in a substantial increase in the incidence of spills, assuming continued use of similar procedures. This impact would likely not be significant in light of its low probability and the past record. However, a potentially significant spill could still occur.

Mitigation W-3.1: Although this impact is considered to have a low probability of occurring, a spill still has the potential to occur, and safety and avoidance measures are prudent. The Harbor Safety Committee of the San Francisco Bay Region adopted a Harbor Safety Plan in 1992 for San Francisco, San Pablo, and Suisun Bays. The plan, as mandated by the California Oil Spill Prevention and Response Act (OSPRA) of 1990, is aimed at improving the prevention, removal, abatement, response, containment, and cleanup and mitigation of oil spills in the state's waters. OSPRA also requires an annual review of the harbor safety plans to be submitted to the state Oil Spill Prevention and Response Administrator for comment and approval. The Bay Area ferry operators participate in the Harbor Safety Committee. The safety issues raised by expansion of ferries in the San Francisco Estuary and relevant recommendations and modifications will need to be incorporated into the annual plan review. A strengthened Harbor Safety Plan would reduce the potential for impacts to water resources resulting from expansion of ferry operations.

Mitigation W-3.2: Ferry operators shall update their contingency plans and continue to use emergency response services for pollution incidents. Several OSROs operate in the Bay and collaborate with the USCG, California Office of Spill Prevention and Response (OSPR), and other organizations in the Unified Command System during drills and spill responses. Ferry operators have retained OSRO services and maintain response equipment on board vessels and at ferry terminals. As part of the ferry expansion program, the contingency plans, drill exercises, and emergency response service agreements would be reviewed and modified, if necessary, to reduce potential impacts to water resources resulting from spills. Such modifications would include ensuring that all of the spill response equipment required at new terminals is available. Review of updates and modifications to plans will be done under the USCG's regular oversight of oil spill contingency plans. The work of updating and expanding the spill response plans should be based on NOAA's Environmental Sensitivity Index (ESI). The ESI involves the

systematic compilation in a standardized format of information related to coastal shoreline sensitivity, biological resources, and human uses. ESI maps have been prepared for San Francisco Bay and are useful tools for setting protection priorities and cleanup strategies before a spill occurs (www.mapfinder.nos.noaa.gov/ mapfinderHTML3/surround/esi/atlas.html).

Mitigation W-3.3: A regular program shall be developed and maintained to train fueling operators on correct fueling methods to minimize spills due to human error or improper use of equipment would decrease the potential for spills.

Mitigation W-3.4: New vessels to be adopted in a ferry expansion program and the equipment to service any new fleets shall include technological designs to avoid fuel spills.

Mitigation W-3.5: Applicable measures recommended by the Ferry Safety Plan (ABS Consulting 2002) shall be adopted to minimize safety risks and prevent navigational incidents with the potential for spills. Ferry operators must take those new measures into account in their updates to contingency plans and OSRO service agreements**.**

Impact After Mitigation: The potential for Impact W-3 would be reduced to less than significant levels after implementation of Mitigations W-3.1 through W-3.5.

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Table 3.4.1
San Francisco Bay Ferry Boat Pollution Data 1998-2001

Year	Date	Location	Type of Pollution	Spill Size (gallons)
1998	07-Jul-98	Larkspur Ferry Landing	Oil, fuel: No. 2-D	10
2000	03-Nov-00	San Francisco	Hydraulic fluid or oil	15
2000	09-Nov-00	Pier 41	Oil, waste/lubricants	1
2001	01-Mar-01	Larkspur	Bilge slops (bilge oil and waste)	1
2001	17-Mar-01	Larkspur	Oil: Diesel	5
2001	09-Jul-01	Port of Richmond	Oil: Crude	5

Source: US Coast Guard Office of Investigations and Analysis, Assistant Commandant for Marine Safety and Environmental Protection, 2002.

Table 3.4.2
Bay Area Ferry Fuel Characteristics

Vessel Name	Owner	Operator	Fuel Type	Fuel Consumption	Fuel Capacity
Marin	GGBH&TD	GGBH&TD	Diesel ASTM D-2	600-1100 gpd	10,375 gallons, normally filled to 6,000 gallons
Sonoma	GGBH&TD	GGBH&TD	Diesel ASTM D-2	600-1100 gpd	10,375 gallons, normally filled to 6,000 gallons
San Francisco	GGBH&TD	GGBH&TD	Diesel ASTM D-2	600-1100 gpd	10,375 gallons, normally filled to 6,000 gallons
Del Norte	GGBH&TD	GGBH&TD	Diesel ASTM D-2,	1800 gpd	3,400 gallons
Mendocino	GGBH&TD	GGBH&TD	Diesel ASTM D-2	est. 2000 gpd	2 x 2100 gallons
Golden Gate	GGBH&TD	GGBH&TD	Diesel ASTM D-2	3900 gal / week annual average	4,600 gallons
Zelinsky	Blue & Gold	Blue & Gold	Diesel ASTM D-2	No data	No data
Vallejo	Vallejo	Blue & Gold	Diesel ASTM D-2	210 GPH	2020 gallons
Intintoli	Vallejo	Blue & Gold	Diesel ASTM D-2	260 GPH	3,500 gallons
Mare Island	Vallejo	Blue & Gold	Diesel ASTM D-2	260 GPH	3,500 gallons
Encinal	Vallejo	Blue & Gold	Diesel ASTM D-2	150 GPH	5400 gallons
Peralta	Vallejo	Blue & Gold	Diesel	No data	No data
Bay Breeze	Harbor Bay Maritime	Harbor Bay Maritime	Diesel ASTM D-2	No data	2,200 gallons
Harbor Bay Express II	Harbor Bay Maritime	Harbor Bay Maritime	Diesel	No Data	No Data

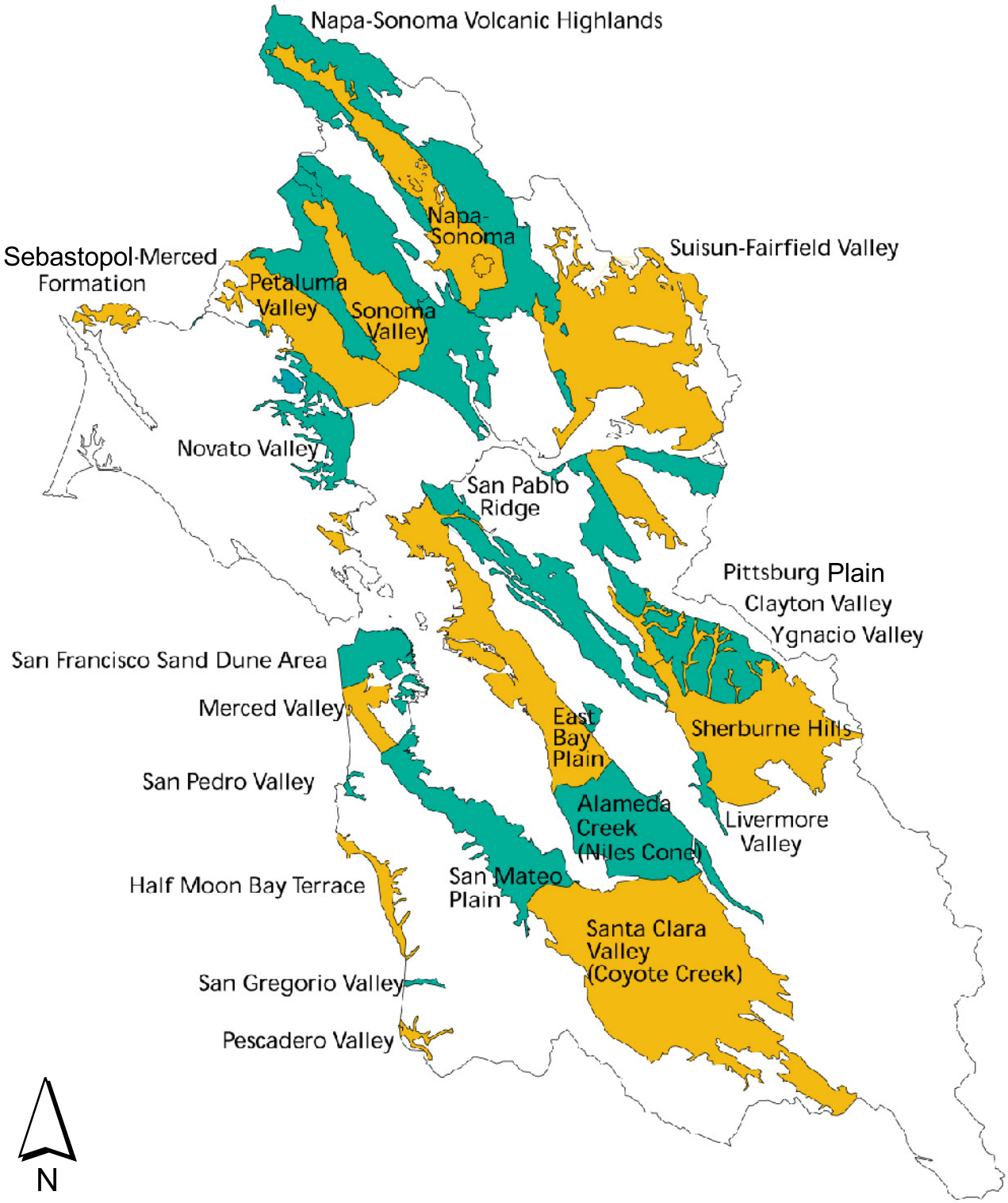
Source: JJMA 2002.



Not to scale

URS	Water Transit Authority Program EIR Project No. 43-00066890.12	Regional Monitoring Program Sampling Stations	Figure 3.4.1

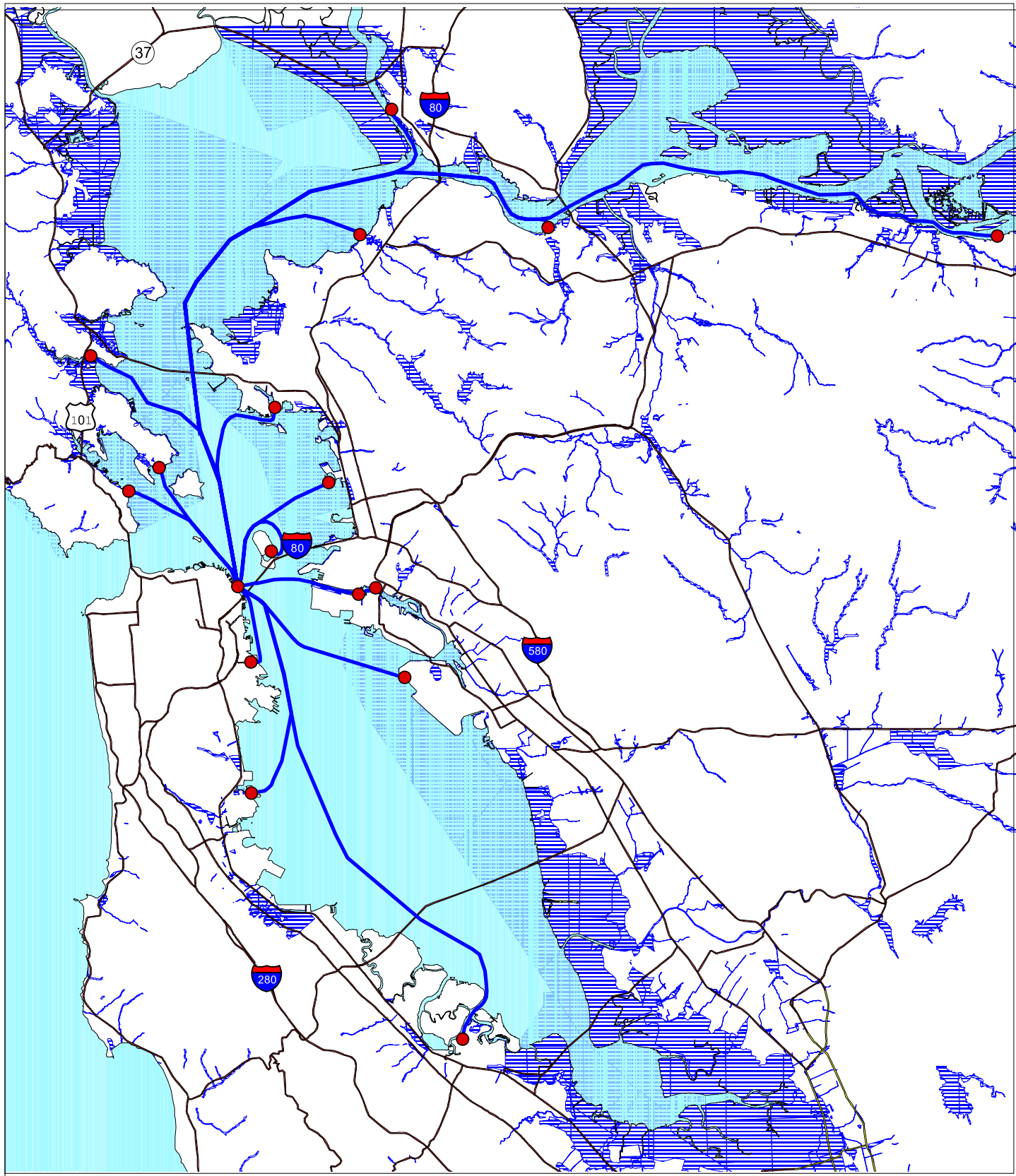
L:/projects/wta/apr/water_resources.apr



Not to scale

URS	Water Transit Authority Program EIR Project No. 43-00066890.12	Significant Groundwater Basins in the San Francisco Bay Region	Figure 3.4.2

L:/projects/wta/apr/water_resources.apr



LEGEND

Primary Roads

FEMA 100-yr Floodplain

Existing or Proposed Ferry Terminal

3 0 3 6 Miles

Scale 1:385,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

FERRY TERMINALS AND FEMA 100-YR FLOOD ZONE

Figure
3.4.3

L:/projects/wta/apr/water_resources.apr

3.5 BIOLOGY

This section provides an overview description of the biological resources that may be affected by implementation of the Proposed Project. The Proposed Project could potentially affect a variety of habitat types, supporting a diverse assemblage of species. This section first describes the general nearshore and tidal habitat types found around the Bay and provides general locations of these habitat types and the species commonly found in them. The open-water community of the Bay is described and has been organized by resource area based on the following broad categories:

- Plankton
- Benthos (bottom dwelling organisms)
- Fish
- Birds
- Marine mammals

Species and habitats (e.g., eelgrass beds, etc.) protected under the state and federal endangered species acts and other regulations are also described.

3.5.1 Environmental Setting

3.5.1.1 Study Area

The biological resources of San Francisco Bay are discussed in the following sections by location and type. Figure 3.5.1 shows the biological resources study area. For purposes of this report, the Bay is categorized into three subregions, which are defined as the following:

- **North Bay** – North of the Richmond Bridge extending to Suisun Bay and the west Sacramento-San Joaquin River Delta (the Delta)
- **Central Bay** – Richmond Bridge to the Bay Bridge
- **South Bay** – South of the Bay Bridge

3.5.1.2 Habitat Types

Habitat types range from marshes and bayflats to agricultural and developed lands, some of which are specific to regional areas. These habitat types, as used in this report, include the broad categories described below.

Habitats around San Francisco Bay include those that fringe the Bay such as tidal marsh, salt ponds, and bayflats as well as the open Bay itself. The habitats types around the Bay often blend with one another in transition zones called ecotones. Species found in these areas often overlap habitat types.

Potential project features (e.g., potential ferry terminal locations) are shown on habitat maps (Figures 3.5.2 through 3.5.4) based on the Bay Area EcoAtlas, managed by the San Francisco Estuary Institute (SFEI 1999). The descriptions of habitats provided below combine similar

habitat types, such as muted tidal marsh and tidal marsh, described in the Bay Area EcoAtlas because the majority of species occur in both habitats. The habitats and common species associated with those habitat types discussed below have the potential to occur within the project boundaries.

Tidal Marsh

Two classifications of tidal marsh occur in San Francisco Bay: salt marsh and brackish marsh. In areas with a predominantly marine influence, tidal salt marsh is present. In areas with significant freshwater influence, especially at the mouths of streams such as in Suisun Bay and the Petaluma and Napa rivers, the water is less saline and the marshes are more brackish (Goals Project 1999). The vegetation in these marsh types differs due to the variation in salinity, and is described in more detail below. Vegetation zones and the distance from the shore characterize the gradations in tidal salt marsh and tidal brackish marsh. Low tidal marsh occurs between the lowest margin of marsh and mean high water (MHW). Middle tidal marsh occurs between MHW and mean higher high water (MHHW).

High tidal marsh occurs between MHHW and the highest margin of the marsh. Tidal marshes can be referred to as young or old. Younger marshes are more recently established, often due to shoreline fill development, which can cause sediments to accumulate in surrounding areas where marsh vegetation eventually grows. These marshes tend to be dominated by low-diversity plant composition, whereas older marshes tend to have a more complex plant composition (Goals Project 2000). The total acreage of tidal marsh area in the Bay has been consistently declining over the past years, with more than 80 percent of the tidal marshes around the Bay already filled or converted to other wetland uses. Today, the few remaining tidal marshes in the Bay exist in the following parts of the Bay (Goals Report 1999):

- **North Bay** – near Port Sonoma; around San Pablo Bay
- **Central Bay** – near Larkspur
- **South Bay** – at the mouth of San Bruno Creek; small patches at the fringe of the Burlingame shoreline south of SFO; near Redwood City

Salt Marsh

Salt marsh occurs throughout the entire San Francisco Bay, primarily in the North and South Bays (Figures 3.5.2 through 3.5.4). Pacific cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia virginica*) dominate salt marshes in the Bay. The low salt marsh zone consists mainly of these species, although it is rapidly being colonized by the invasive smooth cordgrass (*Spartina alterniflora*). Pacific cordgrass and smooth cordgrass frequently hybridize and are slowly outcompeting the native Pacific cordgrass. The middle salt marsh zone, or the salt marsh plains in the Bay, tend to be dominated by pickleweed, but are also characterized to a lesser extent by saltgrass (*Distichilis spicata*), dodder (*Cuscuta salina*), fleshy jaumea (*Jaumea carnosa*), and alkali heath *(Frankenia salina*). Species such as marsh gumplant (*Grindelia stricta* var. *angustifolia*), saltgrass, pickleweed, dodder, and alkali heath characterize the high salt marsh zone (Goals Project 2000).

Common fish and insects in salt marshes include: California killifish (*Lucania parva),* bay goby (*Lepidogobius lepidus*), striped bass (*Morone saxatilis*), topsmelt (*Atherinops affinis*), starry

flounder (*Platichthys stellatus),* water boatman (*Trichocorixa reticulata*), and wandering skipper (*Panoquina errans*). Common wildlife species in salt marshes include Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), white-crowned sparrow (*Zonotrichia leucophrys*), sora (*Porzana carolina*), marsh wren (*Cistothorus palustris*), northern harrier (*Circus cyaneus*), and deer mouse (*Peromyscus maniculatus*).

Special-status animal species found in salt marsh habitat include salt marsh harvest mouse (*Reithrodontomys raviventris*), clapper rail (*Rallus longirostris obsoletus*), black rail (*Laterallus jamaicensis*), Suisun shrew (*Sorex ornatus sinuosus*), salt marsh wandering shrew (*Sorex vagrans halicoetes*), San Pablo vole (*Microtus californicus sanpabloensis*), and salt marsh common yellowthroat (*Geothlypis trichas sinuosa*).

Special-status plant species include soft bird's beak (*Cordylanthus mollis* ssp. *mollis*), Point Reyes bird's beak (*Cordylanthus maritimus* ssp. *palustris*), California seablite (*Suaeda californica*), and Suisun thistle (*Cirsium hydrophilum* var. *hydrophilum*). These species are discussed in more detail in Section 3.5.1.4, Protected Species and Habitats.

In addition to full tidal salt marshes, several different types of tidal marshes are present within the Bay: diked marsh, managed marsh, and muted tidal marsh. They provide slightly different habitats since they differ hydrologically from traditional salt marshes and from each other.

Diked Marsh

Diked marshes are present in low areas or behind dikes that have poor drainage. These areas are not farmed, and since they receive annual rainfall and runoff, they still retain many wetland features and often have seasonal sections of shallow ponded water. They are not typically managed for wildlife. Diked marshes typically resemble tidal salt marsh, tidal brackish marsh, and seasonally wet grasslands in vegetation composition. Diked marshes are used frequently by wintering waterfowl, especially dabbling ducks, and shorebirds.

Managed Marsh

Managed marshes are also diked but are managed for waterfowl. Timing, length, depth and area of ponding are regulated to maximize foraging potential for these birds. Fresh or brackish slough water is the primary source of water for these marshes. The dominant vegetation in these marshes are alkali-bulrush (*Scirpus maritimus*), and brass buttons (*Cotula coronopifolia*).

Muted Tidal Marsh

In muted tidal marshes, some, but not all, natural tidal action has been cut off from the site. The vegetation in these marshes is similar to full tidal marshes but not as varied and diverse since the hydrological range is not as great. Similarly, wildlife species present in full tidal marshes occur in this habitat, although the diversity is also restricted.

Brackish Marsh

Typical brackish marsh species in San Francisco Bay include alkali-bulrush, tules (*Scirpus californicus* and *S. acutus*), and cattails (*Typha angustifolia* and *T. latifolia*) in areas that have more freshwater. The middle brackish zone is frequently dominated by saltgrass, although

pickleweed, fleshy jaumea, and fathen (*Atriplex triangularus)* are also present. The high brackish marsh zone is characterized by perennial peppergrass (*Lepidium latifolium*), fennel (*Foeniculum vulgare*), and exotic grasses (Goals Project 2000). American bittern (*Botaurus lentiginosus*) and wildlife species commonly found in salt marshes also often occur in brackish marshes.

Brackish marsh is present in northern San Pablo Bay within the sloughs connecting to the Bay, the sloughs in the South Bay, and Suisun Marsh. Within the project area, it is present in the vicinity of the Pittsburg, Antioch, Martinez, and Benicia proposed ferry terminals. Special-status species in freshwater marshes include all of the species found in salt marshes listed above except Suisun thistle, San Pablo vole, and salt marsh wandering shrew. These species are discussed in more detail in Section 3.5.1.4.

Bayflats

Bayflats are sparsely vegetated intertidal areas that occur from approximately mean lower low water (MLLW) to mean tide level (MTL). They provide protection to banks and upland shoreline from wave energy and sediment. Bayflats around San Francisco Bay provide habitat for many species of invertebrates, including diatoms, polychaetes, oligochaetes, amphipods, isopods, and crustaceans.

During low tide, bayflats provide crucial foraging and roosting areas for almost one million shorebirds that utilize the Bay during the spring migration. Shorebirds frequently found on bayflats in the Bay include western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), dunlin (*Calidris alpina*), long- and short-billed dowitcher (*Limnodromus griseus,* and *L. scolopaceus,* respectively), long-billed curlew (*Numenius americanus*), whimbrel (*Numenius phaeopus*), and American avocet (*Recurvirostra americana*).

During high tide, bayflats provide foraging habitat for fish, including longfin smelt (*Spirinchus thaleichthys)*, staghorn sculpin (*Leptocottus armatus*), starry flounder, and leopard shark *(Triakis semifasciata)*. One of the few mammals that are occasionally present on bayflats is the Pacific harbor seal (*Phoca vitulina*).

Agricultural Bayland

As noted in the *Baylands Ecosystem Habitat Goals Report* (Goals Project 1999), agricultural bayland is a type of land use rather than a type of wetland or related habitat. They are diked areas of former tidal marsh that are used for agricultural production or are ruderal areas that are fallow. Many of these areas are flooded in the winter. These areas represent a major part of the ecosystem and provide foraging and roosting habitat for a variety of species in San Francisco Bay. Agricultural baylands, located predominantly along San Pablo Bay, are diked, former tidal marshes that are used in agricultural production or as grazing lands. In some cases, agricultural production has stopped and the land is fallow. Upland vegetation is dominant in many of these agricultural baylands, although they also support seasonal wetlands. During the wet season, large areas of bayland are waterlogged or inundated, so these areas are heavily managed to grow crops. If the land were no longer intensively managed for agriculture, the area could support more wetland habitat. Common bird species utilizing agricultural baylands include long-billed curlew, least sandpiper, dunlin, northern harrier, snowy egret (*Egretta thula*), horned lark (*Eremophila alpestris*), and black-crowned night heron (*Nycticorax nycticorax*). Mammal

species occurring in these areas include black-tailed deer (*Odocoileus hemionus*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), and California ground squirrel (*Spermophilus beecheyi*). Common upland plant species in these areas include wild mustard (*Brassica kaber*), fennel, and poison hemlock (*Conium maculatum*).

Developed Areas

Developed areas are already paved and have landscaped or ruderal vegetation. They typically support wildlife species associated with disturbed or urban areas, such as red-winged blackbird (*Agelaius phoeniceus*), mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), rock dove (*Columba livia*), house cat (*Cattus domesticus*), and black rat (*Rattus rattus*).

Salt Ponds

Artificial salt ponds are present in both the North and South bays. The salt ponds, a series of connected hypersaline basins of varying degrees of salinity within which seawater was evaporated and the salt harvested, were first constructed in the latter half of the 19th century and displaced existing tidal marsh. The ponds in the South Bay are still functioning as commercially producing salt evaporation ponds, although those in the North Bay are not. The California Department of Fish and Game (CDFG) purchased these ponds from Cargill Salt Division in 1994 and have since been working to restore them to a more sustainable system.

Due to the hypersaline nature of the ponds, the salt ponds support a distinct flora of halotolerant (salt tolerant) and halophilic (species adapted to a high saline environment) species, the most dominant of which is the algal species *Dunaliella salina.*

Halotolerant and halophilic fauna, such as the black-necked stilt (*Himantopus mexicanus*), American avocet, and eared grebe (*Podiceps nigricollis*) also inhabit the salt ponds of the area. The ponds are also used by many species of waterfowl, primarily canvasbacks (*Aythya valisineria*) and greater and lesser scaup (*Aythya marila* and *A. affinis*), for loafing. Special-status species utilizing the salt ponds include the western snowy plover (*Charadrius alexandrinus*) and occasionally the brown pelican (*Pelecanus occidentalis*).

Open Bay

The Goals Report (Goals Project 1999) subdivides the open Bay into two habitat subunits: deep bay/channel and shallow bay. Deep bay/channel habitat, which accounts for approximately one-third of the area of San Francisco Bay, is defined as those portions of the Bay deeper than 18 feet below MLLW, including the deepest portions of the Bay and the largest tidal channels. Shallow bay is defined as that portion of the Bay between 18 feet below MLLW and MLLW. The shallow bay habitat accounts for two-thirds of the Bay's area (Goals Project 1999).

Species that use the deep bay habitat include several species of free swimming invertebrates such as California bay shrimp (*Crangon franciscorum*), and fishes such as brown rockfish (*Sebastes auriculatus*), halibut (*Paralichthys californicus)*, and sturgeon (*Asipenser* sp.). This habitat provides important feeding, foraging, roosting, and "loafing" habitat for waterbirds, especially in areas protected from intense wind fetch or wave action. Waterbirds, such as surf scoter (*Melanitta perspicillata*), scaup, brown pelican, and terns, and marine mammals, such as harbor

seal and California sea lion (*Zalophus californianus*), can be found utilizing this habitat type. Anadromous fish use the deep bay habitat as migratory pathways to and from upstream spawning areas.

The shallow bay habitat is a feeding area for Pacific herring (*Clupea harengus*), northern anchovy (*Engraulis mordax*), bat ray (*Myliobatis californica*), and jacksmelt (*Catherinops californiensis*), as well as at least 40 other species of fish, crabs, and shrimp. The shallow bay is also a nursery area for juvenile halibut and sanddab (*Citharichthys stigmaeus*), leopard shark, shiner perch (*Cymatogaster aggregata*), herring, and other fishes. Anadromous fish use the shallow bay area as migratory pathways to and from upstream spawning areas. This habitat is within the depth range of many diving birds and, therefore, provides important avian foraging habitat. Marine mammals such as harbor seals also forage in this habitat type. Eelgrass (*Zostera marina L.),* San Francisco Bay's only rooted seagrass, is present in some areas of this habitat type. Eelgrass is particularly important to many species of fish such as Pacific herring (which spawn in the blades of this plant) and the endangered least tern (*Sterna antillarum browni*), which can forage on small fishes associate with the eelgrass.

3.5.1.3 Biological Resources

Plankton

The three major components of plankton are phytoplankton, zooplankton, and ichthyoplankton (fish larvae and eggs), all of which free-float in open water. Representing the lower levels of the food chain, plankton are important to many marine community members, including benthic organisms, fish, and mammals.

Phytoplankton

Phytoplankton are small, floating simple plants that represent the base of the marine food web. Consisting of single cells or chains of cells, phytoplankton are usually microscopic in size and reproduce asexually through cellular division. Much of San Francisco Bay's productivity of other organisms, including clams, worms, mussels, and zooplankton, depends on the growth of phytoplankton (SFEP 1992). Major phytoplankton groups in the Bay include diatoms, dinoflagellates, and cryptomonads (Herbold et al. 1992). In the Bay Area, abundance and distribution of phytoplankton vary seasonally and are affected by water column height, benthic grazing, and availability of light or turbidity (Lucas et al. 1999; Cole and Cloern 1984). Phytoplankton population in the North Bay has generally suffered since the early 1970s, and especially since the 1976-1977 drought (SFEP 1992).

In the North Bay, most phytoplankton occur in the shoals between the deeper channels and the shoreline where light is adequate. In San Pablo Bay, phytoplankton abundance generally peaks in the spring when river flows are high. In Suisun Bay, peak phytoplankton abundance occurs in the spring and summer, sometimes as early as February and as late as November, depending on river flow (SFEP 1992). Phytoplankton abundance, which has been on the decline since the late 1970s, has suffered dramatically, by a factor of almost ten, since the accidental introduction of the nonnative Asian marine filter-feeding clam *Potamocorbula amurensis* in 1986 (SFEP 1992).

In the Central Bay where habitats are mostly open and deep water, the high degree of tidal water exchange and mixing generally keep phytoplankton levels very low.

Under conditions in the South Bay, phytoplankton reach their peak concentrations in the spring when tides and winds are at their weakest and freshwater outflow is at its highest. These conditions create water stratification, resulting in separation of fast growing phytoplankton in the upper waters of adequate light from the benthic filter-feeding organisms, which graze on the phytoplankton (SFEP 1992).

Zooplankton

Zooplankton consist of microscopic and macroscopic animals that either free-float or feebly swim in open water. Zooplankton provide an ecologically important food source for many types of fish such as anchovies, smelt, and striped bass. Two different types of zooplankton exist. Zooplankton that are permanent members of the plankton during their life cycle are known as holoplankton. Other zooplankton, consisting of eggs, larvae, and juveniles of benthic or nektonic organisms, are temporary members of the plankton only during early life stages, and they are known as meroplankton. Common zooplankton found in the Bay include species of copepods, tintinnids, larval forms of gastropods, bivalves, barnacles, polychaetes, and crustaceans such as the Dungeness crab (*Cancer magister*) (Ambler et al. 1985).

Zooplankton abundance can vary seasonally and is affected by factors including temperature or photoperiod, coastal hydrography, seasonal cycles of phytoplankton, and river discharge. River discharge also determines zooplankton distribution by influencing residence time and salinity distribution, which is a determinant for copepod habitat.

Ichthyoplankton

Ichthyoplankton are the eggs and larval forms of marine fishes, such as Pacific herring, northern anchovy, goby (family *Gobiidae*), white seabass (*Cynoscion nobilis*), staghorn sculpin, and diamond turbot (*Hypsopsetta guttulata*). Seasonal abundance and distribution of individual ichthyoplankton species are dependent on the reproductive cycles of the adult fish species and their circulation within the Bay. In return, the dynamics of the adult fish populations are closely related to annual recruitment success rates of individuals from the larval stage. Generally, fish larvae are in the plankton community coinciding with peaks of phytoplankton and zooplankton abundance in the winter and spring (Ambler et al. 1985).

Benthos

Benthos are bottom-dwelling organisms that generally live nonmobile lifestyles, though some mobile species such as crabs do exist. Epibenthos are benthos that live on the substrate surfaces, while infauna are benthos that live within the sediment. Because many infauna species live a year or more in the same bottom area, they serve as one of the best biological indicators of impacts from human disturbances, as well as general indicators of ecosystem health in aquatic environments. The benthos also provide an important food source for many species of fish, birds, and mammals in the marine environment.

In the Bay Area, many benthic invertebrates live within sedimentary or soft-bottom habitats, usually within the top 2 to 3 centimeters of the soft sediment. Some benthic invertebrates also

live on hard substrates, which are much less common in the Bay compared to sedimentary habitats.

Three major benthic species assemblages are present in the Bay Area: fresh-brackish, estuarine, and marine assemblages. Fresh-brackish assemblages are found in the Delta, with a transition assemblage extending into Suisun Bay. Estuarine assemblages are prevalent in San Pablo Bay. The Central and South Bays harbor marine assemblages. The term assemblage refers to a group of organisms that inhabit a location or locations at a certain time or over a period of time. Assemblage characteristics such as species composition and abundance are affected by many physical factors, including salinity and sediment grain size, or by biological factors such as competition and predation (Thompson et al. 2000). Changes in these factors can influence individual benthic species differently.

Many of the more common benthic species in San Francisco Bay today are accidentally or intentionally introduced species (SFEP 1992). Most of these nonnative species were transported here in ballast water of ships or on the oyster shells brought from the east coast for commercial farming purposes in the late 19th century (Carlton 1979). Some of these nonindigenous species serve ecological functions similar to those of the native species that they have displaced. Examples of these include the eastern oyster (*Crassostrea virginica*), the Japanese littleneck clam (*Tapes philippinarum)*, and the soft-shelled clam (*Mya arenaria*), all of which have supported commercial or sport fisheries. However, other species, such as *Potamocorbula amurensis*, have a negative effect on phytoplankton and zooplankton populations and organisms that depend on them. Though *Potamocorbula* may serve as a food source for diving ducks and sturgeon, their high feeding rates can remove much of the phytoplankton from the water column and may have an adverse effect on zooplankton and other organisms in the food chain that feed on them (SFEP 1992).

In Suisun Bay and the western part of the Delta, the benthos found are mostly fresh-brackish assemblages, with a transition assemblage extending into Suisun Bay. Fresh-brackish water species include oligochaetes, chironomids, soft-shelled clams, Asian clams (*Corbicula sp.*), and amphipods (SFEP 1992; Thompson et al. 2000). Farther west into San Pablo Bay, more estuarine conditions exist and intertidal bayflats and marshes are extensive. Here, estuarine assemblages are prevalent. Common benthic species include ribbed mussels (*Ischadium demissum),* Baltic clams *(Macoma balthica*), *Potamocorbula*, California hornsnails (*Cerithidea californica*), yellow shore crabs (*Hemigrapsus oregonensis*), amphipods, polychaete worms, and Bay mussels.

In the Central and South Bays, marine conditions exist. Benthic species common in these areas consist of clams (including *Potamocorbula*), amphipods such as *Monocorophium* and *Ampelisca*, polychaete worms, and Bay mussels (SFEP 1992).

Fish

More than 100 species of fish inhabit the San Francisco Bay system. The majority of species are native, but there are also many introduced species. A large portion complete all life stages within the Bay. A smaller portion, anadromous fish, migrate from ocean waters, through the Bay-Delta Estuary (the Estuary), and into a series of freshwater streams where they spawn. As adults or young-of-the-year (YOY), they migrate through the Estuary back to the ocean. A small portion of these remain in the Bay year-round. Whether spawned offshore and carried into the

Bay by currents or spawned directly in the Bay, most of the anadromous species spend 4 to 8 months in the Bay before entering the ocean. Common fish species found in the Bay are shown in Table 3.5.1, and include northern anchovy, topsmelt, jacksmelt, striped bass, white croaker (*Genyonemus lineatus*), Pacific herring, and English sole (*Parophrys vetulus*).

Fish population trends can be determined by analyzing the data resulting from the monitoring efforts of the CDFG. An analysis of these data from a monitoring study between 1981 and 1988 suggests a general distribution of fishes in the Bay as follows (SFEP 1992):

- **North Bay** – Fish species typically found in the North Bay include sharks, rays, longfin smelt, staghorn sculpin, starry flounder, topsmelt, arrow goby (*Clevelandia ios*), yellowfin goby (*Acanthogobius flavimanus*), stickleback (*Gasterosteus* sp.), mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), Pacific herring, Chinook salmon (*Oncorhynchus tshawytscha*), and steelhead trout (*Oncorhynchus mykiss*).
- **Central Bay** – Typical fish species occurring in the Central Bay include Chinook salmon, striped bass, American shad (*Alosa sapidissima*), green sturgeon, Pacific herring, and northern anchovy.
- **South Bay** – Typical fish species in the South Bay include sharks, rays, longfin smelt, starry flounder, topsmelt, rainwater killifish (*Lucania parva*), yellowfin goby, staghorn sculpin, Pacific herring, and sturgeon.

Because of the large number of fish species that could potentially be present, not all are discussed in detail here. The more ecologically, commercially, and/or recreationally important species are discussed below. A discussion of fish species with either federal or state protection status is included in Section 3.5.1.4. Fish species in the Bay can be divided into several groupings. Common species are described briefly below and are organized by group.

Pelagic Fish

Pelagic species are generally small fish distributed in the mid- and upper water column and include species such as Pacific herring, anchovy, and topsmelt.

Pacific Herring (*Clupea pallasi*). Pacific herring are the largest commercial fishery in the Bay Area, and the Bay is this species' only significant spawning area south of Puget Sound (Alderdice and Velsen 1971 in Baxter et al. 1999). Pacific herring migrate into the Bay to spawn from November through March, and spawn adhesive eggs on subtidal and intertidal substrates, preferably eelgrass (*Zostera* spp.). Herring in San Francisco Bay regularly spawn on other marine algal species, as well as substrates such as sand, natural rock, riprap, and pilings.

Surveys of Pacific herring spawning activity in the Bay have been conducted since the 1973-1974 reproductive season (Griffin and Cherr 2001). Data on natural spawn sites show intertidal and nearshore habitat in the northern Central Bay receiving the predominant proportion of herring spawn (Griffin and Cherr 2001). This area includes San Mateo Point to Fort Point on the west side of the Bay, Alameda to Richmond along the East Bay, and the north tower of Golden Gate Bridge to Paradise Cove in the northern Central Bay. Since 1980, spawns have been primarily restricted to the northern Central Bay from Sausalito to Paradise Cove and on the San Francisco shore from just inside the Golden Gate to Hunters Point. In years when the northern Central Bay has not predominated as spawn habitat, the southern Central Bay or

Oakland/Alameda have been the major recipients of spawn. The western South Bay is considered a minor spawn habitat for herring, receiving spawns in association with a decrease in water quality or an increase in salinity in the southern Central Bay (Griffin and Cherr 2001). Figure 3.5.6 shows common herring spawning locations within San Francisco Bay.

Northern Anchovy (*Engraulis mordax*). Anchovy are found in highest abundance in the Central Bay and in less abundance in the North and South bays. Their primary residence is along California coastal waters, but they migrate into the Bay in late spring for feeding (USEPA et al. 1996). Although most of anchovy spawning sites are located outside of the Bay, eggs and larvae are commonly found in abundance in the Bay (USEPA et al. 1996). In the Bay, anchovy larvae develop rapidly in the productive shallow habitat before migrating out of the Bay in winter with other adult anchovy. The northern anchovy provide an important food resource for other fish species such as salmon, smelt, and striped bass (Baxter et al. 1999).

Topsmelt (*Atherinops affinis*). Topsmelt are among the most abundant fish found in shallow water sloughs in the South Bay (Goals Project 2000). Common topsmelt spawning sites are located on bayflats, which are also used for breeding and nursery areas.

Elasmobranchs

Members of this fish guild include sharks, rays, and skates. Common species in the Bay include the leopard shark, brown smoothhound (*Mustelus henlei*), bat ray, and spiny dogfish (*Raja bionocula*) (Baxter et al. 1999). Leopard sharks and bat rays extensively use shallow subtidal habitats in the Bay, mostly in the South Bay. The recreational value of these fish makes them important to the charter boat industry, recreational fishing, and public and private aquariums.

Anadromous Fish

Most of the anadromous fish use the Bay as corridors to migrate up to freshwater stream spawning. Most anadromous fish species are rare in the South Bay, and are most abundant in the North Bay, especially in the Sacramento-San Joaquin River Delta area.

Chinook Salmon (*Oncorhynchus tshawytscha*) and Steelhead Trout (*Oncorhynchus mykiss*). San Francisco Bay's Chinook salmon stocks have declined significantly from an annual average of about 850,000 fish at the turn of the century to only about 285,000 fish in the recent years (SFEP 1992). Most of these fish spawn in the Sacramento River drainage in the fall. Found mostly in the North Bay, very little is known about salmon and steelhead trout migration routes through the Bay (Maragni 2000; Leidy 2000). These species are discussed in more detail in Section 3.5.1.4, because of their listed status.

Striped Bass (*Morone saxatilis*). Striped bass can be found throughout the Bay, but may be most abundant and spend most time in Suisun Bay, the Delta, and surrounding freshwater areas (Goals Project 2000). Striped bass spawn between May and June in tributaries to the Bay (USEPA et al. 1996). They can tolerate a wide range of environmental conditions including low oxygen and high turbidity (Goals Project 2000). Young-of-the-year show the highest abundance in the "entrapment zone" of the Estuary, the area where freshwater and saltwater mix. Striped bass were once part of the commercial fishery from 1879 to 1935, and now they are managed exclusively as a recreational fishery (McGinnis 1984). Adult abundance in the Bay has declined

over the years (CDFG 1992 in Goals Project 2000), but striped bass remain a very important fish resource for the recreational fishermen, mostly in the North Bay.

Sturgeon (*Acipenser sp.*). Sturgeon are native fish common in the South Bay and they feed on several species of bay shrimp, benthic invertebrates, and herring eggs. The white sturgeon (*Acipenser transmontanus*) is more abundant than the green sturgeon (*Acipenser medirostris*) and is thus an important part of the fishery resource in the Bay. The green sturgeon is discussed in more detail in Section 3.5.1.4. Sturgeon populations are declining (Saltzman 2003).

Rocky Substrate Species

Consisting mainly of various surfperch species (family *Embiotocidae*) and brown rockfish, these fish depend exclusively on rocky substrates and structures with irregular vertical habitat such as natural rocky outcroppings, sunken boats, bridge piers, and pilings supporting boat docks. These species serve an important role for the shore-based recreational fishery.

Small Demersal Fish

The main fish of this group include gobies (family *Gobiiae*), sculpin (family *Cottidae*), and midshipman (*Porichthys* sp.). These are primarily small fish that spend most of their lives on the bottom of the Bay, generally in shallow waters of the Bay. All of these small demersal fish species provide an important food source for harbor seals and wading birds.

Flatfish

Flatfish comprise fish species that metamorphose from bilaterally symmetrical pelagic larvae (free swimming, "upright" larvae) to asymmetrical bottom-dwelling juveniles (flat and bottom-dwelling) (Baxter et al. 1999). The main flatfish species found in the Bay are California halibut, English sole, and speckled sanddab.

California Halibut (*Paralichthys californicus*). Halibut is both a commercially and recreationally important species in the Bay. Its abundance in the Bay has increased corresponding to a general increase in the Bay water temperature over the last 2 decades (Baxter et al. 1999). Halibut juveniles use the shallow Bay subtidal habitat for feeding and rearing (Moser and Watson 1990).

English Sole (*Pleuronectes vetulus*). These fish are very common in the South Bay. Adult English sole spawn from November to May in the shallow coastal areas, mostly in the Central Bay, with some in the South Bay (Wang 1986 in USEPA et al. 1996).

Shrimp and Crabs

The Bay is home to many species of shrimp and crab that are important for their recreational value in the fishery, and ecological value in the aquatic food web.

Bay shrimp (*Crangon* spp.) is the most common shrimp reported by the CDFG in the Bay (Baxter et al. 1999). Bay shrimp, along with other shrimp species, are an important food source for virtually all species of fish, marine mammals, and water birds.

While distributed widely throughout the Bay, the various species of shrimp found in the Bay do have differing centers of distribution. For example, *C. franciscorum* are more commonly collected in the northern reach of the Bay (San Pablo to the west Delta) than in the Central or South Bays, while *C. nigromaculata* are usually found in the Central and South Bays, and to a lesser extent, in San Pablo Bay (Baxter et al. 1999).

Crabs are both recreationally and ecologically important in the Bay. The most common species in the Bay is the Dungeness crab, which supports an important commercial fishery. Other commonly found species in the Bay include C. *productus*, C. *antennarius*, and C. *gracilis*. These species are typically abundant in the more marine waters of the Central Bay but are also found in the South Bay and San Pablo Bay (Baxter et al. 1999).

Birds

San Francisco Bay provides diverse habitat for many species of waterfowl, shorebirds, and tidal marsh birds. Open water, bayflats, and tidal marsh are just some of these habitats.

The Bay serves as an important staging and wintering ground on the Pacific Flyway for numerous species of waterbirds, both common and uncommon. The Pacific Flyway is a bird migration corridor along the Pacific Coast that stretches as far north as northern Canada and Alaska, and as far south as the southern tip of South America (SFEP 1992). In the Bay, the greatest waterbird abundance and species diversity is seen in winter, as birds migrate along the flyway. Each year, nearly one million waterfowl and more than one million shorebirds pass through this area. San Francisco Bay, particularly the North Bay, supports the largest population of canvasback along the Pacific coast, 46 percent of the midwinter population in the Pacific Flyway (Goals Project 2000). Additionally, San Francisco Bay provides crucial wintering habitat for surf scoter (Goals Project 2000). It is the most important inshore habitat in the eastern Pacific, south of the Straits of Georgia and Puget Sound (Small 1994), for this species. Scoters (primarily surf scoters, but also white-winged scoters [*Melanitta fusca*]) are the second most abundant waterfowl in the Bay, and between 1998 and 2000 accounted for 25 percent (South Bay) to 29 percent (Central Bay) of total wintering waterfowl numbers counted during annual surveys (USFWS, unpublished data).

Roughly 120 waterbird species from 16 avian families occur in the Bay. Of these birds, approximately two-thirds are represented by three families: *Anatidae* (waterfowl), *Laridae* (gulls and terns), and *Scolopacidae* (sandpipers and phalaropes). Individual waterbird species may reach their peak abundance during different periods throughout the fall and spring migration.

San Francisco Bay is also recognized as a site of hemispheric importance for shorebirds by the Western Hemisphere Shorebird Reserve Network (WHSRN). A site has been designated of hemispheric importance if it is utilized by at least 500,000 shorebirds annually. Between 1988 and 1995, the Bay supported 41.4 to 96.5 percent of the key species of shorebirds surveyed along the Pacific Flyway in the fall, 37.8 to 90.1 percent in the winter, and 24 to 85.6 percent in the spring. No other site within the Pacific Flyway supported more than 16.1 percent of these species in the fall, 32.9 percent in the winter, and 27.5 percent in the spring (Page et al. 1999). Tidal bayflats in particular offer important habitat and a migratory staging area for shorebirds.

Tidal marshes in the Bay also provide foraging, nesting, and roosting habitat for many tidal marsh species endemic to the area. Many of these species are listed as threatened or endangered by the state or federal governments or are recognized as species of special concern. A discussion

of the distribution of these species is included in the species accounts in Section 3.5.1.4, along with a discussion of all of the bird species with either federal or state protection status.

Waterbirds

Each year, typically in January, the U.S. Fish and Wildlife Service (USFWS) conducts a mid-winter survey of the distribution and number of waterfowl present in the San Francisco Bay. Accurso (1992) analyzed the species and distribution of waterfowl in the Bay from 1988 to 1990. These data, while 10 years old, still provide the most detailed information available concerning the distribution of waterfowl species in the Bay.

Forty-eight and 68 percent of all waterfowl in San Francisco Bay utilized the open Bay in 1988-1989 and 1989-1990, respectively (not including Suisun Bay) (Accurso 1992). Table 3.5.2 shows the percentage of all waterfowl by region.

The most predominant birds in the open Bay are diving ducks. Dabbling ducks such as mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and American widgeon (*Anas americana*) are also present in the open Bay, but in smaller numbers, as they tend to prefer seasonal wetlands, salt ponds, and managed marshes surrounding the Bay. Ruddy ducks (*Oxyura jamaicensis*) and bufflehead (*Bucephala albeola*), also diving ducks, are found predominately in the North and South Bay salt ponds (Goals Project 2000).

Mid-winter surveys from 1998 to 2000 (USFWS, unpublished data) found scaup comprise 43.2 percent of all waterfowl in the entire Bay, 64 percent of all waterfowl in the South Bay open water, and 67 percent of waterfowl in the Central Bay open water. Scoters, the second most abundant waterfowl in the Bay, accounted for 25 percent in the South Bay and 29 percent in the Central Bay.

A comprehensive survey and analysis of waterbirds in the Bay was conducted between 1988 and 1990 by Accurso and published in a report (Accurso 1992). Between 1988 and 1990, diving ducks consisted of between 52 to 75 percent of the Bay's waterfowl, depending on the month. Greater and lesser scaup were the most abundant species in 1989-90, accounting for 47 percent of all species. Surf scoter was the second most abundant species in the Bay, making up 19 to 20 percent of all waterfowl in the Bay. Canvasback, another diving bird, accounted for 7 percent of all waterfowl species in the Bay (Accurso 1992). Table 3.5.3 shows the percentages of each of these species as they are distributed throughout the North, Central, and South Bays. The North Bay is an especially important area for wintering waterfowl, due in part to its relative shallowness compared with the rest of the Bay. More than 62 percent of the diving ducks were observed in depths less than 4 meters, or at the perimeter of the Bay. Figures 3.5.7 and 3.5.8 illustrate the distribution of surf scoter and canvasback in the Bay, based on data from 1982 to 1989.

Tidal Marsh Birds

Tidal flats are a primary foraging habitat for shorebirds within the Bay. The North Bay supports approximately 20 percent of shorebirds in San Francisco Bay, while the South Bay supports approximately 60 percent (SFEP 1992), primarily due to the extensive tidal flats and salt ponds present in the South Bay. The South Bay is a particularly sensitive and important area to shorebirds, because San Francisco Bay supports between 26 and 96 percent of all shorebirds

along the Pacific Flyway and the majority of these birds forage in the South Bay. Figure 3.5.9 shows the locations and relative densities of foraging shorebirds in the Bay.

North Bay. North Bay is the most important habitat for many waterfowl species that utilize the Bay's open-water and wetland habitats. As the amount of wetlands in other parts of the state declines, Suisun Marsh and farmed wetlands in the Delta become increasingly more valuable to many waterfowl species in the Bay. In addition, the North Bay, more specifically San Pablo Bay, is home to about 20 percent of shorebirds in San Francisco Bay (SFEP 1992).

Central Bay. Some of the few remaining rocky shore habitats in the Bay occur in the Central Bay at the edges of Yerba Buena, Angel, and Alcatraz islands. This area is used by several shorebird species, brown pelicans, cormorants, and gulls (SFEP 1992). Other waterbirds representative of Central Bay are supported by its deepwater habitat, and include western grebe (*Aechmophorus occidentalis*), scaup, canvasback, and surf scoter.

South Bay. About 60 percent of shorebirds use the South Bay, which has are extensive bayflats and salt ponds (SFEP 1992). The shorebird species abundance and diversity is greatest in the spring, when these birds stop en route to northern breeding grounds in Canada and Alaska, and in the fall upon their return to South America. Some common waterbirds in the South Bay's intertidal bayflats and salt ponds include western sandpiper, dunlin, marbled godwit (*Limosa fedoa)*, willet (*Catoptrophorus semipalmatus*), American avocet, bufflehead, snowy plover, Caspian tern (*Sterna caspia*), eared grebe, Forster's tern (*Sterna forsteri*), Wilson's phalarope (*Phalaropus tricolor*), and black-necked stilt.

Marine Mammals

San Francisco Bay supports several common marine mammal species that include the Pacific harbor seal, California sea lion, and more recently, the gray whale (*Eschrichtius robustus*). All marine mammals are protected by the Marine Mammal Protection Act of 1972, with additional laws protecting species with very low population levels (e.g., sea otter). Other marine mammal species that have been seen occasionally in the Bay include the humpback whale (*Megaptera noveangliae*), harbor porpoise (*Phocoena phocoena*), northern elephant seal (*Mirounga angustirostris*), Steller sea lion (*Eumetopius jubatus*), northern fur seal (*Callorhinus ursinus*), and less frequently, the southern sea otter (*Enhydra lutris*). Due to their protected status, individual marine mammal species are discussed in greater detail in Section 3.5.1.4.

3.5.1.4 Protected Species and Habitats

Special-status species that occur, or have the potential to occur, in the project vicinity were identified from several sources, including the following: California Natural Diversity Data Base (CNDDB), California Native Plant Society (CNPS) Electronic Inventory records (Skinner and Pavlik 1994), and USFWS special-status species lists. Information was reviewed for the following U.S. Geological Survey 7.5-minute quadrangles:

Denverton	San Quentin	Newark
Birds Landing	Petaluma Point	Redwood Point
Antioch North	Sears Point	Palo Alto
Antioch South	Petaluma River	Mountain View
Clayton	Novato	Niles
Honker Bay	San Rafael	Milpitas
Fairfield South	Point Bonita	San Jose West
Vine Hill	San Francisco South	Cupertino
Walnut Creek	San Francisco North	Mindego Hill
Cordelia	Oakland West	La Honda
Benicia	Oakland East	Woodside
Briones Valley	San Leandro	San Mateo
Cuttings Wharf	Las Trampas Ridge	Montara Mountain
Mare Island	Hayward	Half Moon Bay
Richmond		

The resulting species list gathered from these sources has been formatted into a table showing the common and scientific names, federal and state status, and a general description of suitable habitat for each species (Table 3.5.4). Due to the preliminary nature of the potential ferry terminal locations, the potential for each species to occur in an area is based upon habitat. Habitat maps for the proposed sites are shown on Figures 3.5.2 through 3.5.4. Species with a strong potential to occur in one or more of the potential ferry terminal areas are discussed in more detail in the text. If no suitable habitat exists in the vicinity of any of the potential ferry terminals for a species listed on these tables, the species is not discussed further in this document.

Threatened and Endangered Species

Mammals

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*). The salt marsh harvest mouse is listed as endangered under both the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA) and is a state fully protected species. Salt marsh harvest mice are endemic to tidal and brackish marsh habitats of the Bay, where they occur in areas of dense cover, preferably where pickleweed constitutes 60 percent or more of the vegetation (Shellhammer 1984). These mice are most commonly associated with large tidal marshes of the both the North and South bays that have extensive high marsh zones. Smaller marshes do not usually provide adequate cover for mice during periods of high tide.

Known populations of these mice in the South Bay include Hayward Marsh, New Chicago Marsh, Palo Alto Baylands, and Crescent March. In the North Bay, they have been found in the marshes bordering San Pablo Bay, as well as at Mare Island (Goals Project 2000). They have also been recorded in Suisun Bay. Figure 3.5.10 shows current locations and suitable habitat within the Bay.

Southern Sea Otter (*Enhydra lutris*). The southern sea otter is considered a threatened population under FESA and is protected by the Marine Mammal Protection Act of 1972. Approximately 16,000 to 18,000 sea otters were formerly distributed along the California coastline. After extensive harvesting in the 18th and 19th centuries, less than a hundred sea otters remained off the isolated coastline of Big Sur, California. After years of protection, the population increased to 500 to 600 individuals by 1950 and, thereafter, increased by approximately 5 percent annually until 1976, when the increase slowed (Estes 1990). Currently, about 2,200 individuals exist in the southern sea otter range, and they have expanded their range to north of Santa Cruz (about Half Moon Bay), and are only occasionally seen in the Bay.

For example, in March 2001, a sea otter was observed within the Bay near Sausalito (Oliver 2001). This and other recent observations of sea otters within the Bay confirm that sea otters may be taking up residence in the Bay.

Birds

California Black Rail (*Laterallus jamaicensis coturniculus*). State listed as threatened, the California black rails reside in larger tidally influenced marshes of the Bay region. They require high-elevation emergent tidal marsh for nesting and breeding. Most, if not all, nesting occurs in the northern portions of the Estuary; however, they have been recorded in the South Bay during the breeding season (Evens et al. 1991). Black rails occur in the Central and South bays in the nonbreeding season, with known populations at Dumbarton Marsh and Palo Alto Baylands. They are of low to moderate abundance along the coast of San Pablo Bay, from China Camp State Park to Mare Island. Populations are more concentrated along the Petaluma and Napa rivers. Rails have also been found in low to moderate abundance along Carquinez Strait between Martinez and Baypoint, and in Suisun Slough (Evens et al. 1991). The distribution and abundance of black rails in San Francisco Bay is shown on Figure 3.5.11.

California Brown Pelican (*Pelecanus occidentalis californicus*). The California brown pelican is a state and federally listed endangered species. This species breeds on the California Channel Islands between March and August (Zeiner et al. 1990) and is present in Northern California from June to November. In the Bay, pelicans forage over deep-water habitats and roost on structures such as breakwaters, pilings, and to a lesser extent, salt-pond dikes (USFWS 1992). Brown pelicans feed almost exclusively on fish in either shallow or deep waters. Brown pelicans are fairly common throughout waters of the Central Bay and San Pablo Bay.

California Clapper Rail (*Rallus longirostris obsoletus*). The California clapper rail is a listed as endangered under FESA and CESA and is a state fully protected species. Clapper rails are yearlong residents of emergent salt and tidal marshlands of the Bay (Goals Project 2000; Zeiner et al. 1990). California clapper rail nest between February 15 and June 15, building their nests in marsh vegetation such as bullrush (*Scirpus robustus*) and *Spartina* sp. at the maximum water level for the nest period (Collins et al. 1994; Avocet Research 1992). The whole breeding season for California clapper rail is February 1 through August 31, including courtship, nesting and renesting (Floerke 2002). Loss and degradation of wetland habitat, predation by nonnative red foxes (*Vulpes vulpes*), and sewage effluent in the South Bay have contributed to the population decline of this species (Steinhart 1990). In the Bay, clapper rails are most abundant in marshes south of San Mateo Bridge and in San Pablo Bay. The known distribution of clapper rails in the Bay is shown on Figure 3.5.12.

California Least Tern (*Sterna antillarum browni*). The California least tern is a state and federally listed endangered species. It is migratory, breeds in California from April to August, and ranges from southern Baja California and Mexico north to San Francisco Bay. Breeding colonies are generally located in abandoned salt ponds and along estuarine shorelines that are free of predators. California least terns are ground-nesters and nest in colonies on sandy beaches and fine gravel with sparse vegetation (Goals Project 2000). Due to degradation of more natural nesting habitat, they occasionally nest on dredge-spoil islands, open areas adjacent to airport runways, and industrial ports. Known San Francisco Bay nesting locations of this species include areas in the city of Alameda, Pittsburg Power Plant, and Oakland Airport (Goals Project 2000).

Western Snowy Plover (*Charadrius alexandrinus nivosus*). The western snowy plover is listed by the federal government as a threatened species and by the State of California as a species of special concern. This small shorebird typically occupies sandy beaches and intertidal areas of marine and estuarine habitats, but is known to occur in some inland areas. In San Francisco Bay, it is commonly found on salt pond levees. Western snowy plovers are known to winter in the San Francisco Bay Area. Approximately 250 individuals have been recorded in the Bay during the breeding season (Port of Oakland 1998). They have been found nesting primarily in the salt ponds south of San Mateo Bridge in the South Bay, although they have also been observed in San Pablo Bay at the Napa-Sonoma salt ponds, and in the Central Bay at Alameda Naval Air Station.

Fish

Steelhead (*Oncorhynchus mykiss*). Steelhead are federally listed as threatened. Steelhead historically ranged throughout the north Pacific Ocean from Baja California to Kamchatka Peninsula. Currently, their range extends from Malibu Creek in southern California to Kamchatka Peninsula (Busby et al. 1996). The Bay and its tributary streams support migrating steelhead populations. Trout can be either anadromous (migrating from freshwater to the ocean and returning to spawn in freshwater) or can complete their entire life cycle in freshwater. Those fish that remain in fresh water are referred to as rainbow trout. Steelhead, the anadromous form of *O. mykiss*, can spend several years in freshwater prior to smoltification and can spawn more than once before dying, unlike most other salmonids (Busby et al. 1996). Spawning runs in the Bay occur from December through May.

Individuals from two Evolutionary Significant Units (ESUs[1]) can be found in San Francisco Bay: Central California Coast steelhead and Central Valley steelhead. The Central California Coast ESU includes river basins between the Russian River and Aptos Creek and all of the Bay and its tributaries. Steelhead found east of San Pablo Bay are included in the Central Valley ESU. Central Valley steelhead may migrate through the project area. NMFS has issued a 4(d) rule for steelhead, which prohibits activities and institutes restrictions on all activities that will likely result in harm or take of steelhead and/or their habitat.

Chinook Salmon (*Oncorhynchus tshawytscha*). The species historically ranged from the Ventura River in California to Point Hope, Alaska, on the eastern edge of the Pacific and in the western portion of the Pacific Ocean from Hokkaido, Japan, to the Anadyr River in Russia

[1] An ESU is a distinctive group of steelhead or salmon

(Healey 1991). Chinook salmon consist of four distinct breeding populations or ESUs that are endemic to the Sacramento-San Joaquin River system. Factors used in determining ESUs include spatial, temporal, and genetic isolation, maturation rates, and other life history traits. Chinook salmon have been categorized into fall/late fall, winter, and spring ESUs. Each ESU is considered a distinct race and has been given its own management status. Winter-run Chinook salmon has been state and federally listed as endangered, the fall/late fall-run salmon has been state and federally listed as threatened and is federally proposed as endangered, and spring-run salmon is federally proposed as threatened and is a CDFG species of concern.

Three Chinook salmon ESUs migrate through the Bay: Sacramento River winter-run, Central Valley spring-run, and Central Valley fall/late fall-run. The winter-run, a state and federally listed endangered species, spawns in the upper Sacramento River below Keswick Dam. The fall/late fall-run, a proposed endangered species, spawns in the Sacramento and San Joaquin River basins (Myers et al. 1998). Spring-run Chinook salmon, state and federally listed as threatened, spawn in the Sacramento River Basin. All three runs are most commonly found migrating through the northern and central portions of the Bay (CDFG 1987).

Coho Salmon (*Oncorhynchus kisutch*). Coho salmon are listed as threatened under FESA and endangered under CESA. This species ranges from Baja California, Mexico, north to Alaska, and southwest to Japan (McGinnis 1984). This species exhibits a simple 3-year anadromous life cycle (Federal Register 1999), rearing in freshwater for up to 15 months before migrating to the ocean. Coho salmon typically spend two growing seasons in the ocean before returning to their natal streams to spawn (Federal Register 1996). The Central California Coast Coho Salmon evolutionarily significant unit (ESU) occurs from Punta Gorda in Northern California south to, and including, the San Lorenzo River in central California, including tributaries to the Bay, but excluding the Sacramento-San Joaquin River system (Weitkamp et al. 1995). Coho generally return to their natal streams between November and December.

Coho no longer spawn in Bay tributaries and are not expected to occur within the Bay.

Delta Smelt (*Hypomesus transpacificus*). Delta smelt is listed as threatened under FESA and CESA. This fish is primarily an annual species and is endemic to the Estuary. Spawning occurs in shallow freshwater in tidally influenced rivers and sloughs. Spawning sites include (among others) the lower Sacramento and San Joaquin rivers and Georgiana Slough, and in sloughs of Suisun Marsh, with a significant portion of spawning taking place in the northern and western Delta. Juvenile and adult Delta smelt occur in the surface and shoal waters of the lower reaches of the Sacramento River below Mossdale, through the Delta, and into Suisun Bay. The species inhabits a salinity range of less than 2 parts per thousand, and tolerates a wide range of water temperatures (<8ºC to >25ºC). Delta smelt had a sharp decline in abundance in the 1980s. Declines have been attributed to restricted habitat and increased losses through entrainment by Delta diversions. Competition with nonnative inland silversides may have also contributed to their decline (Goals Project 2000).

Sacramento Splittail (*Pogonichthys macrolepidotus*). The Sacramento splittail is listed as a federally threatened species and is a CDFG California Species of Special Concern. Splittail historically lived in all low-gradient portions of all major tributaries to the Sacramento and San Joaquin rivers, and some other freshwater tributaries to San Francisco Bay. Currently, they are most common in the brackish water of Suisun Bay, Suisun Marsh, and the Delta. Adults and young are abundant in the Napa and Petaluma rivers, along with Peyton, Hastings, and Pacheco

sloughs, tributaries of Suisun Bay. Migration barriers have contributed to much of the loss of splittail habitat, along with loss of floodplain and wetlands due to diking. The upstream spawning migration occurs November through May, with a peak from January to March, and the preferred spawning habitat is shallow, seasonally flooded vegetation. Despite a reduction in their range, splittails are hardy fish that tolerate low dissolved oxygen levels, strong water currents, and a wide range of temperatures (Goals Project 2000).

Tidewater Goby (*Eucyclogobius newberryi*). Tidewater goby is a federally endangered small fish, rarely exceeding 5 centimeters. It prefers semiclosed estuaries or lagoons of small coastal streams that are low in salinity. Optimal habitat has fairly still but not stagnant water and high oxygen levels. Populations are found along the entire California coast (McGinnis 1984). Tidewater gobies are rare in San Francisco Bay, but nearby populations are located in coastal San Gregorio Creek and Pescadero Creek in San Mateo County. In 1980, it was found at the mouth of Novato Creek of San Pablo Bay (Swift 1980). It has been found in Rodeo Lagoon, Estero de San Antonio, and Estero Americano (Wang 1986). This study also searched for this species at other sites within the Sacramento-San Joaquin Estuary but did not find any more specimens. Historically, they have also occurred in Corte Madera Creek and Novato Creek (CDFG 2001). The USFWS has proposed to delist all California populations north of Orange County, California.

Plants

California Sea Blite (*Suaeda californica*). This FESA listed endangered species occupies coastal saltwater marshes and the upper margins of salt flats. Today, this species is known primarily to inhabit the relatively well-drained marshy beach ridges along Morro Bay. The last known specimen collected in San Francisco Bay was in 1943 (Goals Project 2000).

Soft Bird's Beak (*Cordylanthus mollis* ssp. *mollis*). Soft bird's beak is an annual herb listed as endangered under FESA and state-listed as rare. This plant occurs in the high brackish marsh zone, typically in the lower end of a well-drained high marsh gradient, on slight topographic relief above the marsh plain. It is often found in association with high marsh vegetation such as pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*), fleshy jaumea (*Jaumea carnosa*), and alkali seaheath (*Frankenia salina*). Soft bird's beak is hemiparasitic, and its numbers fluctuate from year to year. The plant may disappear for a year or more and then regenerate from dormant seed banks. Threats to the species include erosion and marsh drainage. Soft bird's beak is currently found in tidal brackish marshes around the Napa River, Carquinez Strait tidal marsh, and Suisun Marsh area (Goals Project 2000).

Suisun Thistle (*Cirsium hydrophilum* var. *hydrophilum*). Suisun thistle is listed as a federally endangered species. A perennial herb, it is endemic to the Delta and exists only in Solano County. It grows with bulrush and salt grass near small watercourses in saltmarshes, and blooms from July to September. Current occurrences have been recorded on Grizzly Island in the Suisun Marsh area (CDFG 2001). This plant is threatened by altered hydrology and competition from native and nonnative plants (CNPS 2001).

Other Special-Status Species

Mammals

California Sea Lion (*Zalophus californianus*). The California sea lion is protected under the Marine Mammal Protection Act. California sea lions breed in Southern California and along the Channel Islands. After the breeding season, males migrate up the Pacific Coast and enter the Bay. In the Bay, sea lions are known to haul out at Pier 39 in the Fisherman's Wharf area of the San Francisco Marina. An estimated 600 animals were observed in January and February 1991 at that haul-out site (USFWS 1992). In addition to that site, California sea lions have the potential to haul out on buoys and similar structures throughout the Bay. No other repeatedly used haul-out site for California sea lions, other than Pier 39, has been observed in the Bay (Allen 1999). During anchovy and herring runs, approximately 400 to 500 sea lions (mostly immature males) feed almost exclusively in the North and Central bays (USFWS 1992).

Gray Whale (*Eschrichtius robustus*). Gray whales are protected by the Marine Mammal Protection Act of 1972 (as are all marine mammals including seals and sea lions), and were recently delisted as an endangered species. Gray whales migrate each year along the west coast of North America, typically passing off the coast of San Francisco heading south from December through February and heading north from mid-February through July. The population has recently reached a level thought to be near carrying capacity (approximately 26,000 animals), which may explain why more gray whales have been observed feeding off of the coasts of British Columbia, Washington, Oregon, and California rather than migrating the entire way to Alaska.

Gray whales consume benthic prey (primarily amphipods) in North America (e.g., Bering, Beaufort, and Chukchi seas) during summer and migrate south along the west coast of North America to calve and breed off the coast of Mexico. During the migration, gray whales will occasionally enter rivers and bays (such as San Francisco Bay) along the coast either because they are disoriented or to forage. Recently, small numbers of gray whales (presumably juveniles and post-weaning females) have been observed foraging along the nearshore coastline of California, Oregon, Washington, and British Columbia during summer and are remaining there instead of migrating northward as do the bulk of the population (Sumich 1985).

In the past, gray whales have been seen irregularly in the Bay. These whales may be individuals that meandered off during the migration, although it is unknown specifically why they are entering the Bay. Most of these individuals eventually make their way out of the Bay. The number of gray whales sighted in the Bay has increased recently. The Sea Training Institute reported two gray whales in the Bay during 1999 and six in 2000, although some of these may be repeat sightings. The Oceanic Society has observed and recorded reported gray whales in the Bay. During spring 2000, most of the whales were seen near the mouth of the Bay as shown on Figure 3.5.13. Note that this figure shows reported gray whale sightings and not the actual number of whales in the Bay at a given time.

The Oceanic Society has also reported increased numbers of sightings recently. Concurrent with the increased sightings of gray whale in the Bay during 2000, approximately 29 gray whales stranded dead within the Bay from April through July (Moore et al. 2001). About a third of these individuals were adults, and some appeared to be in good shape (e.g., not emaciated with a thick

blubber layer). Although some may have been killed by encounters with passing ships, the cause of death for most was undetermined.

Pacific Harbor Seal (*Phoca vitulina*). The harbor seal is protected by the Marine Mammal Protection Act. Harbor seals are nonmigratory and can be found along shorelines and in estuaries throughout North America. Pacific harbor seals use the Bay year-round where they engage in limited seasonal movements associated with foraging and breeding activities (Kopec and Harvey 1995). They are the only marine mammals that permanently reside in the Bay. Harbor seals haul out in groups ranging in size from a few individuals to several hundred seals. Habitats used as haul-out sites include tidal rocks, bayflats, sandbars, and sandy beaches (Zeiner et al. 1990). Haul-out sites are relatively consistent from year to year and are important habitats for harbor seals (Kopec and Harvey 1995). They are used for resting, breeding, and raising of pups. Harbor seal haul-out sites are shown on Figure 3.5.14. In the Bay, pupping occurs from March to May, and molting in June and July (Kopec and Harvey 1995). These activities correspond to the greatest number of harbor seals counted at major haul-out sites in the Bay (Kopec and Harvey 1995). Haul-out sites that support some of the largest concentrations of seals include Corte Madera Marsh and Castro Rocks in the Central Bay, Mowry Slough south of Dumbarton Bridge, and Yerba Buena Island.

The total population of harbor seals in the Bay is estimated to be approximately 700 animals (USFWS 1992). Aerial counts by CDFG (1999) indicate that the harbor seal population has remained relatively constant in the Bay from 1982 through 1995, with an average increase in the population of 60 individuals over all years. However, harbor seal populations in other areas off the West Coast have been increasing by a much larger percentage since the late 1970s than that observed in the Bay (Kopec and Harvey 1995). Factors such as pollution and human disturbance at haul-out sites in the Bay may be factors contributing to this population difference.

Harbor seals forage in shallow, intertidal waters on a variety of fish, crustaceans, and a few cephalopods (e.g., octopus). They also consume benthic organisms as well as schooling fishes. The most numerous prey items identified in harbor seal fecal samples from haul-out sites in the Bay include yellowfin goby, northern anchovy, Pacific herring, staghorn sculpin, plainfin midshipman, and white croaker (Harvey and Torok 1994).

Salt Marsh Wandering Shrew (*Sorex vagrans haliocoetes*). The salt marsh wandering shrew is a Special Concern Species under FESA and a CDFG California Species of Special Concern. The salt marsh wandering shrew is located in salt marshes of the South Bay and exists in a narrow band of tidal marsh. It is not present in diked marshes. This insectivorous mammal prefers wet, medium-high salt marshes that provide dense cover, abundant invertebrates, suitable nesting sites, and fairly continuous ground moisture. Suitable sites have abundant driftwood and debris scattered among pickleweed 1 to 2 feet in height (Goals Project 2000).

Birds

American Bittern (*Botaurus lentiginosus*). The American bittern is a federal species of concern and is distributed widely in the Bay in fresh emergent wetlands. This bird feeds in tall, fresh or saline, emergent wetlands; less often in adjacent shallow water of lakes, backwaters of rivers, or estuaries; and occasionally along adjacent shores. It relies on tall, dense, emergent vegetation for resting and roosting. The American bittern declined due to draining of marshes, pesticides, and overgrazing of emergent vegetation (Zeiner et al. 1990).

American Peregrine Falcon (*Falco peregrinus anatum*). The American peregrine falcon is federally delisted but was formerly a federally listed endangered species. It is still state-listed as endangered. The historic range of the American peregrine falcon extends throughout North America from the boreal forests south into Mexico (USFWS 1992). Peregrines generally nest on protected ledges of high cliffs in woodland, forest, and coastal habitats; however, pairs are also known to nest on human-made structures such as bridges and buildings.

Caspian Tern (*Sterna caspia*). Nesting colonies of Caspian tern are of concern; however, this species is listed as "demonstrably secure; commonly found throughout its historic range" (CDFG 2000). Active South Bay and Central Bay colonies are located at Coyote Hills (west levee), Alviso Pond A7, Hayward Shoreline, Ravenswood Slough, Brooks Island, and Naval Air Station Alameda (Goals Project 1999). It also nests within the Napa-Sonoma salt ponds complex (Lu 2000).

Common Loon (*Gavia immer*). The common loon is listed as a California Special Concern species (CDFG) with a 'demonstrably secure' population. The common loon is observed in the Bay, but their nesting sites, which do not occur in the Bay region, are of primary concern (Zeiner et al. 1990).

Double-Crested Cormorant (*Phalacrocorax auritus*). The double-crested cormorant is a CDFG species of special concern and is a permanent resident along the coast of California and within the Bay. It roosts beside water on offshore rocks, islands, steep cliffs, and trees, as well as wharves and bridges.

Elegant Tern (*Sterna elegans*). The elegant tern is a CDFG species of special concern, and its nesting colonies are protected. Elegant terns are post-nesting visitors to coastal California north of San Diego, generally between June and October (Zeiner et al. 1990). In the Bay, this species is most often observed foraging or roosting near breakwaters and marinas in the Central Bay.

Long-Billed Curlew (*Numenius americanus*). Long-billed curlew is a federal and CDFG species of special concern. Long-billed curlews commonly winter in the Central Valley, where they occupy seasonal wetland habitats. Smaller numbers of curlews also winter in San Francisco Bay. This species breeds within the northeastern portion of the state in grassland or wet meadow habitats that are usually adjacent to lakes or marshes. Conversion of these breeding grounds to agricultural areas is believed to be the primary cause for the decline of this species in the state (Zeiner et al. 1990).

Northern Harrier (*Circus cyaneus*). The northern harrier is a state species of concern. It occurs throughout the state except for the Sierra Nevada and the Cascade Ranges. Breeding usually occurs in shrubby vegetation within marshes, although nesting may also occur in grasslands or other dry habitats away from water. Harriers forage primarily on small mammals that inhabit a variety of wet and dry habitats.

Salt Marsh Common Yellowthroat (*Geothlypis trichas sinuosa*). The salt marsh common yellowthroat is a California Special Concern species (CDFG 2000). The salt marsh common yellowthroat is mostly a resident in the fresh and brackish marsh habitat surrounding the Bay, moving into saline tidal marshes in winter. The salt marsh common yellowthroat population has been reduced by 80 to 90 percent in the past 100 years due to loss of suitable habitat, with this diminution most exacerbated in the South Bay (Goals Project 2000).

Song Sparrow (*Melospiza melodia*). Three subspecies of song sparrow reside year-round in marshlands of San Francisco Bay: Alameda song sparrow (*Melospiza melodia pusillula*), San Pablo song sparrow (*M. m. samuelis*), and Suisun song sparrow (*M. m. maxillaris*). All three subspecies are federal species of concern and CDFG species of special concern. The Alameda and San Pablo song sparrows are found predominantly in tidal salt marsh, which provides optimum habitat for all life needs as long as the marsh contains numerous small channels and complex vegetation structure. Tidal brackish marsh dominated by tall hardstem bulrush (*Scirpus acutus)*, salt marsh bulrush (*S. robustus)*, and concentrated areas of pickleweed and gumplant provides habitat for the Suisun song sparrow. The birds generally forage along the banks of sinuous tidal channels and utilize gumplant bushes for nest sites and song perches. The San Pablo song sparrow ranges from San Pablo Bay and northern San Francisco Bay (south to Sausalito and north Richmond), with the most suitable habitat in Petaluma Marsh. The Alameda song sparrow is found in the San Francisco Bay shores, breeding from San Francisco and southeast Richmond south to Alviso. Their highest-quality habitat is located in Dumbarton Marsh, Greco Island, and Outer Bair Island. The Suisun song sparrow is found within the Suisun Bay marsh complex and west to include Southhampton Bay (Goals Project 2000).

Densities of all of the song sparrow species (Alameda song sparrow, San Pablo song sparrow, and Suisun song sparrow) are lower in the Central/South Bay, with a median of 3.7 birds/hectare for the tidal marshes surveyed, than in San Pablo Bay (18 birds/hectare) and Suisun Bay (26 birds/hectare) (Nur et al. 1997). Densities in San Pablo Bay range from 3.7 to 94 birds/hectare. They range from 7.6 to 46 birds/hectare in Suisun Bay. Highly channeled marshes were directly correlated to higher song sparrow density for this species.

Fish

Green Sturgeon (*Acipencer medirostris*). Green sturgeon are a federal and state species of concern. Green sturgeon are not abundant in any estuaries along the Pacific Coast but are known to exist in the Estuary (Pycha 1956; Skinner 1962; Moyle 1976). Green sturgeon are anadromous fish that spend most of their lives in saltwater and return to spawn in freshwater. Green sturgeon rely on streams, rivers, and estuarine habitat as well as marine waters during their lifecycle. They spawn in the lower reaches of large rivers with swift currents and large cobble. Juveniles remain in the estuaries for a short time and migrate to the ocean as they grow larger. Green sturgeon are found throughout the Bay and are native to the Sacramento-San Joaquin River system. Spawning occurs in the lower reaches of the Sacramento-San Joaquin River system; however, feeding occurs throughout the Bay. Sturgeon often feed on invertebrates and small fish and are common in areas where herring spawn.

Pacific Lamprey (*Lampetra tridentata*). Pacific lamprey are a federal species of special concern. Pacific lampreys range from Baja California to the Bering Sea in Alaska and Asia. In California, the species is more abundant from Monterey northward (Wang 1986). Pacific lamprey are a parasitic anadromous species that enter freshwater streams from July to October, and spawn the following spring. Adults migrate to the ocean between January and April and remain there for about 2 to 3 years before returning to freshwater to spawn (Pacific States Marine Fisheries Commission 1997). Within the Estuary, Pacific lamprey spawn primarily in the San Joaquin, American, Sacramento, and Napa rivers and Sonoma and Walnut creeks (Wang 1986).

Plants

Coastal Marsh Milk-Vetch (*Astragalus pycnostachyus* var. *pychnostachyus*). The coastal marsh milk-vetch is a CNPS List 1B plant. The coastal marsh milk-vetch is a perennial herb that blooms from April to October. It occurs at the high edges of mesic coastal dunes, coastal salt marshes, and streamsides. Associated species include coyote brush (*Baccharis pilularis*) and mule fat (*Baccharis salicifolia*). Known from fewer than 10 occurrences, it is possibly threatened by cattle trampling and erosion (CNPS 2001).

Delta Tule Pea (*Lathyrus jepsonii var. jepsonii*). Delta tule pea is a federal species of special concern. Delta tule pea is a perennial herb that occurs in high brackish marshes, which today are primarily associated with diked habitats dominated by nonnative grasses and herbs. Within this habitat, Delta tule pea occurs in the lower end of well-drained high marsh gradients, often on slight topographic relief above the marsh plain (Goals Project 2000). Historically, this species has occurred in Alameda, Contra Costa, Marin, Napa, and Santa Clara counties (Skinner and Pavlik 1994). The current distribution of Delta tule pea is believed to occur in Suisun Marsh and in tidal brackish marshes along the Napa River (Goals Project 2000). Threats to the species include agriculture and erosion.

Mason's Lilaeopsis (*Lilaeopsis masonii*). Mason's lilaeopsis is state-listed as rare and is found generally in marshes and swamps. It is a minute perennial plant that spreads by rhizomes and produces narrow, jointed leaves. The plant extends from the margins of the Napa River in Napa County, east to the channels and sloughs of the Delta in Contra Costa, Solano, Sacramento, Yolo, and San Joaquin counties. Associated vegetation includes pickleweed, alkali heath, salt grass, and sea lavender. Currently, approximately 130 occurrences of this plant are recorded, although CDFG does not know how many of these still exist. It is threatened by levee maintenance and construction, widening of Delta channels for water transport, dredging and dumping of spoils, recreation, erosion, and, potentially, changes in water quality in the Delta (CDFG 2000).

Point Reyes Bird's-Beak (*Cordylanthus maritimus* ssp. *palustris*). Point Reyes bird's-beak is a federal species of special concern. This species is a hemiparasitic annual herb that occurs in high sandy salt marshes (Goals Project 2000). Associated plants include marsh gumplant (Grindelia stricta var. *stricta),* seaside lavender *(Limonium californicum),* and sandspurry *(Spergularia sp.).* The known range of Point Reyes bird's-beak extends from northern Oregon to Marin and Sonoma counties in the North Bay with small remnant populations known both from Petaluma Marsh and near Gallinas Creek in Marin County. Historically, this species was also known to occur as far south as Santa Clara and San Mateo counties (Skinner and Pavlik 1994). Threats to the species includes development, competition from invasive species, and cattle grazing.

Suisun Marsh Aster (*Aster lentus).* The Suisun Marsh aster is a CNPS List 1B plant. The Suisun Marsh aster is a rhizomatous perennial herb that blooms from May to November. It is endemic to the Delta, occurring in brackish and freshwater marshes and swamps. Most often, it is associated with common reed, bulrush, blackberry, and cattail. Populations occur in Suisun Slough, Van Sickle Island in Suisun Marsh, Barker Slough, the San Joaquin River shoreline in Antioch, Brannon Island, and Sherman Island (CDFG 2001). The Suisun Marsh aster is seriously threatened by marsh habitat alteration and loss (CNPS 2001).

Special Aquatic Sites

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) regulates the disposal of dredged and fill materials into "waters of the United States." Waters of the U.S. include intrastate lakes, rivers, streams (including intermittent streams), bayflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the U.S. (33 Code of Federal Regulations [CFR] Part 328). In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line or to the boundary of any adjacent wetlands. Certain waters of the U.S. are considered "special aquatic sites" because they are generally recognized as having unique ecological value. Such sites include sanctuaries and refuges, mudflats, wetlands, vegetated shallows, eelgrass bed, coral reefs, and riffle and pool complexes. Special aquatic sites are defined by the U.S. Environmental Protection Agency (USEPA), and may be afforded additional consideration in the permit process for a project. The following describes eelgrass, wetlands, and tidal marshes that were previously discussed in Section 3.5.1.2.

Eelgrass (*Zostera marina*) is a native marine vascular plant indigenous to the soft-bottom bays and estuaries of the Northern Hemisphere. It has been afforded special management considerations by CDFG, USFWS, National Marine Fisheries Service (NMFS), and the Golden Gate Audubon Society. The species is found from middle Baja California and the Sea of Cortez to northern Alaska along the west coast of North America, and is common in healthy, shallow bays and estuaries. The depth at which this species grows is a function of light penetration. At greater depths, light is reduced to a level below which photosynthesis is unable to meet the metabolic demands of the plant to sustain net growth (the photocompensation depth).

Eelgrass beds perform multiple functions within an estuarine ecosystem. For example, they provide a nursery area for many species of fish, including Pacific herring, halibut, and English sole. Detritus from eelgrass is not only used by animals immediately adjacent to the beds, but also is transported further into the estuary, making it an important part of the detrital-based food web. As substrate for the epiphytic algae, invertebrates, and crustaceans on which these species feed, eelgrass beds also contribute to the ecosystem at multiple trophic levels. Eelgrass beds are also foraging areas for wintering waterfowl such as American wigeon (*Anas americana*) that feed on the roe and invertebrates.

In addition to being refugia for young fish, eelgrass beds stabilize shorelines by dampening wave energy, collecting sediments transported to the shore, and preventing erosion. They also improve water quality by collecting and filtering organic matter and sediments. This filtering also acts as a nutrient pump, transferring waterborne nutrients to the sediments and invertebrates.

Eelgrass is easily affected by changes in water quality and turbidity. Eelgrass beds are extremely dynamic, expanding and contracting by as much as several hectares per season depending on the quality of the site. Consequently, they serve as an indicator community for the overall health of an estuary.

A 1987 NMFS survey of San Francisco Bay documented 128 hectares (316 acres) of eelgrass, covering less than 0.1 percent of the total Bay bottom. Table 3.5.5 lists the location and acreage of all the beds located. Eelgrass beds are scattered throughout the Bay, and approximately one-third of all beds are in San Pablo Bay (Wyllie-Echeverria and Rutten 1989). Although there have been a number of site specific surveys for eelgrass over the years, a more recent comprehensive survey of the Bay has not been conducted. Figures 3.5.15 through 3.5.17 show

known locations of eelgrass beds in the North Bay, Central Bay, and South Bay, respectively. The water tends to get more turbid and brackish in Northern San Pablo Bay and Suisun Bay and eelgrass generally does not grow in areas of high turbidity or brackish water. No known beds are located in these areas.

3.5.1.5 Regulatory Setting

Federal

Federal Endangered Species Act (16 USC 1531-1544)

FESA provides protection for endangered and threatened species and requires conservation of such species' critical habitats in the ecosystem. An "endangered" species is a species in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become "endangered" in the foreseeable future without further protection. Other special-status species include "proposed" and "candidate" species, and "species of concern." Proposed species are those that have been officially proposed (in the Federal Register) for listing as threatened or endangered. Candidate species are those for which enough information is on file to propose listing as endangered or threatened. "Species of concern" are species for which not enough information is on file to support a listing proposal, but still may be appropriate for listing in the future after further study. A "delisted" species is one whose population has reached its recovery goal and is no longer in jeopardy.

The FESA is administered by the USFWS and the NMFS. In general, NMFS is responsible for protection of FESA-listed marine species and anadromous fishes, while other species are under USFWS jurisdiction.

FESA Section 9 prohibits the "take" of listed species, while Section 7 of this act provides a means of authorizing the "take" of listed species. Taking is defined by FESA [Section 3(19)] to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct." Section 7 requires formal consultation with USFWS or NMFS for projects that may affect those species that are either listed as or proposed for listing as endangered or threatened, to ensure that the proposed action will not jeopardize listed species or destroy or adversely modify designated critical habitat. "Take" of fully protected species can only be authorized for necessary scientific research. "Incidental take" permits cannot generally be issued for fully protected species. Fully protected species in the project area include salt marsh harvest mouse, California clapper rail and California black rail.

A proposed project may address federally listed species in one of two ways: (1) a nonfederal government entity may resolve potential adverse impacts to protected species or (2) a federal lead agency may regulate a proposed project and develop mitigation for any significant impacts to federally listed species. Both cases require consultation with the USFWS and/or NMFS, which ultimately issues a final opinion determining whether the federally listed species will be adversely impacted by a proposed project.

Fish and Wildlife Coordination Act (16 USC 661-667e)

The original act of March 10, 1934, authorized the Secretaries of Agriculture and Commerce to assist and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife.

The amendments to this act, enacted in 1946, require consultation with the USFWS, NMFS, and state agencies responsible for fish and wildlife resources for all proposed federal undertakings and nonfederal actions needing a federal permit or license that would impound, divert, deepen, or otherwise control or modify a stream or waterbody, and to make mitigation and enhancement recommendations to the involved federal agency.

Additionally, the act requires that wildlife conservation be coordinated with other features of water resource development programs. Determination under this authority for specific projects located in estuarine areas constitute compliance with the provisions of the Estuary Protection Act, as discussed below.

Estuary Protection Act (16 USC 1221–1226)

This act highlights the value of estuaries and the need for conservation of their valuable natural resources. It authorizes the Secretary of the Interior, in cooperation with other federal agencies and the states, to study and inventory estuaries of the United States and to determine whether any areas should be acquired by the federal government for future protection.

Under this act, the Secretary of the Interior is required to review all project plans and reports for land and water resource development affecting estuaries and make an assessment of likely impacts and related recommendations for conservation, protection, and enhancement of estuaries.

Magnuson-Stevens Fisheries Act (16 USC 1801-1882)

The original act was passed in 1976, and its primary purposes were conservation and management of U.S. fishery resources, development of U.S. domestic fisheries, and phasing out foreign fishing activities within federal waters, the 200-mile limit extending from the edge of state waters. This area become known as the Exclusive Economic Zone (EEZ), and the Magnuson Act achieved its goal of eliminating foreign fisheries and enhancing domestic fisheries in the EEZ.

The Amended Magnuson-Stevens Fishery Conservation and Management Act of 1996, also known as the Sustainable Fisheries Act (Public Law 104-297), requires all federal agencies to consult with the Secretary of Commerce on proposed projects authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat (EFH). The main purpose of the EFH provisions of the Sustainable Fisheries Act is to avoid loss of fisheries due to disturbance and degradation of the fisheries habitat.

The act requires that EFH must be identified for all species federally managed under the Pacific Fisheries Management Council (PFMC). The PFMC is responsible for managing commercial fisheries resources along the coasts of Washington, Oregon, and California. Managed species are covered under three fisheries management plans:

- Coastal Pelagic Fishery Management Plan;
- Pacific Groundfish Fishery Management Plan; and
- Pacific Salmon Fishery Management Plan.

Migratory Bird Treaty Act (16 USC 703-712)

This act established special protection for migratory birds by regulating hunting or trade in migratory birds. Furthermore, this act prohibits anyone to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Definition of "take" includes any disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young), and such activity is potentially punishable by fines and/or imprisonment.

Marine Mammal Protection Act (16 USC 1361-1421h)

The Marine Mammal Protection Act, adopted in 1972, makes it unlawful to take or import any marine mammals and/or their products. Under Section 101(a)(5)(D) of this act, an incidental harassment permit may be issued for activities other than commercial fishing that may impact small numbers of marine mammals. An incidental harassment permit covers activities that extend for periods of not more than 1 year and that will have a negligible impact on the impacted species. Amendments to this act in 1994 statutorily defined two levels of harassment. Level A harassment is defined as any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal in the wild. Level B harassment is defined as harassment having potential to disturb marine mammals by causing disruption of behavioral patterns including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

Executive Order 13112: Invasive Species

The purpose of this order is to prevent the introduction of invasive species and to provide control for the spread of any invasive species that have already been introduced. This law prohibits the federal government to "authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions."

Additionally, this order requires federal agencies to consult with the Invasive Species Council, consistent with the Invasive Species Management Plan.

Section 404/10 Jurisdiction (33 USC 1251-1376)

Under Section 404 of the Clean Water Act, the USACE regulates the disposal of dredged and fill materials into "waters of the United States," which include intrastate lakes, rivers, streams (including intermittent streams), bayflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, and wetlands adjacent to any water of the U.S. [33 CFR

328]. In areas subject to tidal influence, Section 404 jurisdiction extends to the high tide line or boundary of any adjacent wetlands.

The USACE also regulates navigable waters under Section 10 of the Rivers and Harbors Act. Navigable waters are defined as "those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce" [33 CFR 322.2].

In San Francisco Bay, waters of the U.S. include open waters of the Bay, seasonal and tidal wetlands, and intertidal habitats. Any dredge or fill activities required as a part of ferry implementation and/or operation require a permit from the USACE.

California Endangered Species Act (California Fish and Game Code 2050-2116)

Similar to FESA, CESA, along with the Native Plant Protection Act, authorizes the California Fish and Game Commission to designate, protect, and regulate the taking of special-status species in the state of California. CESA defines "endangered" species as those whose continued existence in California is jeopardized. State-listed "threatened" species are those not presently threatened with extinction, but which may become endangered if their environments change or deteriorate. Any proposed projects that may adversely impact state-listed threatened or endangered species must formally consult with the CDFG. In addition to listed species, the CDFG also maintains a list of "Species of Special Concern," most of which are species whose breeding populations in California may face extirpation. To avoid the future need to list these species as endangered or threatened, the CDFG recommends consideration of these species, which do not as yet have any legal status, during analysis of the impacts of proposed projects.

3.5.2 Impacts and Mitigation

The following section describes the potential impacts that expanded ferry service could have on the biological environment. It is organized by major biological habitat or species type (e.g., overall Bay habitat, benthic environment, fish, marine mammals, etc.). Where applicable, a distinction is made between impacts from construction of ferry facilities and operation of vessels. This section is an evaluation of impacts from the overall ferry service expansion and, therefore, the discussion addresses the overall potential for impacts and the mitigation measures that can be adopted to avoid or minimize these effects.

3.5.2.1 Significance Criteria

Impacts would be considered significant if they would:

- Substantially affect threatened, endangered, or protected species;
- Alter or diminish designated critical habitat[2] or special aquatic sites, including eelgrass beds, mudflats, and wetlands;

[2] Habitat, whether occupied by listed species or not, that has been determined to be essential for the conservation and management of a listed species and has been formally described in the Federal Register.

- Result in the reduction of protected wetland habitat as defined in Section 404 of the Clean Water Act and/or in Section 6610 of the San Francisco Bay Conservation and Development Commission (BCDC) McAteer-Petris Act or result in alteration of desirable functions and values through direct removal, filling, hydrological interruption, or other means;
- Cause the introduction or substantial spread of invasive nonnative plants or wildlife;
- Interfere substantially with the movement of resident or migratory fish or wildlife species;
- Cause substantial or sustained impact to spawning habitat of commercially important species (e.g., Pacific herring); and/or
- Cause underwater sound pressure levels during construction or operation that exceed National Marine Fisheries Service (NMFS) guidelines for protection of marine mammals (i.e., 160 decibels [dB] referenced to 1 micropascal [160 dB re 1 μPa]).

3.5.2.2 Potential Impacts on Habitat

This section identifies impacts that could potentially affect biological habitat types. These habitat types include tidal marshes (including salt and brackish marshes), mudflats, agricultural baylands, salt ponds, and sandy or rocky shorelines.

Impact B-1 **Loss of jurisdictional wetland habitat could occur in areas of dredging and construction at terminal facilities.**

The need for dredging of channels has been minimized with the Proposed Project, with only the Hercules/Rodeo site predicted to potentially require new dredging of an access channel. There is an unknown potential for minor incidental dredging for installation or upgrading of facilities. The Hercules/Rodeo site has not been regionally identified as an area of wetland habitat, and therefore impacts to wetlands are not expected from any needed dredging activity. This would have to be verified once this terminal site has been specifically selected and advanced for further evaluation.

At the regional level of evaluation, mapped wetland areas could potentially occur at the Pittsburg/Antioch and Martinez vicinity. Areas of tidal marsh are located in the vicinity of the existing Larkspur terminal. These resources could potentially be affected by new construction of water transit terminal facilities, if wetland resources are specifically present at these or any of the Proposed Project sites.

Summary of Impact B-1

- Regionally mapped wetlands are present in the vicinity of the Pittsburg/Antioch and Martinez terminals. New terminal construction could impact wetlands at these or other Proposed Project terminals if the resources are present. This impact could be potentially significant.

Mitigation B-1.1: Terminal locations, while having the potential for wetland impacts, have not been specifically surveyed for wetland habitat occurrence with respect to project features because no specific improvements are proposed at this time. Existing mapping of wetlands, discussed in Section 3.5.1 (Environmental Setting), was used to identify areas of known wetlands, but these maps and databases are regional in nature. As part of the environmental studies and documentation for specific projects, wetland areas should be delineated on a site-

specific basis. Specific wetland boundary determinations shall be used to avoid disturbance of these resources when specific terminal layout plans are defined. For example, parking lot facilities, typically the largest part of a terminal footprint, could be located in areas away from the shore and associated wetlands.

Mitigation B-1.2: In cases where wetland impacts are unavoidable, suitable compensatory mitigation shall be designed within the same subarea and implemented in consultation with the appropriate regulatory agencies.

The Goals Project (1999) has described habitat restoration goals and 115 potential restoration sites around the Bay, representing tens of thousands of acres of potential habitat restoration. While not all of these sites may be within the same subarea, available, or suitable for the types of mitigation necessary for impacts from terminal construction, a substantial amount of area could potentially be used by the project proponent for compensatory mitigation. The total area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation.

Impact After Mitigation: Impact B-1 would be potentially significant if loss of wetlands could not be substantially avoided and/or successfully mitigated. The residual impact cannot be quantified until site-specific mitigation measures are designed and thus is considered potentially significant.

Impact B-2 Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.

Construction activities in tidal wetland areas could result in the spread of nonnative invasive plant species that are of concern in San Francisco Bay. Of particular concern is the nonnative smooth cordgrass, *Spartina alterniflora*. This is the most widespread of the nonnative cordgrass species and has the ability to invade and exclude and/or hybridize with the native Pacific cordgrass, alter native northern saltmarsh habitat, colonize tidal mudflats, and reduce open-water areas, potentially resulting in reduced habitat for foraging shorebirds, fish, and invertebrates. Most smooth cordgrass occurs in the South Bay (SFEISP 2002). Other species in the Bay include *S. anglica*, *S. densiflora*, and *S. patens.*

Dredging in areas of nonnative cordgrass infestations could increase the spread of this species by creating root fragments and rhizomes that could disperse with the tides. However, as discussed for impact B-1, dredging is limited within the Proposed Project to Hercules/Rodeo, and regional-level information does not identify this as a site of concern for nonnative cord grass. Erosion from ferry operations, which could disperse root fragments and rhizomes, is not expected to be significant when using the prescribed measure discussed under Impact WW-1.

Summary of Impact B-2

- The Proposed Project would involve construction of new facilities, including in the South Bay where smooth cordgrass is most widely distributed. According to mapping by the San Francisco Estuary Invasive Spartina Project (SFEISP), this species may occur in areas near the potential Oyster Point and Redwood City terminal locations. Spread of this species due to project construction would be considered significant. Therefore, this impact is considered potentially significant.

Mitigation B-2.1: Preconstruction surveys by a qualified biologist/botanist shall be conducted to identify and map areas of smooth cordgrass within potential terminal locations where this species could potentially occur. Identified areas of nonnative cordgrass, if falling within areas of disturbance, shall be removed to the extent feasible prior to construction activities. The methods of removal shall be developed in coordination with the USACE and consultation with the SFEISP. Eradication of this species at a site shall be done well in advance of construction. However, depending upon the extent, complete removal may be infeasible. In this case, funding of an area-wide cordgrass eradication program would be used as mitigation.

Impact After Mitigation: Impact B-2 would be less than significant after successful implementation of Mitigation B-2.1.

Impact B-3 Project construction could result in the removal or disturbance of "Special Aquatic Sites", including eelgrass beds, mudflats, and wetlands.

Eelgrass beds, mudflats, and wetlands are considered special aquatic sites and are subject to USACE jurisdiction under Section 404 of the Clean Water Act and to BCDC jurisdiction under Section 66605 of the McAteer-Petris Act. Eelgrass in the Bay provides spawning habitat for herring, serves as a nursery ground, and provides shelter for juvenile fish, among other functions. Mudflats serve as important foraging areas for shorebird species and provide shallow-water habitat for juvenile fish.

Wetlands, eelgrass and mudflats could be impacted from vessel wake if it is severe enough to cause shoreline erosion. This issue is addressed and mitigated in Section 3.3. Deepening areas to create channels could result in the permanent loss of these habitat types. In addition, eelgrass beds may be impacted indirectly during construction by sedimentation in areas adjacent to dredging operations. Potential removal or other disturbance causing degradation to eelgrass beds or mudflats would be considered a significant impact.

For the Proposed Project, locations that have the potential to include mudflats to varying degrees include Berkeley/Albany, Martinez, and Hercules/Rodeo. Hercules/Rodeo is the only location where dredging of an access channel would be required.

Known eelgrass beds are located near the entrance to the potential Richmond terminal and at the Harbor Bay location. Eelgrass may be affected by ferry operations (e.g., wake and prop wash) if vessels pass in close proximity to eelgrass beds. While known eelgrass beds have not been identified near other proposed terminals or near new routes, new sidescan sonar survey techniques have been identifying eelgrass in areas previously thought not to have eelgrass.

Potential wetland impacts are addressed under Impact B-1.

Summary of Impact B-3

- Impacts to Special Aquatic Sites could occur from dredging operations, construction of facilities, or severe erosion from wake wash. Any impacts to special aquatic sites would be considered significant. Special aquatic sites are identified on a regional level at Berkeley/Albany, Martinez, Richmond, and Hercules/Rodeo. However, Hercules/Rodeo is the only location where dredging of an access channel would be required. Without site-specific study, this impact is considered potentially significant.

Mitigation B-3.1: Disturbance of eelgrass beds and mudflats shall be avoided in the design of project features and routing of ferries. Site specific sidescan sonar surveys would be required prior to implementation of new routes or construction of new terminals to verify that eelgrass is not present.

Mitigation B-3.2: As part of the environmental studies and documentation for specific projects, specific areas of eelgrass beds and mudflats that could be impacted shall be specifically determined.

The general locations of eelgrass beds in the Bay were mapped in the late 1980s (Figures 3.5.15 through 3.5.17). Recent comprehensive mapping of eelgrass beds in the Bay has not been conducted. If any project construction were to occur in the vicinity of any of these known beds, updated mapping of the extent of the beds should be conducted. Methods include use of side-scan sonar techniques, possibly in conjunction with other techniques such as visual surveys. In addition, areas that are less than 3 meters deep may have a reasonable potential to support eelgrass while areas less than 1.5 meters deep have a moderate potential to support eelgrass. Areas such as these should be surveyed to determine the current status of eelgrass prior to design and construction, and this information shall be used to avoid or substantially minimize impacts.

In cases where impacts to eelgrass beds or mudflats are unavoidable, suitable compensatory mitigation shall be designed in consultation with the appropriate state and federal agencies such as the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), the California Department of Fish and Game (CDFG), the San Francisco Bay Regional Water Quality Control Board (RWQCB), and BCDC. However, it should be noted that very little eelgrass mitigation has been done in San Francisco Bay and that mitigation of eelgrass impacts may not be feasible or successful in all cases.

If impacts to eelgrass are unavoidable or impacts cannot be reduced to an acceptable level, compensation or offsetting mitigation shall be further investigated. Mitigation shall provide enhanced functions and values relative to the impacted special aquatic sites. A mitigation plan shall be prepared that identifies the specific habitat restoration methods, the criteria to be used for monitoring and evaluating the success of the mitigation effort, and a contingency plan if the mitigation fails.

Mitigation B-3.3: Indirect impacts to eelgrass beds from sedimentation shall be avoided or reduced through the use of silt curtains to protect the beds from sedimentation or other methods that would otherwise protect the eelgrass from turbidity plumes generated during dredging. Mitigation for indirect effects would need to be evaluated on a case-by-case basis as the techniques used may differ from site to site. For example, at a given location, the specific dredging requirements and the potential for sediment plume generation and specific areas that may be impacted by the sediment plume should be evaluated. If it appears eelgrass could be affected by sedimentation, then site-specific conditions (depth, etc.) and local tidal currents shall be assessed to determine the best way to deploy mitigation, such as silt curtains.

Impact After Mitigation: The applicability and potential for success of eelgrass impact mitigation should be determined on a site-specific basis. For some sites, impacts would be less than significant after implementation of Mitigations B-3.1 through B-3.3. However, for some sites, impacts could still be potentially significant.

3.5.2.3 Potential Effects on Plankton/Productivity

Impact B-4 **Turbidity caused by dredging would reduce light penetration in the water column and could locally reduce phytoplankton production.**

Dredging activity at the Hercules/Rodeo site or minor incidental dredging of other locations could cause increased sediment concentrations in the upper water column, reducing sunlight penetration, which in turn can reduce the depth of the zone in which phytoplankton are productive. Phytoplankton productivity is reduced at suspended sediment concentrations that may occur in estuaries during periods of high runoff or when wind and currents agitate sediments.

The Port of Oakland evaluated turbidity plumes associated with clamshell dredging operations for its 50-foot deepening project (Port of Oakland 1998). The results indicated that increases in turbidity tended to be localized, with the most concentrated portion of the plume located near the bottom and with decreasing concentrations nearer the surface. The studies showed that light transmissivity in a 13-meter (42-foot) water column decreased by approximately 5 percent (from 40 to 35 percent transmissivity) in near-surface waters, while transmissivity near the bottom decreased by as much as 35 percent (to only 5 percent transmissivity at the bottom).

Turbidity plumes are expected to dissipate quickly after dredging activities are completed. Sand settles very rapidly, in a matter of minutes. Silts settle more slowly, on the order of approximately 1.2 meters (4 feet) per day. Very fine clay particles can remain suspended in the water column for longer periods of time.

The impact of dredging and dredge material disposal on phytoplankton is expected to be localized to the dredging areas (within 100 to 200 meters) and to be short-lived because the material dissipates and settles relatively quickly out of the upper water column.

Due to the relatively small scale of dredging operations for the Proposed Project (Hercules/Rodeo only), with the potential for minor incidental dredging at other locations, it is unlikely that any of the necessary dredging would result in a reduction in phytoplankton productivity that would significantly affect Bay-wide production at other trophic levels (e.g., benthos, fish, etc.). However, each individual project should be reviewed with respect to dredging needs, sediment types, and local current conditions to evaluate the potential of a dredge plume at a given location.

No established threshold of significance exists for this impact; however, the impact of increased suspended solids on estuary zooplankton is not expected to be significant for the same reason stated above for phytoplankton: primarily because turbidity plumes are expected to be localized and short-lived.

Summary of Impact B-4

- The Proposed Project would require dredging at one potential known terminal location (Hercules/Rodeo). This dredging could cause turbidity plumes that could locally reduce phytoplankton productivity during the period that dredges are operating. This impact to productivity in the Bay is expected to be local and short-lived. No long-term impacts to plankton and productivity are expected from implementation of the Proposed Project. Therefore, this impact is anticipated to be less than significant. No mitigation is required.

3.5.2.4 Potential Effects on Benthos

Potential impacts to benthic (bottom dwelling) communities that could occur during construction of new terminals or dredging new channels include:

- Removal of benthic organisms during dredging operations and sedimentation on adjacent areas;
- Temporary loss of benthic prey items for larger animal species such as fish, birds, and mammals; and/or
- Potential reduction of native benthic species and increases or spread of nonnative species during the recolonization of bottom habitat disturbed by construction activities.

Impact B-5 **Disturbance of benthic habitat from dredging could result in the temporary loss of benthic (bottom dwelling) organisms.**

The Proposed Project would require construction dredging only for access at Hercules/Rodeo. Minor amounts of incidental dredging could be needed at other locations during installation or upgrading of existing facilities. Dredging of sediments for creation of channels could result in the temporary loss of benthic (bottom dwelling) organisms in dredged sediments. Some benthic species serve as sources of food for diving birds, fish, and mammals such as harbor seals. The loss of organisms could temporarily and locally decrease food resources.

In addition to the direct loss of organisms, additional organisms could be impacted by the settling of suspended sediments in areas adjacent to the dredging operations. This increased sedimentation could potentially bury fauna or clog feeding and respiration structures. The potential impacts of sedimentation would depend on the amount of dredging, current patterns, rate of accumulation, and the types of benthic organisms present. For example, burrowing organisms would likely be less impacted or could withstand deeper burial than surface and suspension feeding organisms, which do not possess a strong ability to burrow upward through newly deposited sediments. Studies reported by the Port of Oakland (1998) suggested that average critical burial depths ranged from 5 centimeters maximum for surface feeders to 30 centimeters for active burrowers.

Following dredging, disturbed areas are anticipated to recolonize first with opportunistic species. These species, characterized by rapid growth and reproduction, may not be the same species that were present in the area prior to the disturbance. Marine benthic invertebrates usually colonize disturbed sedimentary habitats via pelagic larvae that settle from the water column. Early colonists are often polychaete worms with opportunistic life histories, which includes short generation times, high number of larvae, and high mortality rates (Oliver et al. 1977; Lenihan and Oliver 1995; Conlan et al. 1998).

Routine maintenance dredging, if needed, would continue to periodically disturb the benthic community.

Summary of Impact B-5

- The Proposed Project would require construction dredging only at Hercules/Rodeo. The dredging would disturb approximately 9.8 acres, representing 0.003 percent of shallow

benthic habitat in the Bay. This dredging would result in the removal of benthic organisms from the dredged areas. In addition, some loss or degradation of the benthos in areas immediately adjacent to the dredged areas is anticipated due to increased sedimentation. The disturbed areas are expected to recolonize with organisms once the dredging is complete; thus, benthic prey items would return. The temporary loss of benthic organisms is considered less than significant. No mitigation is required.

Impact B-6 Disturbance of habitat by dredging may result in the spread of nonnative benthic invertebrate species.

San Francisco Bay has been disturbed by a wide variety of human activities, including the introduction of nonnative benthic invertebrates (Cohen and Carlton 1995; Cohen 1996). Among the benthic infauna, the average number of introduced species is highest throughout the main estuary and into fresh-brackish water habitats (34-79 percent); is lower in the Central and South Bay marine muddy habitats (23 percent), and is lowest in the Central Bay sandy habitats (11 percent) (Lee et al. 1999). The opportunistic life histories of many introduced species are widely recognized; they are similar to early colonists in a natural succession. However, unlike early native colonists, some nonnative species can be strong competitors that persist and are not replaced by less opportunistic native species later in succession (Nichols and Thompson 1985). Certain nonnative species such as *Potamocorbula* appear to have a greater impact on the ecosystem than other species. Lee et al. (1999) indicate that although the Bay has been invaded by more than 200 species, only a small number, such as *Potamocorbula*, mitten crabs, and green crabs, are considered to pose a threat to ecosystem sustainability. Many of the nonnative species inhabiting the Bay serve ecological functions similar to native species.

Disturbance of sediments from dredging operations could lead to recolonization of the disturbed areas by increased densities of nonnative species. However, *Potamocorbula* is already widespread in the North Bay and may already be found in relatively high densities in areas that would be disturbed by the project (Peterson 1996). This, in addition to the fact that the areas that could be dredged under the Proposed Project are small relative to the available benthic habitat in the Bay (0.003 percent), this impact is not considered significant. The project would not result in the introduction of any new species to the Bay.

Summary of Impact B-6

The Proposed Project would require dredging to access a potential terminal location at Hercules/Rodeo. Recolonization after dredging could result in an increase in the number of nonnative species, or an increase in the number if individuals of a particular nonnative species, in the disturbed areas. Many nonnative species serve ecological functions similar to native species, though some species, such as *Potamocorbula*, can have a greater impact on the ecosystem. *Potamocorbula* however, is already relatively widespread in North Bay areas that would be likely disturbed. The areas that could be dredged are small relative to the available benthic habitat in the Bay and this impact is considered less than significant.

3.5.2.5 Potential Impacts on Fish

Impact B-7 **Dredging could adversely impact fish species near the construction activities.**

Construction dredging would only be potentially necessary at the Hercules/Rodeo terminal site. Increased turbidity levels caused by dredging can adversely affect dissolved oxygen levels in the water and oxygen uptake by fish in the immediate vicinity of the plume due to clogged or lacerated gills. Studies cited by the Port of Oakland indicated that juvenile Chinook salmon showed damage to the gill tissues after exposure to suspended solids concentrations of 1,547 mg/L for 96 hours. Because fish tend to avoid areas of high turbidity and return when concentrations of suspended solids are lower, impacts are generally expected to be minimal. Nevertheless, dredging at the Hercules/Rodeo location, where fish might migrate or could not avoid the sediment plume, could be potentially significant. Impacts due to dredging are discussed further under Impact D-4 (Section 3.1). Similar impacts could result during maintenance dredging.

Summary of Impact B-7

- The Proposed Project would require dredging at one terminal location, and this action has the potential to adversely affect fish species and movements. This impact is considered potentially significant.

Mitigation B-7.1: Mitigation for Impact B-7 is the same as discussed under Impact D-4.

Impact After Mitigation: Impact B-7 would be reduced after implementation of dredging Mitigations D-4.1 and D-4.2 (Section 3.1). Implementation of site-specific mitigation measures at the project level would further reduce Impact B-7 to less than significant levels.

Impact B-8 **Dredging and associated turbidity could affect spawning by Pacific herring.**

Increased turbidity and sedimentation could adversely affect Pacific herring (*Clupea harengus*), a commercially important species that spawns in the Bay. However, herring spawning generally occurs in the central portion of the Bay (Figure 3.5.6). Proposed Project terminals within known herring spawning boundaries include Mission Bay, Harbor Bay Island, Berkeley/Albany, and Richmond. No new dredging would be required for access channels any of these terminals.

Summary of Impact B-8

- The Proposed Project would not require dredging at locations in the Bay used by herring to spawn. This impact would be considered less than significant.

Impact B-9 **Underwater noise from pile driving and other construction activities could impact nearby fish.**

Fish could be temporarily displaced by noise from construction activities (barges, workboats, etc.), but would return once the construction activities ceased.

Construction activity associated with pile driving would result in increased underwater noise and acoustic pressure waves. Underwater noise and acoustic pressure resulting from pile driving

could affect aquatic resources by causing behavioral avoidance of the construction area and/or sublethal or lethal effects on sensitive species. Fish mortality resulting from pile driving activities could be considered a significant impact, particularly if the activity results in take of listed species such as winter-run chinook.

The severity of adverse effects on fish (e.g., behavioral avoidance) depends upon a number of factors, including the concentration and location of fish within the area, species-specific differences in sensitivity to acoustic pressures, the depth of water, bottom- and surface-water characteristics, and the type of pile (steel, concrete, and hammer size). Exposure to sound pressure levels in water associated with pile driving also decreases exponentially as a function of the distance from the source.

Sound pressure levels of 180 dB re 1 μPa are known to cause permanent injury to the lateral line and inner ear of fish (Hastings et al. 1996). Damage to these organs results in disorientation and the inability to locate food and avoid predators. Exposure to low-frequency underwater sound may also result in reduced hatching rates of fish eggs and reduced larval fish survival. Fish eggs are known to be especially vulnerable to vibration and acoustic pressure waves during the first few days after fertilization. Fish larvae and small juvenile fish have been found to be much more vulnerable to elevated sound pressure levels than adult fish (Yelverton et al. 1975).

Although specific designs are not available, it is assumed that any piles needed to construct terminal facilities would likely be small (24 to 36 inches in diameter) and would likely be concrete as is typically used in these applications. Concrete piles tend to generate lower underwater sound pressure levels than steel piles. In addition, smaller piles need much smaller hammers, resulting in lower underwater sound pressure levels than large piles. Pile driving for terminal facilities would be very unlikely to generate sound pressure levels even close to those referenced above. Therefore, it is not expected that significant fish mortalities would result from driving small concrete piles. However, further analysis would be needed once specific designs and specifications for individual projects are known.

Recent experience in San Francisco Bay during a pile installation test for the Bay Bridge East Span indicated that the use of large pile drivers can result in the mortality of fish that have swim bladders (Caltrans 2001). Pile driving for the Bay Bridge East Span test resulted in fish mortalities. The Bay Bridge project, however, is using large (8-foot diameter, approximately 300-foot) steel piles and some of the largest pile driving hammers available. Fish mortality has also occurred at the construction site of the new Benicia-Martinez Bridge on the Carquinez Strait, again using relatively large-diameter steel piles. Widening of the San Mateo Bridge required the driving of 900-1,200 concrete piles with 2- to 3-foot diameters. No fish kills were reported during this pile driving operation (Morrow 2003). Pile driving for terminal facilities would likely include small diameter concrete piles and would be unlikely to have the same sorts of impacts as much larger-scale bridge projects.

Summary of Impact B-9

- The Proposed Project could require pile driving. Fish mortality from this activity is unlikely, although it could be a potentially be a significant impact if it were to occur.

Mitigation B-9.1: Mitigation for this potential impact shall be evaluated on a site-specific basis. Once specific designs and construction specifications for a particular site are known, sound

pressure levels shall be estimated to the extent possible. During initial pile driving efforts, the area around the in-water pile driving activities shall be monitored for signs that fish are being injured (e.g., floating on the surface, birds moving in to prey on dead or injured fish). Measures to reduce sound pressure levels in surrounding waters, such as placing bubble jackets surrounding the piles, shall be deployed if sound pressure levels exceed those that could harm fish.

Impact After Mitigation: Impact B-9 would be less than significant with successful implementation of Mitigation B-9.1.

3.5.2.6 Potential Impacts on Birds

Impact B-10 **Construction could result in loss of habitat for waterfowl, shorebirds and other birds.**

Construction in tidal wetlands and dredging of mudflats could result in the loss of foraging, roosting, and possibly nesting habitat for various bird species. The impact would be site-specific and would depend on the design and specific location of terminal facilities and access channels. Loss of habitat could be considered a potentially significant impact. The impacts to general habitat are further discussed under Impacts B-1 and B-3.

Summary of Impact B-10

- The Proposed Project could potentially result in significant habitat impacts due to new construction.

Mitigation B-10.1: Mitigation for Impact B-10 is the same as for Impacts B-1 and B-3.

Impact After Mitigation: Impact B-10 would be less than significant with successful implementation of Mitigation B-1.1 and/or Mitigations B-3.1 through B-3.3.

Impact B-11 **Ferry traffic could disturb roosting, rafting, and foraging waterfowl in the Bay.**

San Francisco Bay is an important stopover for many species of migratory waterfowl in the Pacific Flyway. Waterfowl are sensitive to the noise level, speed, size, and visual effects of travelling vessels, and generally react to this disturbance by flushing (taking flight away from the area of disturbance). Huffman (1999) noted that after repeated disturbance events, the number of birds in an area would decrease and subsequent disturbances resulted in greater proportions of birds leaving the area. Birds generally returned to an area after a 10- to 35-minute period of no disturbance. The degree of tolerance to disturbance from vessel traffic varies greatly depending upon the species, tide, flock characteristics, location, and season (Davidson and Rothwell 1993; Mori et al. 2001; Keopff and Dietrich 1986 in Hockin et al. 1992). Surf scoters, canvasback, and lesser scaup appear to be more sensitive than other species (Goals Project 2000; Korschgen and Dahlgren 1992; Korschgen et al. 1985; Huffman 1999).

When waterfowl flush or take flight when disturbed, they often circle several times before landing (Huffman 1999). Flying is a high-energy activity for waterfowl (Korschgen and Dalhgren 1992) and frequent flying due to human disturbance may take away from the energy

reserves that would normally be used to complete migration. Large flocks appear to be more susceptible to disturbance than small flocks and canvasback and scaup are especially vulnerable (USFWS 1992; Mori et al. 2001).

The projected ferry routes for the Proposed Project would bisect shallow areas of the Bay that are used as foraging and roosting areas for diving birds, particularly surf scoter, canvasback, lesser and greater scaup, and ruddy duck. Other waterfowl, such as dabbling ducks, typically use habitat such as salt ponds and marshes more frequently than open-water habitat in the Bay (Accurso 1992), and may be less impacted by disturbance from ferries.

Most routes for the Proposed Project would be in deeper channel areas and areas where ship traffic routinely travels. The largest number of transects would occur in the Central Bay, where large rafts of birds do not generally occur due to the deeper waters found there. Most of the Proposed Project routes are located in areas where existing ferry and other ship traffic occurs. Figures 3.5.7 and 3.5.8 indicate use of the shallow areas by waterfowl relative to potential ferry routes. Only the Hercules/Rodeo terminal location would cross a shallow area not routinely used by vessel traffic. Routes to Oyster Point and Redwood City would also cross shallow areas used by waterfowl. These areas currently experience relatively light vessel traffic, and under the Proposed Project would experience more routine disturbance. This disturbance would not result in a permanent loss of habitat, but rather the area of habitat where disturbance may take place. Waterfowl may use these areas when ferries are not present.

There is evidence that waterfowl habituate to repeated disturbances and avoid areas that experience routine disturbance. For example, studies in Denmark showed that waterfowl annually redistributed themselves to areas of lesser routine disturbance, depending on which areas of a lake were set up as refuges (Madsen 1994). This suggests that waterfowl may become accustomed to the ferry traffic and avoid the direct path of the vessel routes. If birds avoided the vessel corridors, this would potentially reduce the frequency of disturbance to the birds and lessen the likelihood that birds would be struck by the vessels.

Increasing the frequency of flushing of waterfowl could be potentially significant.

Summary of Impact B-11

- The Proposed Project would add ferry routes that would bisect some areas of waterfowl roosting and foraging habitat. Large portions of roosting and foraging habitat in San Pablo Bay in the North and the South Bays would remain undisturbed by ferry traffic. An increase in the frequency of flushing of waterfowl flocks would be considered potentially significant.

Mitigation B-11.1: Ferry routes shall be consolidated within common corridors, travel down deeper channel areas as much as possible, and choose the shortest routes across shallow areas to leave as much undisturbed shallow open-water habitat as possible.

Mitigation B-11.2: Response of waterfowl to new ferry routes in shallow North and South Bay roosting, rafting, and foraging habitat shall be evaluated. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).

Impact After Mitigation: This impact would be considered less than significant after implementation of Mitigations B-11.1 and B-11.2.

3.5.2.7 Potential Effects to Marine Mammals

Impact B-12 **Increased turbidity and activity from dredging operations could affect marine mammal foraging.**

Increased turbidity during dredging may disturb foraging activities by decreasing visibility, and removing benthic prey. Figure 3.5.14 shows haul-out and feeding areas. Dredging would only occur for the Hercules/Rodeo Terminal in a total area slightly less than 10 acres. Marine mammals typically are well adapted to low light levels because they feed deep in the water column, often at night, and in areas with decreased visibility. The effects of localized turbidity plumes during dredging are not expected to be significant. It is likely that most dredging would take place during daylight hours.

Dredging could also temporarily remove or displace benthic prey species for marine mammals (e.g., small bottom fish such as gobies fed on by seals or amphipods fed on by gray whales). This impact is not expected to be significant due to the localized nature of the dredging impacts and the relatively large feeding ranges of marine mammals in the Bay.

Summary of Impact B-12

- The Proposed Project would require construction dredging at only one location (Hercules/Rodeo), causing localized increases in turbidity. Because this location is not near any known haul-out or feeding locations, this impact is considered less than significant to marine mammal populations in the Bay.

Impact B-13 **Underwater pile driving noise could disturb marine mammals.**

If pile driving in aquatic environments is required under the Proposed Project, construction could result in temporary disturbance to foraging or migrating marine mammals. Under the Marine Mammal Protection Act of 1972 (amended in 1994), intentional harassment of marine mammals is forbidden. Harassment is defined under the Act as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption to migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment)." Pile driving activities would be considered Level B harassment.

NMFS considers, as a guideline, underwater sound pressure levels at or above 160 dB re 1 μPa as constituting harassment to marine mammals. Studies have suggested that sound pressure levels above 180 dB re 1 μPa can cause temporary hearing impairment in marine mammals. Caltrans (2001a) measured sound pressure levels exceeding this guideline in areas near the installation of a test pile for the Bay Bridge East Span Project. It should be noted that these were very large piles, using some of the largest pile driving hammers available. Pile driving of this magnitude is not expected for the Proposed Project.

Several studies have been conducted on the behavioral reactions of marine mammals to underwater sounds. As reported in a summary of these studies by Richardson et al. (1995), reactions often involved cessation of feeding, resting, or social interaction, and increased alertness or avoidance behaviors. Avoidance reactions in pinnipeds (seals and sea lions) often involved movement from haul-out sites to water (or vice versa).

The potential for adverse underwater sound pressure levels during construction would depend largely on whether in-water piles are necessary for terminal or docking facilities, the types and sizes of piles necessary, the substrate and depth of the area where piles are needed, and the proximity of pile driving activities to sensitive areas such as haul-out and feeding locations. Any work that could result in sound pressure levels exceeding NMFS guidelines would be considered significant. However, as discussed in Impact B-9, pile driving for terminal facilities would involve much smaller (24- to 36-inch-diameter) piles than the piles used for the Bay Bridge project, and sound pressure levels are unlikely to be above the NMFS guideline values.

Known haul-out sites are shown on Figure 3.5.14. Most potential new construction would not occur near major haul-out sites. Redwood City, however, is near a haul-out site.

Summary of Impact B-13

- The Proposed Project could require in-water pile driving for potential new and existing terminal locations. Most potential new construction would not occur near major haul-out sites. Redwood City, however, is near a haul-out site. The need, extent, and location of any pile driving is unknown at this time. Impacts to marine mammals from this activity, however, would be considered potentially significant if sound pressure levels exceeded NMFS guidelines.

Mitigation B-13.1: An Incidental Harassment Authorization from NMFS may be required for pile driving activities, particularly if activities are to occur near sensitive areas such as haul-out sites. Redwood City is near a haul-out site. Pre-construction surveys shall be conducted to determine use of the area by marine mammals before pile driving begins. Marine mammal monitoring shall be conducted during construction in conjunction with underwater noise monitoring. A "safety zone" shall be established based on the initial monitoring. Pile driving activities shall not commence until marine mammals are not sighted within the safety zone for approximately 15 to 30 minutes.

Impact After Mitigation: Impact B-13 would be less than significant after implementation of Mitigation B-13.1.

Impact B-14 Transiting ferries could disturb marine mammals resting at haul-out sites.

Haul-out sites are areas where seals and sea lions pull themselves from the water to rest. Some of these sites are also used for breeding and raising pups. Known haul-out locations around the Bay are shown on Figure 3.5.14.

Ferry routes for the Proposed Project are generally well away from most haul-out sites in the Bay. However, existing routes pass near Yerba Buena Island and Castro Rocks, two major haul-out sites in the Bay.

Ferries passing near sensitive areas such as haul-out sites could potentially disturb seals using these areas. Human activities have been shown to adversely affect the behavioral patterns of marine mammals. Seals react to both visual and acoustic disturbances (Richardson et al. 1995). According to Green et al. (2001), the primary sources of disturbance for harbor seals in San Francisco Bay are boats, kayaks, jet skis, aircraft, foot traffic, and dogs in the vicinity of haul-out sites. Disturbance sources that occur closer to the animals tend to provoke a stronger negative

response. Long-term exposure to disturbance can result in separation of mothers and pups and the potential for outright abandonment on a haul-out site (Lowe 2002).

Green et al. (2001) found that watercraft, especially those that exhibit erratic movements, are a common disturbance to seals on San Francisco Bay. Green et al. conducted studies of disturbances at Castro Rocks and Yerba Buena Island. They found that the average distance at which watercraft caused animals to flee the site (flush) was approximately 183 meters at Castro Rocks and approximately 133 meters at Yerba Buena Island. Larger boats, such as tugboats and ferries, tended to cause a flush at greater distance than smaller watercraft such as jet skis and kayaks. For example, at Castro Rocks, larger watercraft caused a flush at an average of approximately 264 meters (range 121 to 511 meters) while jet skis and kayaks caused a flush at an average of approximately 150 meters (range 10 to 500 meters). Watercraft that exhibit erratic movements such as sudden changes in speed or direction were more likely to cause a disturbance than those traveling at steady speeds, at slow speeds, and in a constant direction (Green et al. 2001; Kopec and Harvey 1995).

Summary of Impact B-14

- The Proposed Project includes existing routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. Passing too close and disturbing marine mammals at these locations would be considered potentially significant.

Mitigation B-14.1: Although NMFS does not regulate normal watercraft operations or require Incidental Harassment Authorizations for regular shipping and pleasure craft operations (Fahy 2002), NMFS does have guidelines, outlined below, for avoidance of marine mammals to reduce disturbance.

NMFS Guidelines

Animal or Sensitive Site	Minimum Distance
Whales	91 meters (100 yards)
Pinnipeds (seals and sea lions)	46 meters (50 yards) in water 91 meters (100 yards) from haul-out sites
Dolphins	46 meters (50 yards)

This guidance, however, does not take potential boat speeds and related wake effects into account. Distances discussed in the literature indicate that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Site-specific information available for San Francisco Bay (Castro Rocks) showed average disturbance from larger vessels occurring at distances of about 250 meters. Therefore, ferry routes shall be at least 100 to 250 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations.

Impact After Mitigation: Impact B-14 would be less than significant after implementation of Mitigation B-14.1.

Impact B-15 **High-speed ferries could potentially strike gray whales in San Francisco Bay.**

Because of the increase in gray whale sightings in San Francisco Bay over the last several years, concern exists about collisions between whales and vessels during normal operations. As discussed in Section 3.5.1 (Environmental Setting), as the gray whale population in the Pacific has returned to historic levels, the number of whales entering San Francisco Bay during their migration has increased. Since this phenomenon of more frequent use of the Bay by whales is relatively recent, the length of time whales stay in the Bay and the average number of whales in the Bay at a given time are not well known.

An attempt to statistically estimate the probability of a vessel making contact with whales was made using an unpublished whale strike model as well as a Monte Carlo simulation. The whale strike model was developed by Tregenza et al. (www.chelonia.demon.co.uk) to predict the probability of a pilot whale being struck in the Canary Islands where ferries cross perpendicularly to a whale migration route. Both models assume that whale behavior is random, that is, the whales can statistically be at any location at any given time.

The Monte Carlo model was developed because initial runs of the whale strike model predicted a certainty (probability of 1) of a whale collision in a test case where a significant probability of no collision should have resulted. The Monte Carlo model was tested (calibrated) against known whale observations along the Larkspur ferry route. Again, a certainty of a whale collision was predicted in a situation where no collisions have actually occurred. Discussions of the models with ecological modeling specialists indicated the weakness of both models is that whale behavior in the Bay is not random. If whales were not actively avoiding ferries, and were traversing the Bay randomly, the statistical models predict there would be a large history of whale strikes. Since there have been no recorded whale strikes, whales are likely not migrating perpendicularly to ferry routes but are probably feeding at preferred locations and likely are actively avoiding ferry vessel routes. For a meaningful statistical prediction of a collision between a ferry and a whale to be made, it will be necessary to develop a greater understanding of whale behavior and movements in the Bay. As alluded to above, no documented collisions between gray whales and any type of vessel have occurred in San Francisco Bay (Cordero 2001). Whales have been stranded in the Bay and areas just offshore. However, it is often difficult to determine the exact cause of death. The fact that gray whales are sighted in the Bay, however, suggests that the potential exists for a ferry to strike a whale at some point. Any whale strike would be considered a significant impact.

Summary of Impact B-15

- The Proposed Project includes increased numbers of vessel transits across the Bay. Every transit represents a potential for a whale strike. Although the likelihood of a whale strike is very low, such a strike would be a significant impact.

Mitigation B-15.1: Ferry operators shall be aware of the potential for whales entering the Bay and should know hot to spot whales at the surface. The USCG reports whale sightings and distance to vessels when they receive a report of a whale sighting. Ferry captains shall be made aware of these reports and exercise diligence when a whale sighting has been reported.

The ferry system shall implement a program of informing ferry operators of whale sightings and locations. For example, if one captain sights a whale, it should be reported through a network to

all other captains. Operators should be informed or reminded during seasonal periods of heightened whale activities or presence. If whale sightings continue to increase in the Bay, having dedicated lookouts on board or other detection equipment could be warranted, especially during certain times of the year. Devices (such as sound-generating equipment) used to scare whales from the area may be considered intentional harassment by NMFS and would not likely be allowed.

Mitigation B-15.2: Ferries shall be equipped with a whale detection system such as forward-looking sonar. Such a system is currently under development and being tested on a NOAA vessel in Cape Cod Bay.

Impact After Mitigation: Implementation of Mitigations B-15.1 and B-15.2 would reduce the chances of a whale strike; however, some probability, though small, would still remain of an accident occurring. One gray whale represents approximately 0.004 percent of the total estimated population of 26,000 whales along the Pacific coast, and the rare occurrence of a whale strike would not likely have an effect on long-term regional gray whale populations. However, the possibility of a whale strike is still considered potentially significant.

3.5.2.8 Potential Effects on Special-Status Species

Impact B-16 **Project construction and/or operation could result in the "take" of state or federally listed species or loss or degradation of these species' habitat.**

Activities that could affect listed species or their habitat include construction of ferry terminals, dredging or excavation near wetland habitats, or operational impacts such as wake effects on species such as California clapper rail. Wake effects are addressed in Impact B-20. Table 3.5.4 provides a comprehensive list of special status species in the Bay Area. Figures 3.5.10 through 3.5.12 show the relationship of the Proposed Project to known distributions of salt marsh harvest mouse, black rail, and California clapper rail.

"Incidental take" permits of fully protected species cannot be authorized by DFG. Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Known distributions of salt marsh harvest mouse and/or suitable habitat include locations near the following proposed terminal locations: Antioch/Pittsburg, Martinez, and Redwood City. Black rail occur near Martinez. Clapper rail have known distributions near Martinez, Richmond, and Redwood City. Potential impacts to special status species would be addressed on a site specific basis.

Summary of Impact B-16

- The Proposed Project could potentially result in the take of listed species or loss of habitat due to new construction. The greater potential for impacts to listed species would be in or near wetland areas and primarily in the North and South Bay areas. This would be a potentially significant impact.

Mitigation B-16.1: Table 3.5.4 lists threatened, endangered, and other special-status species that could occur around the Bay Area. Terminal locations shall be reviewed for potential occurrence of listed species and habitat using the literature and tools such as the CNDDB. Field surveys by

qualified biologists shall be conducted in areas of potential occurrence or with suitable habitat for listed species. Areas with listed species should be avoided.

In areas where construction of a terminal is could impact a listed species, either through construction disturbance or loss of resting, foraging, or breeding habitat, consultation shall be initiated with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and CDFG as required by the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA). Specific mitigation measures will likely be required as a result of that consultation and must be incorporated into the specific project design or mitigation plan. Measures may include redesign of project features to avoid impacts to listed species or habitat or include restoration or creation of replacement habitat.

Mitigation B-16.2: Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Proposed terminals and routes would be designed or located to avoid take of these species.

Impact After Mitigation: The significance of impacts after implementation of project-specific mitigation measures would need to be evaluated after design of those specific measures. Impacts could still be potentially significant.

3.5.2.9 Potential Water Quality Effects on Biological Resources

Impact B-17 **Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality, which could, in turn, affect local biological resources.**

This impact is potentially significant and is addressed, along with mitigation, under Impact W-1.

Impact B-18 **Contaminated sediments could potentially become resuspended during construction and dredging operations and could cause toxicity to Bay organisms.**

Contaminated sediments exist at various locations in the Bay. Dredging of these sediments could release chemicals to the water column that could result in toxicity to Bay organisms. The potential release of sediment contaminants and mitigation measures are discussed in detail in Impact D-2 (Section 3.1). This is considered a potentially significant impact.

Impact B-19 **Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.**

Fuel spill could expose Bay fish and wildlife to toxic pollutants in fuels and oils. This potentially significant impact is addressed in Impact W-3.

3.5.2.10 Potential Wake Effects

Impact B-20 **Vessel wakes could potentially cause erosion and loss of wetland habitats, impact special-status species such as the clapper rail and salt marsh harvest mouse, and impact marine mammals through disturbance at or erosion of haul-out sites.**

These potentially significant impacts and mitigation measures are addressed in Section 3.3, Wake Analysis.

3.5.2.11 Potential Effects on Terrestrial Wildlife

Impact B-21 **Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from terminal facilities and associated vehicle parking areas.**

New terminals could potentially be constructed in areas where new sources of light or glare could adversely impact wildlife. The Proposed Project includes nine new terminals. With the exception of one terminal (Hercules/Rodeo), all are within existing ports or developed maritime areas, and therefore would not likely have significant impacts.

Summary of Impact B-21

- The Proposed Project could potentially adversely impact wildlife through new sources of light or glare, especially at Hercules/Rodeo, where the terminal would not be in an area of existing maritime use. This impact could be potentially significant.

Mitigation B-21.1: New lighting should be directed on intended project areas and avoid surrounding wildlife habitat.

Impact After Mitigation: The impact is anticipated to be less than significant with implementation of Mitigation Measure B-21.1.

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Table 3.5.1
Common San Francisco Bay Fish Species Found in California Department of Fish and Game Beach Seine and Otter Trawl Catches

Scientific Name	Common Name
Acanthogobius flavimanus	yellowfin goby
Allosmerus elongatus	whitebait smelt
Alosa sapidissima	American shad
Amphistichus argenteus	barred surfperch
Amphistichus koelzi	calico surfperch
Atherinops affinis	topsmelt
Atherinopsis californiensis	jacksmelt
Citharichthys stigmaeus	speckled sanddab
Clevelandia ios	arrow goby
Clupea pallasi	Pacific herring
Cymatogaster aggregata	shiner surfperch
Dorosoma petenense	threadfin shad
Embiotoca jacksoni	black surfperch
Engraulis mordax	northern anchovy
Gasterosteus aculeatus	threespine stickleback
Genyonemus lineatus	white croaker
Hyperprosopon argenteum	walleye surfperch
Hypomesus pretiosus	surf smelt
Hypsopsetta guttulata	diamond turbot
Ilypnus gilberti	cheekspot goby
Lepidogobius lepidus	bay goby
Leptocottus armatus	Pacific staghorn sculpin
Menidia beryllina	inland silverside
Micrometrus minimus	dwarf surfperch
Morone saxatilis	striped bass
Mustelus henlei	brown smoothhound
Myliobatis californica	bat ray
Oncorhynchus tshawytscha	Chinook salmon
Ophiodon elongatus	lingcod
Paralichthys californicus	California halibut
Parophrys vetulus	English sole
Peprilus simillimus	Pacific pompano
Phanerodon furcatus	white seaperch
Platichthys stellatus	starry flounder
Pleuronichthys decurrens	curlfin turbot
Porichthys notatus	plainfin midshipman
Psettichthys melanostictus	sand sole
Raja binoculata	big skate
Rhacochilus toxotes	rubberlip seaperch
Rhacochilus vacca	pile perch
Sebastes auriculatus	brown rockfish
Spirinchus thaleichthys	longfin smelt
Symphurus atricauda	California tonguefish
Syngnathus leptorhynchus	bay pipefish
Triakis semifasciata	leopard shark
Tridentiger trigonocephalus	chameleon goby

Source: California Department of Fish and Game, Bay-Delta Monitoring Project, unpublished data.

Table 3.5.2
Percentage of All Waterfowl in San Francisco Bay by Region

Region	Percentage of all waterfowl	
Year	**1988-89**	**1989-90**
North Bay	20	42
Central Bay	17	17
South Bay	11	9

Source: Accurso 1990

Table 3.5.3
Percentages of Scaup, Canvasback, and Surf Scoter in the Overall Waterfowl Abundance in San Francisco Bay From 1988-1990

	Species					
	Scaup		Canvasback		Surf Scoter	
Year	**1988-1989**	**1989-1990**	**1988-1989**	**1989-1990**	**1988-1989**	**1989-1990**
North Bay	35	69	9.5	25.5	19	35
Central Bay	16	13	0.4	0.4	47	50
South Bay	18	13	1.9	1.7	16	14

Source: Accurso 1990

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Mammals					
Guadalupe fur seal	*Arctocephalus townsendi*	T	T	NA	Coastal waters, islands, isolated, rocky haul-outs.
Right whale	*Balaena glacialis*	E	None	NA	Near shore in shallow waters, large bays
Sei whale	*Balaenoptera borealis*	E	None	NA	Temperate open seas, nearshore and offshore, from Gulf of Alaska to Baja California
Blue whale	*Balaenoptera musculus*	E	None	NA	Open waters, occasional inshore waters
Finback whale	*Balaenoptera physalus*	E	None	NA	Open waters, occasional inshore waters
Pacific western big-eared bat	*Corynorhinus townsendii townsendii*	SC	SC	NA	Humid coastal regions; roosts include caves, mines, and buildings
Berkeley kangaroo rat	*Dipodomys heermanni berkeleyensis*	SC	None	NA	Annual grassland, coastal scrub, chaparral, hardwood-conifer habitats (not specific to subspecies)
Southern sea otter	*Enhydra lutris nereis*	T	None	NA	Pacific Ocean nearshore marine waters; historically in San Francisco Bay
Gray whale	*Eschrichtius robustus*	D		NA	Open waters, occasional inshore waters
Right whale	*Eubalaena glacialis*	E	None	NA	Near shore in shallow waters, large bays
Steller sea lion	*Eumetopias jubatus*	T	None	NA	Isolated shoreline and rocky islands from San Mateo County north
Greater western mastiff bat	*Eumops perotis californicus*	SC	SC	NA	Chaparral-type areas with rock walls and low-growing vegetation, or trees
Harbor seal	*Phoca vitulina*	MMPA	None	NA	Shallow water; in and near mouths of rivers; sand bars
Sperm whale	*Physeter catodon*	E	None	NA	Temperate and tropical oceans, near continental shelf, from Bering Sea to equator
Long-eared myotis bat	*Myotis evotis*	SC	None	NA	Brush, woodland and forest habitats
Fringed myotis bat	*Myotis thysanodes*	SC	None	NA	Piñon-juniper forest, valley and foothill hardwood woodlands and hardwood-conifer forest
Long-legged myotis bat	*Myotis volans*	SC	None	NA	Woodlands, forests, chaparral, coastal scrub
Yuma myotis bat	*Myotis yumanensis*	SC	SC	NA	Open forests and woodlands near water
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	SC	SC	NA	Riparian woodland, hardwood forest, chaparral (not specific to subspecies)
Riparian woodrat	*Neotoma fuscipes riparia*	E	SC	NA	Brushy habitats with scattered trees

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
San Joaquin pocketmouse	*Perognathus inornatus*	PE	SC	NA	Dry, open grasslands or scrub areas, mostly on ridges or hillsides
Salt Marsh Harvest Mouse	*Reithrodonyomys raviventris*	E	E	NA	Coastal salt marsh, dense stands of pickleweed
Alameda Island mole	*Scapanus latimanus parvus*	SC	None	NA	Grassland, pasture, montane and valley foothill riparian, cropland, wet meadow, open forest (not specific to subspecies).
Salt-Marsh Wandering Shrew	*Sorex vagrans halicoetes*	SC	SC	NA	Salt marshes 6-8 feet above sea level where abundant driftwood is scattered throughout pickleweed.
California Sea Lion	*Zalophus californicus californianus*	MMPA	None	NA	Shallow water; on offshore rocks, sand bars, bays
Point Reyes jumping mouse	*Zapus trinotatus orarius*	SC	SC	NA	Riparian, grassland, and wet meadow habitats, also prefers habitat near coniferous forest (not specific to subspecies)
Birds					
Tricolored blackbird	*Agelaius tricolor*	SC	SC	NA	Open valleys and foothills in streamside timber, alfalfa and rice fields, blackberry thickets, tules and cattails on and around marshes and reservoirs
Grasshopper sparrow	*Ammodramus savannarum*	SC	None	NA	Grasslands, meadows, fields, pastures
Bell's sage sparrow	*Amphispiza belli belli*	SC	SC	NA	Chaparral, coastal scrub
Tricolored blackbird	*Agelaius tricolor*	SC	SC	NA	Open valleys and foothills in streamside timber, alfalfa and rice fields, blackberry thickets, tules and cattails on and around marshes and reservoirs
Golden Eagle	*Aquilla chrysaetos*	None	SC	NA	Mountainous areas, canyons, shrub-land and grasslands
Short-eared owl	*Asio flammeus*	SC	SC	NA	Meadows, grasslands, wetlands, irrigated land
Burrowing Owl	*Athene cunicularia*	None	SC	NA	Short-grass prairie and open space; associated with burrowing mammals such as ground squirrels
American bittern	*Botaurus lentiginosus*	SC	None	NA	Fresh and salt water marshes and wet meadows with tall emergents such as cattail and bulrush
Marbled murrelet	*Brachyramphus marmoratus*	T	E	NA	Mature Douglas fir and redwood forest within 56km (35mi) of the coast

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Aleutian Canada goose	*Branta canadensis leucopareia*	D	None	NA	Streams, marshes, lagoons, and sea cliffs are used for breeding; winter habitat includes agricultural croplands and pastures.
Ferruginous hawk	*Buteo regalis*	SC	SC	NA	Undisturbed grassland and agricultural areas (winter)
Costa's hummingbird	*Calypte costae*	SC	None	NA	Desert scrub
Lawrence's goldfinch	*Carduelis lawrencei*	SC	None	NA	Valley foothill hardwood, valley foothill hardwood-conifer
Vaux's swift	*Chaetura vauxi*	SC	SC	NA	Redwood and Douglas fir forests with hollow trees and snags
Western Snowy Plover	*Charadrius alexandrinus nivosus*	T	None	NA	Sandy coastal beaches, salt pans, coastal dredges spoils sites, dry salt ponds, salt pond levees
Lark sparrow	*Chondestes grammacus*	SC	None	NA	Grazed grasslands, fields, pastures, city parks
Northern Harrier	*Circus cyaneus*	None	SC	NA	Nests and forages in salt marsh, freshwater marsh, and grassland habitats.
Olive-sided flycatcher	*Contopus borealis* (*cooperi*)	SC	None	NA	Mixed conifer, montane hardwood-conifer, Douglas fir, redwood, red fir, lodgepole forest
Black swift	*Cypseloides niger*	SC	SC	NA	Mountains and coastal cliffs
Hermit warbler	*Dendroica occidentalis*	SC	None	NA	Mature pine and coniferous forests
Short-tailed albatross	*Diomedea albatrus*	C	None	NA	Open ocean; majority of the species is found off the coast of Japan
White-tailed kite	*Elanus leucurus*	SC	FP	NA	Nests among dense-topped trees; forages in open grasslands, meadows or marshes
Little willow flycatcher	*Empidonax trailii brewsteri*	None	E	NA	Riparian habitat, dense willow thickets edging wet meadows or ponds (not specific to subspecies)
Horned Lark	*Eremophila alpestris*	None	SC	NA	Grasslands, meadows, fields, pastures and deserts
Pacific-slope flycatcher	*Empidonax difficilis*	SC	None	NA	Valley foothill and montane riparian, hardwood, and hardwood-conifer woodlands
Little willow flycatcher	*Epidonax traillii brewsteri*	None	E	NA	Riparian habitat, dense willow thickets edging wet meadows or ponds (not specific to subspecies)
American peregrine falcon	*Falco peregrinus anatum*	D	E	NA	Cliff ledges, particularly near shores and marshes

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Common loon	*Gavia immer*	SC	SC	NA	Estuaries and subtidal marine habitats from September through May
Saltmarsh common yellowthroat	*Geothylpis trichas sinuosa*	None	SC	NA	San Francisco Bay region in fresh and saltwater marshes with thick continuous cover to water surface, tall grasses, tule patches and willows for nesting.
Bald Eagle	*Haliaeetus leucocephalus*	PD	E	NA	Seacoast, islands, sea cliffs, large lakes, large rivers, coastal lagoons
Harlequin duck	*Histrionicus histrionicus*	SC	SC	NA	coastal marine environments; breeds near fast-flowing rivers
Western least bittern	*Ixobrychus exilis hesperis*	SC	SC	NA	Emergent wetlands of cattail and tule
Loggerhead shrike	*Lanius ludovicianus*	SC	SC	NA	Open canopied valley and foothill hardwood, riparian; urban areas
California black rail	*Laterallus jamaaciensis coturniculus*	SC	SC	NA	Tidal salt marshes, freshwater and brackish marshes.
Lewis' woodpecker	*Melanerpes lewis*	SC	None	NA	Open pine-oak woodlands, coniferous forests, and riparian woodlands. Prefers burned and logged woodlands.
Suisun song sparrow	*Melospiza melodia maxillaris*	SC		NA	Intermixed stands of bulrush (*Scirpus* spp.), cattail (*Typha* spp.), and other emergent vegetation
San Pablo song sparrow	*Melospiza melodia samuelis*	SC		NA	Intermixed stands of bulrush (*Scirpus* spp.), cattail (*Typha* spp.), and other emergent vegetation
Alameda song sparrow	*Melospiza melodia pusillula*	SC	SC	NA	Salient emergent wetland
Long-billed curlew	*Numenius americanus*	SC	SC	NA	Intertidal mudflats of large estuaries, upland herbaceous areas, and cropland (winter)
Ashy storm-petrel	*Oceanodroma homochroa*	SC	SC	NA	Isolated coast and island nester
Brown pelican	*Pelecanus occidentalis*	E	E	NA	Nests on coastal islands, lacking ground predators; roost on piers, buys and other structures
Double-crested cormorant (rookery)	*Phalacrocorax auritus*	None	SC	NA	Coastal cliffs, offshore islands, and inland along lake margins; nests on ground or in tall trees.
California clapper rail	*Rallus longirostric obsoletus*	E	E	NA	Salt marshes dominated by pickleweed and cord grass
Bank swallow	*Riparia riparia*	SC	T	NA	Riparian vegetation, vertical banks or cliffs near streams, rivers, lakes, and

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
					oceans
Rufous hummingbird	*Selasphorus rufus*	SC	None	NA	Valley and foothill woodland, hardwood-conifer forest, riparian woodland, and chaparral during migration
Allen's hummingbird	*Selasphorus sasin*	SC	None	NA	Brushy slopes, chaparral, thickets and open coniferous forests
Red-breasted sapsucker	*Spyrapicus ruber*	SC	None	NA	Winters in lowland, cismontane habitats
California least tern	*Sterna antillarum*	E	E	NA	Flat, open areas along the coast near inshore estuaries, river mouths, or shallows, sandy ground with little or no vegetation, bays, freshwater ponds, channels, lakes1
Elegant tern	*Sterna elegans*	SC	SC	NA	Inland coastal waters, bays, estuaries, and harbors
Xantus' murrelet	*Synthliboramphus hypoleucus*	SC	SC	NA	Breeds on Channel Islands; winters in Monterey Bay and other coastal waters
Bewick's wren	*Thryomanes bewickii*	SC	None	NA	Chaparral, riparian forest, woodlands and conifer forest with brush understory
California thrasher	*Toxostoma redivivum*	SC	None	NA	Cismontane woodland, chaparral, and riparian woodland
Fish					
Green sturgeon	*Acipenser medirostris*	SC	SC	NA	Rivers and estuaries
Tidewater goby	*Eucyclogobius newberryi*	E	SC	NA	Upper end of lagoons in salinities less than 10 parts per thousand.
Delta smelt	*Hypomesus transpacificus*	T	T	NA	Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, river channels and sloughs
River lamprey	*Lampetra ayresi*	SC	SC	NA	Sacramento and San Joaquin Rivers and Delta; estuaries, rivers and creeks with fine gravel substrates
Pacific lamprey	*Lampetra tridentata*	SC	None	NA	Estuaries, rivers and creeks with fine gravel substrates
Central California Coho salmon	*Oncorhynchus kisutch*	T	E	NA	Between Punta Gordo and San Lorenzo River
Central Coast and Central Valley steelhead ESUs	*Oncorhynchus mykiss*	T	None	NA	Delta, Suisun Bay and associated marshes, San Francisco Bay west to the Golden Gate bridge is designated as suitable habitat.

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Sacramento Valley winter-run Chinook salmon	*Oncorhynchus tshawytscha*	E	E	NA	Sacramento River from Keswick Dam (near Redding) south to Chipps Island, then west through Carquinez Strait, San Pablo Bay and San Francisco Bay
Central Valley spring-run Chinook salmon	*Oncorhynchus tshawytscha*	T	T	NA	Central Valley rivers and their tributaries, west to the Pacific Ocean
Central Valley fall/late-fall Chinook salmon	*Oncorhynchus tshawytscha*	C	SC	NA	Central Valley rivers and their tributaries, west to the Pacific Ocean
Sacramento splittail	*Pogonichthys macrolepidotus*	T	SC	NA	Fresh water from lower Sacramento and San Joaquin rivers down to Montezuma Slough (may extend to the mouth of Napa River at San Pablo Bay)
Longfin smelt	*Spirinchus thaleichthys*	SC	SC	NA	Moderately saline estuaries and lower reaches of rivers
Invertebrates					
Opler's longhorn moth	*Adela olplerella*	SC	None	NA	Serpentine soils, open grasslands, sandy soils; host plant is cream cups (*Platystemon californicus*)
Vernal pool fairy shrimp	*Branchinecta lynchi*	SC	None	NA	Vernal pools
Tomales isopod	*Caecidotea tomalensis*	SC	None	NA	Localized freshwater ponds or streams with still or nearly still water
Edgewood blind harvestman	*Calicina* (*Sitalcina*) *minor*	SC	None	NA	Open grassland with serpentine bedrock; seeps
Sandy beach tiger beetle	*Cicindela hirticollis gravida*	SC	None	NA	Sandy areas adjacent to non-brackish water along coast; found in dry sand of upper zone
Globose dune beetle	*Coelus globosus*	SC	None	NA	Coastal sand dunes; foredunes and sand hummocks with dune vegetation
Bay checkerspot butterfly	*Euphydryas editha bayensis*	T	None	NA	Grasslands containing native forbs where host plant dwarf plantain (*Plantago erecta*) is present, frequently on serpentine soils.
Black abalone	*Haliotes cracherodii*	C	None	NA	Mid to low rocky intertidal
White abalone	*Haliotes sorenseni*	E	None	NA	Rocky pinnacles and deep reefs in southern California; especially those off the channel islands. Lives at depths of a least 80 feet to over 200 feet
Ricksecker's water	*Hydrochara rickseckeri*	SC	None	NA	Freshwater habitats, restricted to the San Francisco Bay Area

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
scavenger beetle					
Leech's skyline diving beetle	*Hydroporus leechi*	SC	None	NA	Freshwater predacious diving beetle
Bridges' Coast Range shoulderband snail	*Helminthoglypta nicklinianan bridgesi*	SC	None	NA	Grasslands of Alameda and Contra Costa counties
Mission blue butterfly	*Icaricia icariodoides missionensis*	E	None	NA	Coastal scrub, grassland; host plants are perennial lupines: *Lupinus albifrons, L. variicolor,* and *L. formosus*; preferred nectar plants of adults are coast buckwheat (*Eriogonum latifolium*) and golden aster (*Heterotheca sessiliflora*)
Marin elfin butterfly	*Incisalia mossii*	SC	None	NA	Coastal scrub with cliffs or rock outcrops; host plant is stonecrop (*Sedum spathulifolium*)
San Bruno elfin butterfly	*Incisalia mossii bayensis*	E	None	NA	Coastal scrub with cliffs or rock outcrops, north facing slopes; host plant is stonecrop (*Sedum spathulifolium*)
Bumblebee scarab beetle	*Lichnanthe ursina*	SC	None	NA	Coastal sand dunes from Sonoma County to San Mateo County
California linderiella fairy shrimp	*Linderiella occidentalis*	SC	None	NA	Vernal pools
Tiburon microblind harvestman	*Microcina tiburona*	SC	None	NA	Serpentine soils
San Francisco lacewing	*Nothochrysa californica*	SC	None	NA	Freshwater streams
Unsilvered fritillary butterfly	*Speyeria adiaste adiaste*	SC	None	NA	Redwood forest; food plant is Western heart's ease (*Viola ocellata*)
Callippe silverspot butterfly	*Speyeria callippe callippe*	E	None	NA	Grassy hillsides, chaparral, and oak woodland with native forbs; host plant a native violet (*Viola pedunculata)*
Mimic tryonia (California brackishwater snail)	*Tryonia imitator*	SC	None	NA	Coastal lagoons, estuaries, and salt marshes.
Reptiles and Amphibians					
California tiger salamander	*Ambystoma californiense*	C	SC	NA	Annual grassland and valley-foothill hardwood habitats, vernal pools and other seasonal water sources adjacent to underground refuges.

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Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Silvery legless lizard	*Anniella pulchra pulchra*	SC	SC	NA	stabilized dune areas with coastal shrubs
Loggerhead turtle	*Caretta caretta*	T	None	NA	Open ocean, seldom California coast
Green (sea) turtle	*Chelonia mydas* (including *agassizi*)	T	None	NA	Warm-water bays and lagoons
Northwestern pond turtle	*Clemmys marmorata marmorata*	SC	SC	NA	Permanent or nearly permanent water with basking sites and upland for nest sites; can tolerate seawater for short periods of time, but prefer freshwater
Southwestern pond turtle	*Clemmys marmorata pallida*	SC	SC	NA	Permanent or nearly permanent water with basking sites and upland for nest sites; can tolerate seawater for short periods of time, but prefer freshwater
Leatherback turtle	*Dermochelys coriacea*	E	None	NA	Open ocean, California coast, bays and estuaries
Olive (Pacific) Ridley sea turtle	*Lepidochelys olivacea*	T	None	NA	Bay and lagoons, seldom in California
Alameda whipsnake	*Masticophis lateralis euryxanthus*	T	T	NA	Chaparral and other scrubland habitats
California horned lizard	*Phrynosoma coronatum frontale*	SC	SC	NA	Lowlands along sandy washes with scattered low bushes and open areas for sunning
California red-legged frog	*Rana aurora draytonii*	E	SC	NA	Lowlands and foothills with deep water remaining for at least 11 weeks; water source is usually associated with abundant emergent and/or shoreline vegetation
Foothill yellow-legged frog	*Rana boylii*	SC	SC	NA	Partly shaded, shallow streams and riffles with cobble size or larger rocky substrate
Western spadefoot toad	*Scaphiopus hammondii*	SC	SC	NA	Quiet streams and temporary pools in grassland, open chaparral, and pine-oak woodlands
San Francisco garter snake	*Thamnophis sirtalis tetrataenia*	E	E,FP	NA	Wetlands or grasslands near ponds, marshes, sloughs, and canals, and associated upland
Plants					
San Mateo thornmint	*Acanthomintha duttonii*	E	E	1B	Chaparral, grassland; serpentinite; Apr-Jun

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Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Franciscan onion	*Allium peninsulare* var. *franciscanum*	None	None	1B	Cismontane woodland, valley and foothill grassland; May-Jun
Napa false indigo	*Amorpha californica* var. *napensis*	None	None	1B	Chaparral, cismontane woodland; Apr-Jul
Large-flowered fiddleneck	*Amsinckia grandiflora*	None	None	1B	Cismontane woodland, valley and foothill grassland; Apr-May
Bent-flowered fiddleneck	*Amsinckia lunaris*	None	None	1B	Coastal bluff scrub, cismontane woodland, valley and foothill grassland; Mar-Jun
Santa Cruz manzanita	*Arctostaphylos andersonii*	SC	None	1B	Broadleafed upland forest, chaparral, coniferous forest; Nov-Apr
Mount Diablo manzanita					Chaparral; Jan-Mar
San Francisco manzanita	*Arctostaphylos hookeri* ssp. *franciscana*	SC	None	1B	Coastal scrub, chaparral, coastal prairie, coastal scrub, grassland; sandy; Mar-Aug
Presidio manzanita	*Arctostaphylos hookeri* ssp. *ravenii*	E	E	1B	Chaparral, coastal prairie, coastal scrub; serpentinite outcrop; Feb-Mar
San Bruno Mountain manzanita	*Arctostaphylos imbricata*	SC	E	1B	Chaparral, coastal scrub; rocky; Feb-May
Contra Costa manzanita	*Arctostaphylos manzanita* ssp. *laevigata*	None	None	1B	Chaparral; Jan-Feb
Montara manzanita	*Arctostaphylos montaraensis*	SC	None	1B	Chaparral, coastal scrub; Jan-Mar
Pacific manzanita	*Arctostaphylos pacifica*	SC	E	none	Chaparral, coastal scrub; sandstone outcrops
Pallid manzanita	*Arctostaphylos pallida*	T	E	1B	Chaparral, Foothill Woodland, Mixed Evergreen Forest; Dec-Mar
Kings Mountain manzanita	*Arctostaphylos regismontana*	None	None	1B	Chaparral, north coast coniferous forest; Jan-Apr
Marin manzanita	*Arctostaphylos virgata*	None	None	1B	Chaparral, north coast coniferous forest, closed cone coniferous forest; Jan-Mar
Marsh sandwort	*Arenaria paludicola*	E	E	1B	Freshwater marsh; May-Aug
Suisun Marsh aster	*Aster lentus*	None	None	1B	Brackish and freshwater marshes and swamps; May-Nov
Coastal marsh milk-vetch	*Astragalus pycnostachyus var. pycnostachyus*	None	None	1B	Coastal dunes, coastal salt marshes; Apr-Oct

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Adobe milk-vetch	*Astragalus tener* var. *tener*	None	None	1B	Playas, adobe clay grasslands, vernal pools; Mar-Jun
Heartscale	*Atriplex cordulata*	None	None	1B	Chenopod scrub, saline or alkaline meadows; Apr-Oct
Britlescale	*Atriplix depressa*	None	None	1B	Chenopod scrub, meadows, playas, vernal pools, valley and foothill grassland; May-Oct
San Joaquin spearscale	*Atriplex joaquiniana*	None	None	1B	Alkaline meadows, playas, chenopod scrub, valley and foothill grassland; Apr-Oct
Big-scale balsamroot	*Balsamorhiza macrolepis* var. *macrolepis*	None	None	1B	Chaparral, cismontane woodland, valley and foothill grassland; Mar-Jun
Sonoma sunshine	*Blennosperma bakeri*	E	E	1B	Valley foothill grassland, vernal pools; Mar-May
Big tarplant	*Blepharizonia plumosa* ssp. *plumosa*	None	None	1B	Valley foothill grassland; Jul-Oct
Mount Diablo fairy-lantern	*Calochortus pulchellus*	None	None	1B	Chaparral, cismontane woodland, valley foothill grassland; Apr-Jun
Tiburon mariposa lily	*Calochortuns tiburonensis*	T	T	1B	Serpentine soils; Mar-Jun
Chaparral harebell	*Campanula exigua*	None	None	1B	Chaparral; May-Jun
Tiburon paintbrush	*Castilleja affinis* ssp. *neglecta*	E	T	1B	Serpentine soils; Apr-Jun
Holly-leaved ceanothus	*Ceanothus purpureus*	None	None	1B	Chaparral, cismontane woodland, often on volcanic substrates;Feb-Jun
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*	None	None	1B	Valley foothill grassland; Jan-Nov
San Francisco Bay spineflower	*Chorizanthe cuspidata var. cuspidata*	SC	None	1B	Coastal bluff scrub, coastal dunes, coastal prairies, coastal scrub; Apr-Aug
Robust spineflower	*Chorizanthe robusta var. robusta*	E	None	1B	Cismontaine woodland, coastal dunes, coastal scrub; Apr-Sep
Sonoma spineflower	*Chorizanthe valida*	E	E	1B	Sandy coastal prairie; Jun-Aug
Franciscan thistle	*Cirsium andrewsii*	None	None	1B	Broadleaved upland forest, coastal bluff scrub, sometimes serpentite soils; Mar-Jul
Fountain thistle	*Cirsium fontinale* var. *foninale*	E	E	1B	Chaparral, grassland; serpentinite seeps; Jun-Oct

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Suisun Thistle	*Cirsium hydrophilum* var. *hydrophilum*	E	None	1B	Salt marshes and swamps; Jul-Sep
Mt. Tamalpais thistle	*Cirsium hydrophilum* var. *vaseyi*	None	None	1B	Broadleaved coniferous forest, chaparral, serpentite seeps; May-Aug
Compact cobwebby thistle	*Cirsium occidentale* var. *compactum*	SC	None	1B	Chaparral, coastal dunes; Apr-Jun
Presidio clarkia	*Clarkia franciscana*	E	E	1B	Coastal scrub, grassland; serpentine; May-Jul
South Bay clarkia	*Clarkia concinna* ssp. *automixa*	SC	None	1B	Cismontane woodlands; Apr-Jul
Round-headed Chinese houses	*Collinsia corymbosa*	None	None	1B	Coastal dunes; Apr-Jun. Believed by the CNPS to be extirpated from the San Francisco North USGS quadrangle.
San Francisco collinsia	*Collinsia multicolor*	None	None	1B	Closed cone coniferous forest, coastal scrub, sometimes serpentite soils; Mar-May
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *palustris*	SC	None	1B	Coastal salt marshes; Jun-Oct
Hispid bird's-beak	*Cordylanthus mollis* ssp. *hispidus*	None	None	1B	Alkaline meadows, playas, valley foothill grassland; Jun-Sep
Soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	E	Rare	1B	Coastal salt marsh; Jul-Nov
Mount Diablo bird's-beak	*Cordylanthus nidularius*	None	Rare	1B	Serpentite soils in chaparral; Jul-Aug
Hoover's cryptantha	*Cryptantha hooveri*	None	None	1B	Valley foothill grassland; Apr-May
Santa Cruz cypress	*Cupressus abramsiana*	E	E	1B	Coniferous forest, chaparral, lower montane coniferous forest; sandstone or granitic
Clustered lady's-slipper	*Cypripedium fasciculatum*	SC	None	4	Coniferous forest; usually serpentinite seeps, streambanks; Mar-Jul
Hospital Canyon larkspur	*Delphinium californicum* ssp. *interius*	None	None	1B	Chaparral, cismontane woodland; Apr-Jun
Western leatherwood	*Dirca occidentalis*	None	None	1B	Broadleaved coniferous forest, closed cone coniferous forest, chaparral, cismontane woodland; Jan-Apr
San Mateo woolly	*Eriophyllum latilobum*	E	E	1B	Cismontane woodland; serpentinite; May-Jun

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
sunflower					
Ben Lomond buckwheat	*Eriogonum nudum* var. *decurrens*	None	None	1B	Chaparral, cismontane woodland, lower montane coniferous forest; Jun-Oct
San Mateo woolly sunflower	*Eriophyllum latilobum*	E	E	1B	Serpentite soils in cismontane woodlands; May-Jun
Hoover's button celery	*Eryngium aristulatum* var. *hooveri*	SC	None	4	Vernal pools; Jul
Coast wallflower	*Erysimum ammophilum*	SC	None	1B	Chaparral, coastal dunes, coastal scrub; sandy, openings; Feb-Jun
Contra Costa wallflower	*Erysimum capitatus* ssp. *angustatum*	E	E	1B	Inland dunes; Mar-Jul
San Francisco wallflower	*Erysimum fransiscanum*	SC	None	4	Coastal dunes, coastal scrub, grassland; often serpentinite or granitic; Mar-Jun
Diamond-petaled California poppy	*Eschscholzia rhombipetala*	None	None	1B	Alkaline soils in valley foothill grasslands; Mar-Apr
N/A	*Fissidens pauperculus*	None	None	1B	North coast coniferous forest; moss
Hillsborough chocolate lily	*Fritillaria biflora* var. *ineziana*	None	None	1B	Cismontane woodland, grassland; serpentinite; Mar-Apr
Marin checker lily	*Fritillaria lanceolata* var. *tristulis*	None	None	1B	Coastal bluff scrub, prairie scrub; Feb-Apr
Fragrant fritillary	*Fritillaria liliacea*	SC	None	1B	Coastal prairie, coastal scrub, grassland; often serpentinite; Feb-Apr
Dune gilia	*Gilia capitata ssp. chamissonis*	None	None	1B	Coastal dunes, coastal scrub; Apr-Jul
Woolly-headed gilia	*Gilia capitata* ssp. *tomentosa*	None	None	1B	Rocky outcrops in coastal bluff scrub; May-Jul
Dark-eyed gilia	*Gilia millefoliata*	None	None	1B	Coastal dunes; Apr-Jul
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	SC	None	1B	Coastal bluff scrub, coastal scrub, grassland; sandy, serpentinite; Aug-Sept
Marsh gumplant	*Grindelia stricta* var. *angustifolia*	None	None	4	Coastal salt marsh, northern coastal scrub; Aug-Sep
Diablo helianthella	*Helinathella castanea*	SC	None	1B	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub,

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
					riparian woodland, grassland; Apr-Jun
Tiburon tarplant	*Hemizonia multicaulis* ssp. *vernalis*	SC	None	None	Annual grassland
Pappose spikeweed	*Hemizonia parryi* ssp. *congdonii*	SC	None	1B	Grasslands; alkaline
Brewer's western flax	*Hesperolinon breweri*	None	None	1B	Chaparral, cismontane, serpentite soils in valley foothill grassland; May-Jul
Marin dwarf flax	*Hesperolinon congestum*	T	T	1B	Chaparral, grassland; serpentinite; Apr-Jul
Loma Preita hoita	*Hoita strobilina*	None	None	1B	Chaparral, serpentite soils in cismontane woodland; May-Oct
Santa Cruz tarplant	*Holocarpha macradenia*	T	E	1B	Coastal prairie, grasslands; often clay; Jun-Oct
Kellogg's (wedge-leaved) horkelia	*Horkelia cuneata* ssp. *sericea*	SC	None	1B	Coniferous forest, chaparral, coastal scrub; Apr-Sep
Point Reyes horkelia	*Horkelia marinensis*	SC	None	1B	Coastal dunes, coastal prairie, coastal scrub; sandy; May-Sept
Thin-lobed horkelia	*Horkelia tenuiloba*	None	None	1B	Broad leaved forest, chaparral; May-Jul
Carquinez goldenbush	*Isocoma arguta*	None	None	1B	Alkaline valley foothill grassland; Aug-Dec
Northern California black walnut	*Juglands hindsii*	None	None	1B	Riparian forest and woodland; Apr-May
Contra Costa goldfields	*Lasthenia conjugens*	E	None	1B	Grasslands, vernal pools; Mar-Jul
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*	SC	None	1B	Freshwater and brackish water marshes; May-Jun
Beach layia	*Layia carnosa*	E	E	1B	Coastal dunes, coastal scrub; Mar-Jul
Legenere	*Legenere limosa*	SC	None	1B	Vernal pools; Apr-Jun
Crystal Springs lessingia	*Lessingia arachnoidea*	SC	None	1B	Cismontane woodland, coastal scrub, grassland; serpentinite; Jul-Oct
San Francisco lessingia	*Lessingia germanorum*	E	E	1B	Coastal scrub, remnant dunes; Jun-Nov
Tamalpais lessingia	*Lessingis micradenia* var. *micradenia*	None	None	1B	Chaparral, serpentite soils in valley foothill grassland; Jun-Oct
Mason's lilaeopsis	*Lilaeopsis masonii*	None	Rare	1B	Brackish and freshwater marshes and swamps; Apr-Nov
Coast yellow linanthus	*Linanthus croceus*	None	None	1B	Coastal bluff scrub, prairie; May

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
San Mateo tree lupine	*Lupinus arboreus* var. *eximius*	SC	None	3	Chaparral, coastal scrub; Apr-Jul
Showy madia	*Madia radiata*	None	None	1B	Cismontane woodland, valley foothill grassland; Mar-May
Arcuate bush mallow	*Malacothamnus arcuatus*	None	None	1B	Chaparral; Apr-Sep
Hall's bush mallow	*Malacothamnus hallii*	None	None	1B	Chaparral, coastal scrub; May-Sep
Oregon meconella	*Meconella oregana*	None	None	1B	Coastal prairie, coastal scrub; Mar-Apr
Marsh microseris	*Microseris paludosa*	None	None	1B	Closed cone coniferous forest, cismontane woodland; Apr-Jun
Baker's navarretia	*Navarretia leucocephala* ssp. *bakeri*	None	None	1B	Cismontane woodland, lower montane woodland; May-Jul
Prostrate navarretia	*Navarretia prostrata*	None	None	1B	Coastal scrub, alkaline valley foothill grassland, coniferous forest; Apr-Jul
Marin County navarretia	*Navarretia rosulata*	None	None	1B	Coastal scrub, alkaline valley foothill grassland; Apr-Jun
Colusa grass	*Neostapfia colusana*	T	E	1B	Vernal pools; Mar-Aug
Antioch Dunes evening-primrose	*Oenothera deltoides* ssp. *howellii*	E	E	1B	Inland dunes; Mar-Sep
Dudley's lousewort	*Pedicularis dudleyi*	SC	R	1B	Chaparral, cismontane woodland, coniferous forest, grassland; Apr-Jun
White-rayed pentachaeta	*Pentachaeta belliciflora*	E	E	1B	Valley and foothill grassland; often serpentinite; Mar-May
Mount Diablo phacelia	*Phacelia phacelioides*	None	None	1B	Chaparral, cismontane woodland; Apr-May
Choris's popcornflower	*Plagiobothrys chorisianus* var. *chorisianus*	None	None	1B	Chaparral, coastal prairie; Mar-Jun
San Francisco popcornflower	*Plagioobothrys diffusus*	None	E	1B	Coastal prairie, valley and foothill grasslands; Apr-Jun
North Coast semaphore grass	*Pleuropogon hooverianus*	None	None	1B	Broadleaved upland forest, meadows, freshwater marshes and swamps; May-Aug
Hickman's potentilla (cinquefoil)	*Potentilla hickmanii*	E	E	1B	Coastal bluff scrub, coniferous forest, vernally mesic meadows, freshwater marsh; Apr-Aug
Tamalpais oak	*Quercus parvula* var. *tamalpaisensis*	None	None	1B	Lower montane coniferous forest; Mar-Apr
Adobe sanicle	*Sanicula maritima*	None	None	1B	Chaparral, coastal prairie, meadows, grassland; serpentine soils; Feb-May

Table 3.5.4
Special-Status Species Potentially Occurring Within the WTA Ferry Service Expansion Area

Common Name	Scientific Name	Status			Supporting Habitat/Flowering Period
		Federal	State	CNPS	
Rock sanicle	*Sanicula saxatilis*	None	Rare	1B	Broadleaved coniferous forest, chaparral, valley foothill grassland; Apr-May
Point Reyes checkerbloom	*Sidalcea calycosa* ssp. *rhizomata*	None	None	1B	Freshwater marshes and swamps near coast; Apr-Sep
Marin checkermallow	*Sidalcea hickmanii* ssp. *viridis*	SC	None	1B	Chaparral; serpentinite; May-Jun
Mission Dolores campion	*Silene verecunda* ssp. *verecunda*	SC	None	1B	Open, grassy areas in sandy or rocky soils; Mar-Aug
Pacific cordgrass	*Spartina foliosa*	SC	None	None	Coastal salt marshes
Santa Cruz microseris	*Stebbinsoseris decipiens*	None	None	1B	Broadleaved coniferous forest, closed cone coniferous forest, chaparral; Apr-May
Most beautiful jewelflower	*Streptanthus albidus* ssp. *peramoenus*	SC	None	1B	Chaparral, grassland; serpentinite; Apr-Jun
Tamalpais jewelflower	*Steptanthus batrachopus*	None	None	1B	Closed cone coniferous forest, serpentite chaparral; Apr-Jun
Mt. Tamalpais jewelflower	*Streptanthus glandulosus* ssp. *pulchellus*	None	None	1B	Chaparral, serpentite valley foothill grassland; May-Jul
Mt. Diablo jewelflower	*Streptanthus hispidus*	None	None	1B	Chaparral, valley foothill grassland; Mar-Jun
Tiburon jewelflower	*Streptanthus niger*	E	E	1B	Serpentine soils; May-Jun
California sea blite	*Suaeda californica*	E	None	1B	Coastal salt marshes and swamps; Jul-Oct
Showy Indian clover	*Trifolium amoenum*	E	None	1B	Wet swales, grasslands and grassy hillsides; occasionally found on serpentine soils; Apr-Jun
Saline clover	*Trifolium depauperatum* var. *hydrophilum*	None	None	1B	Vernal pools, valley grassland, mixed evergreen forests; Apr-Jun
San Francisco owl's clover	*Triphysaria floribunda*	None	None	1B	Coastal prairie, coastal scrub, serpentite grassland; Apr-Jun
N/A	*Triquetrella californica*	None	None	1B	Coastal bluff scrub, coastal scrub; moss
Capper-fruited tropidocarpum	*Tropidocarpum capparideum*	SC	None	1A	Grasslands, alkaline hills; Mar-Apr

Notes:
Federal Status Codes:
E= Endangered. Species in danger of extinction throughout all or a significant portion of its range.
T = Threatened. Species likely to become endangered within the foreseeable future.
PE = Proposed for listing as endangered.
PT = Proposed for listing as threatened.
PD = Proposed for delisting.
C = Candidate for listing.
SC = Species of Concern

California Status Codes:
E= Endangered. Species whose continued existence in California is in jeopardy
T = Threatened. Species likely to become endangered within the foreseeable future.
SC = Species of Concern566
R = Rare. Plant species, although not presently threatened with extinction, that may become endangered in the foreseeable future.

California Native Plant Society Status Codes:
1A = Plants presumed extinct in California
1B = Plants that are rare, threatened or endangered in California and elsewhere.
2 = Plants that are rare, threatened or endangered in California, but more common elsewhere.
3 = Plants about which more information is needed.
4 = Plants of limited distribution.

Table 3.5.5
Acreage of Individual Eelgrass Beds in San Francisco/San Pablo Bay in 1989

Location	*Acres*
San Pablo Bay	124
Point Orient	3
Naval Supply Depot	12
Point Molate Beach	26
Toll Plaza, East	0.5
Toll Plaza, West	0.5
Point Richmond, North	7
Point Richmond, South	4
Richmond Breakwater, North	18
Richmond Breakwater, South	7
Emeryville	13
Alameda	55
Bay Farm, North	2
Bay Farm, South	4
Coyote Point	1
Richardson Bay	13
Angel Island	3
Belvedere Cove	5
Point Tiburon	1
Keil Cove	10
Paradise Cove, North	4
Paradise Cove, South	3
TOTAL ACRES	**316**

Source: NMFS SW Region. Wyllie-Echeverria and Rutten 1989 Administrative Report SWE-89-05



The study area was limited to the Bay and near-shore environments.

5 0 5 10 Kilometers

Scale 1:400,000

N

URS

Water Transit Authority Program EIR

Project No. 43-00066890

Biological Resources Study Area

Figure 3.5.1

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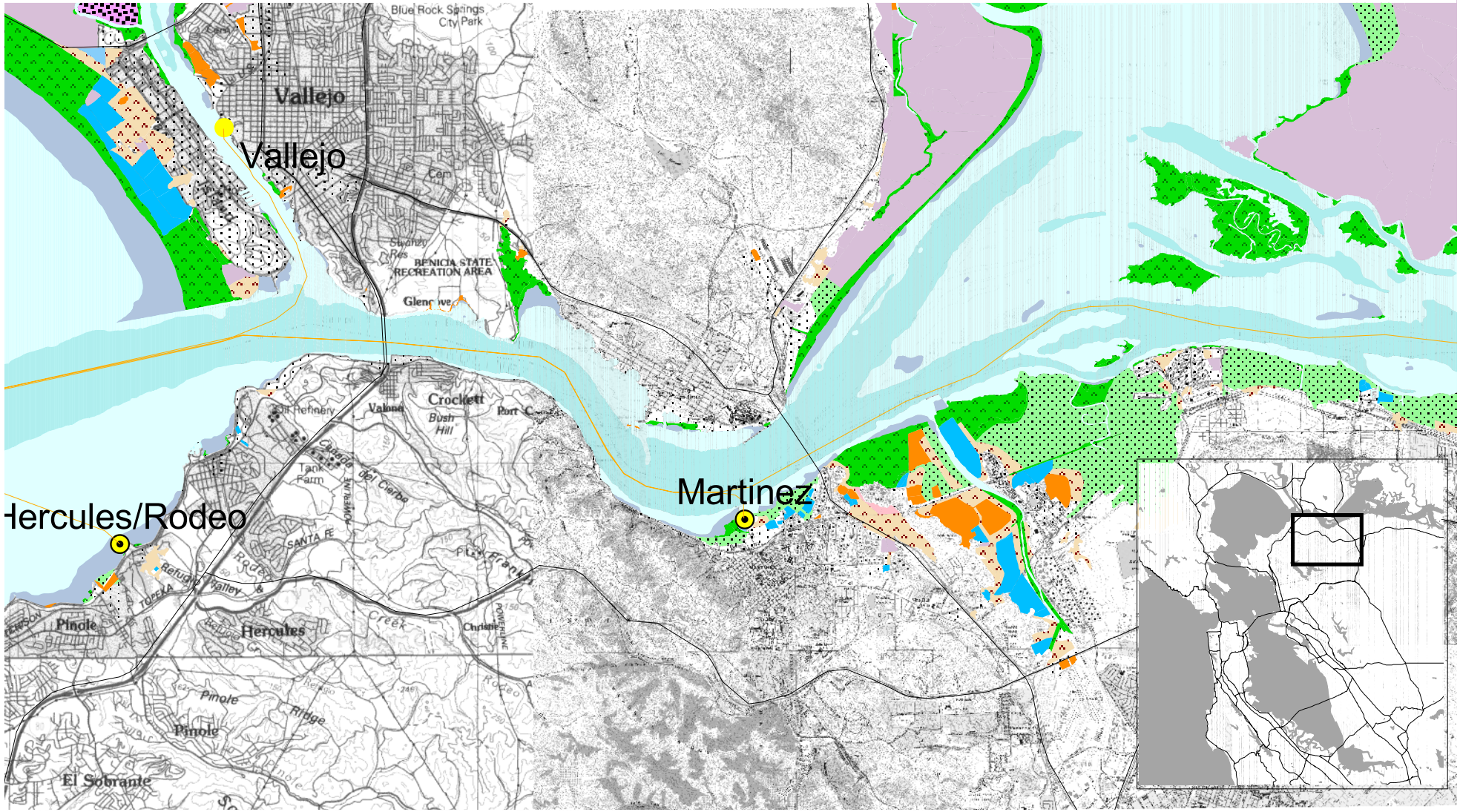

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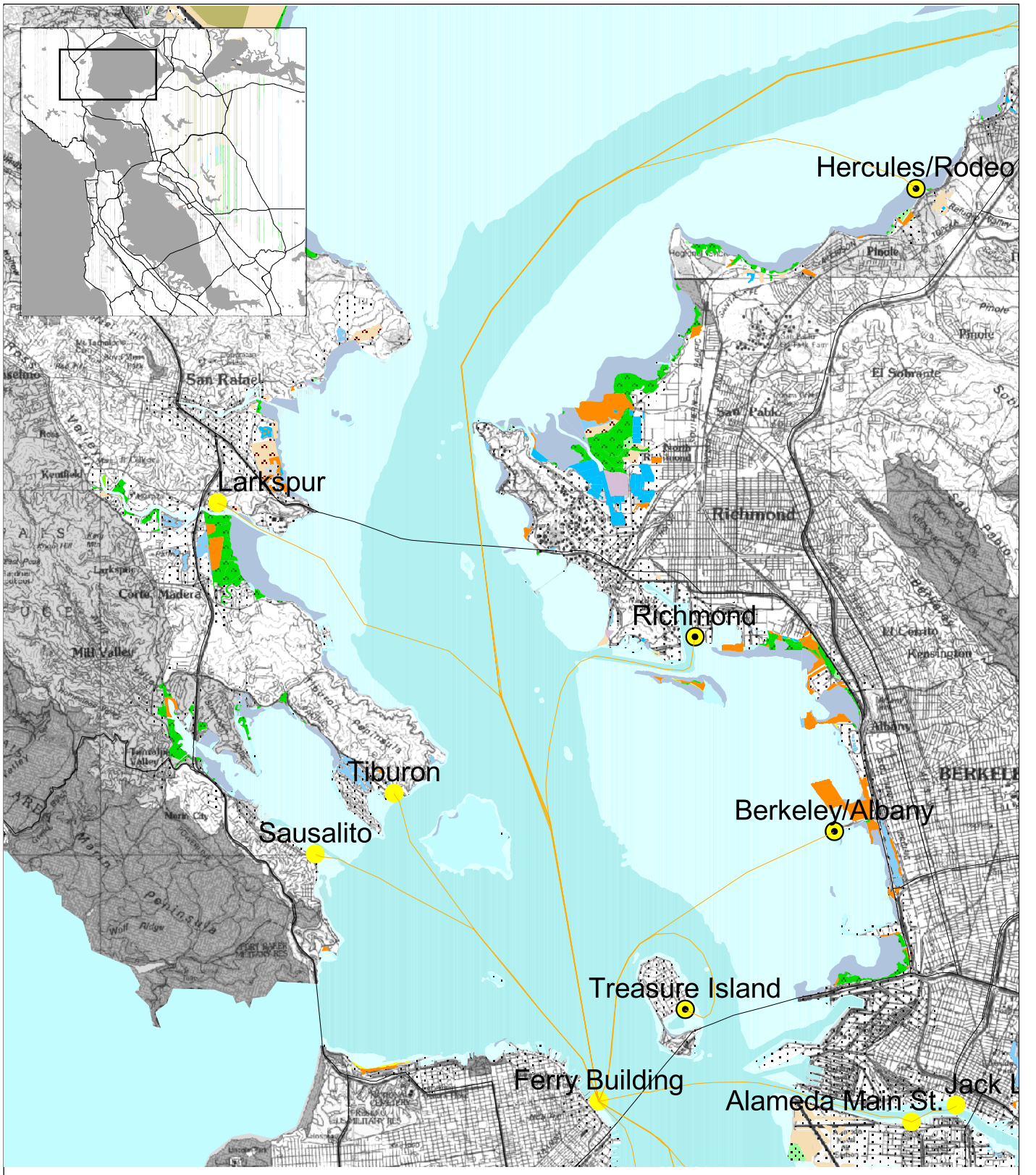
Project No. 43-00066890

HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - CARQUINEZ STRAIT

Source: Goals Project 1999

Figure 3.5.2

L:GIS/projects/wta/apr/habitat_types_updated_0503.apr



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Program EIR

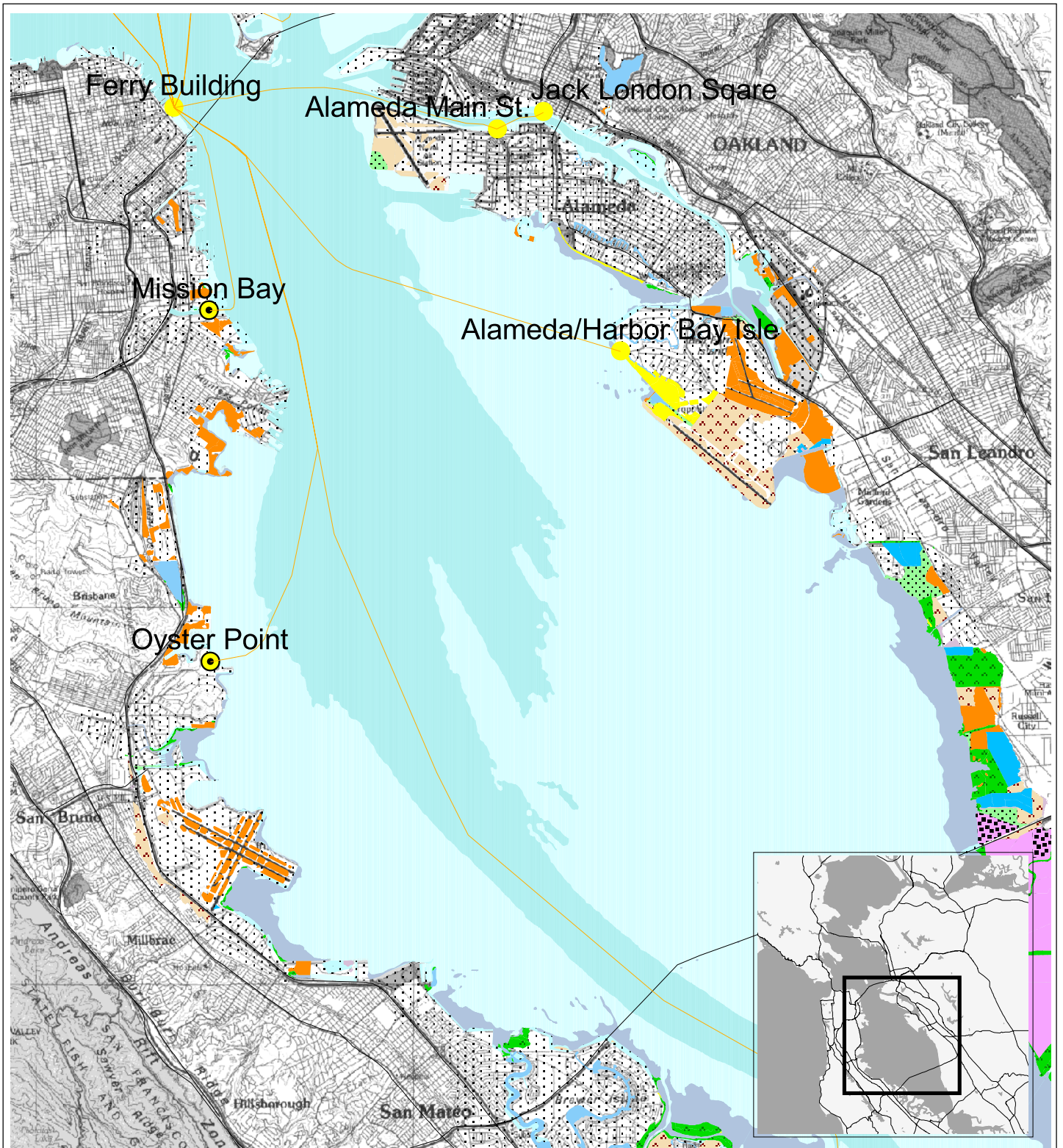
Project No. 43-00066890

Habitat Types for Existing and Potential Terminal Locations - Central Bay

Source: Goals Project 1999

Figure 3.5.3

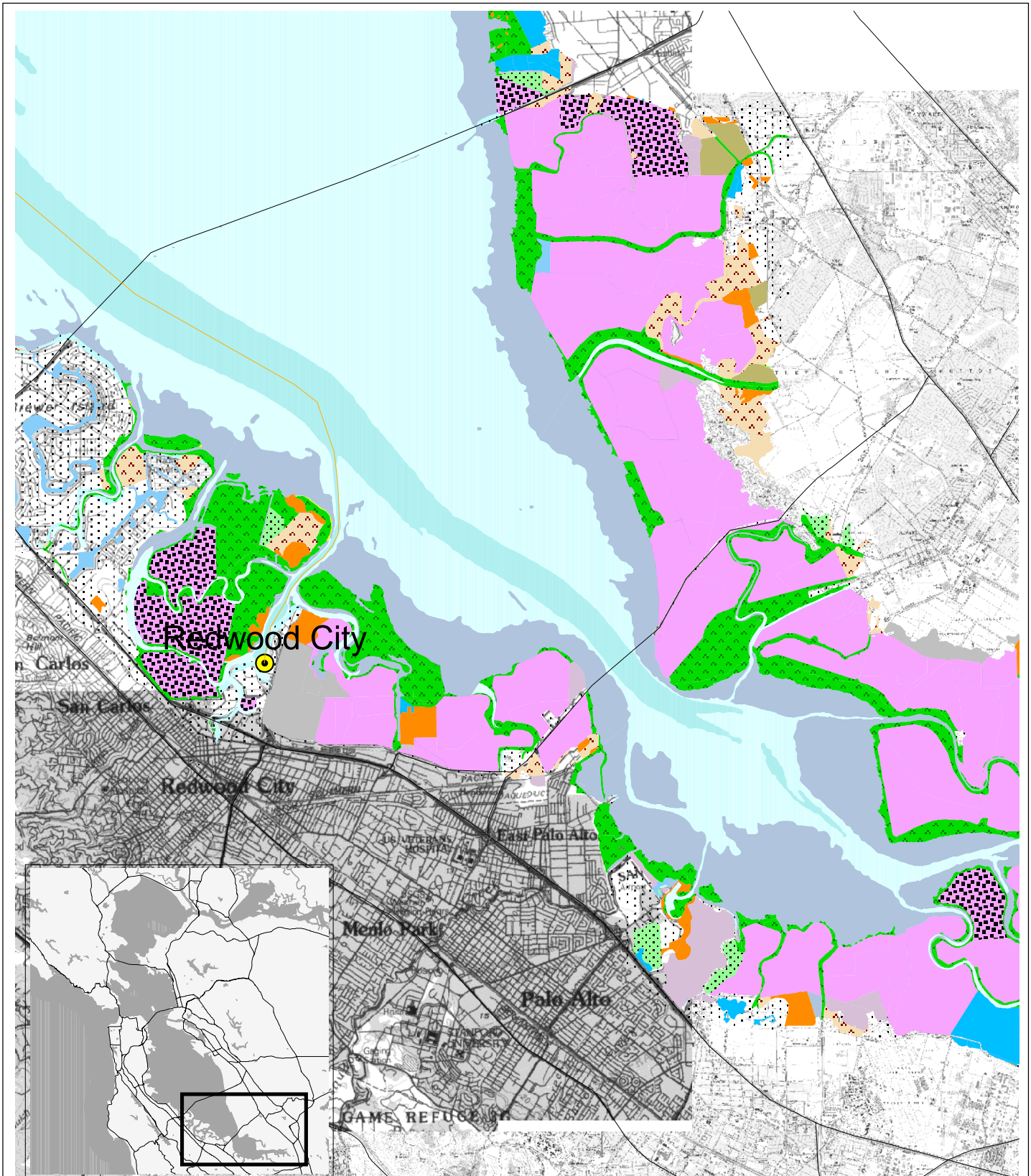
L:GIS/projects/wta/apr/habitat_types_updated_0503.apr



URS	Water Transit Authority Program EIR Project No. 43-00066890	HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - SOUTH BAY Source: Goals Project 1999

Figure 3.5.4

L:GIS/projects/wta/apr/habitat_types_updated_0503.apr



Lagoon
Muted Tidal Marsh
Salt Pond
Inactive Salt Pond
Tidal Marsh
Managed Marsh
Diked Marsh
Deep Bay
Shallow Bay
Bay Flat
Farmed Bayland
Storage Basin
Ruderal Bayland
Undeveloped Fill
Developed Island or Fill

Terminal Locations
Existing
Proposed

N
0.5 0 0.5 Miles
Scale 1:125,000

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Water Transit Authority
Program EIR

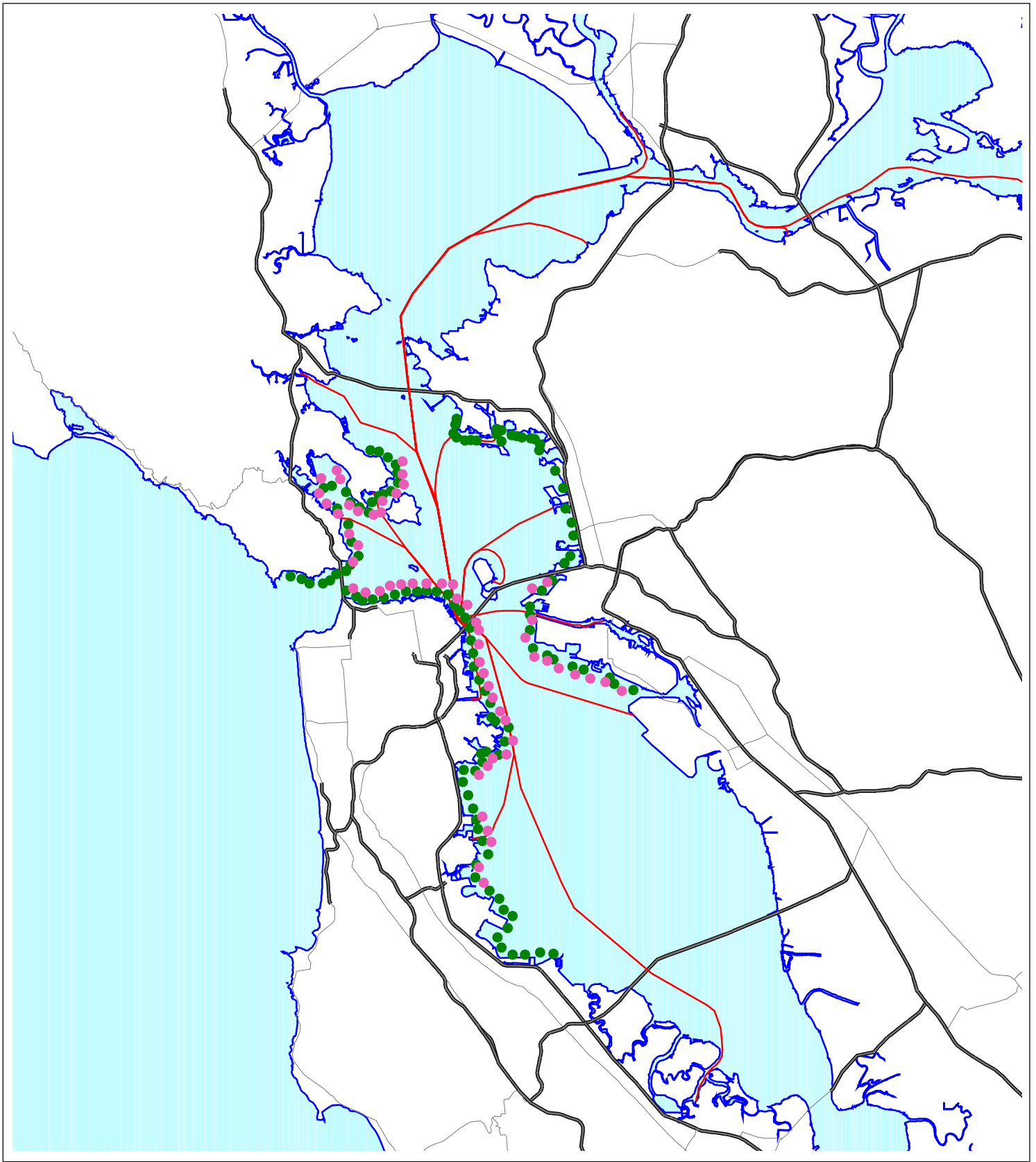
Project No. 43-0006689

HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - EXTREME SOUTH BAY

Source: Goals Project 1999

Figure
3.5.5

L:GIS/projects/wta/apr/habitat_types_updated_0503.apr



Legend

- Inclusive Since 1973
- Inclusive After 1980
- Transit Routes

Source: Griggin and Cherr, 2001; Herring spawning regions from Sratt, 1981 and CDF6 Pacific Herring Project, 1999. Sightings locations are approximate

1 0 1 2 Miles

Scale 1:300,000

N

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Project No. 43-00066890

HERRING SPAWNING REGIONS OF SAN FRANCISCO BAY

Figure 3.5.6

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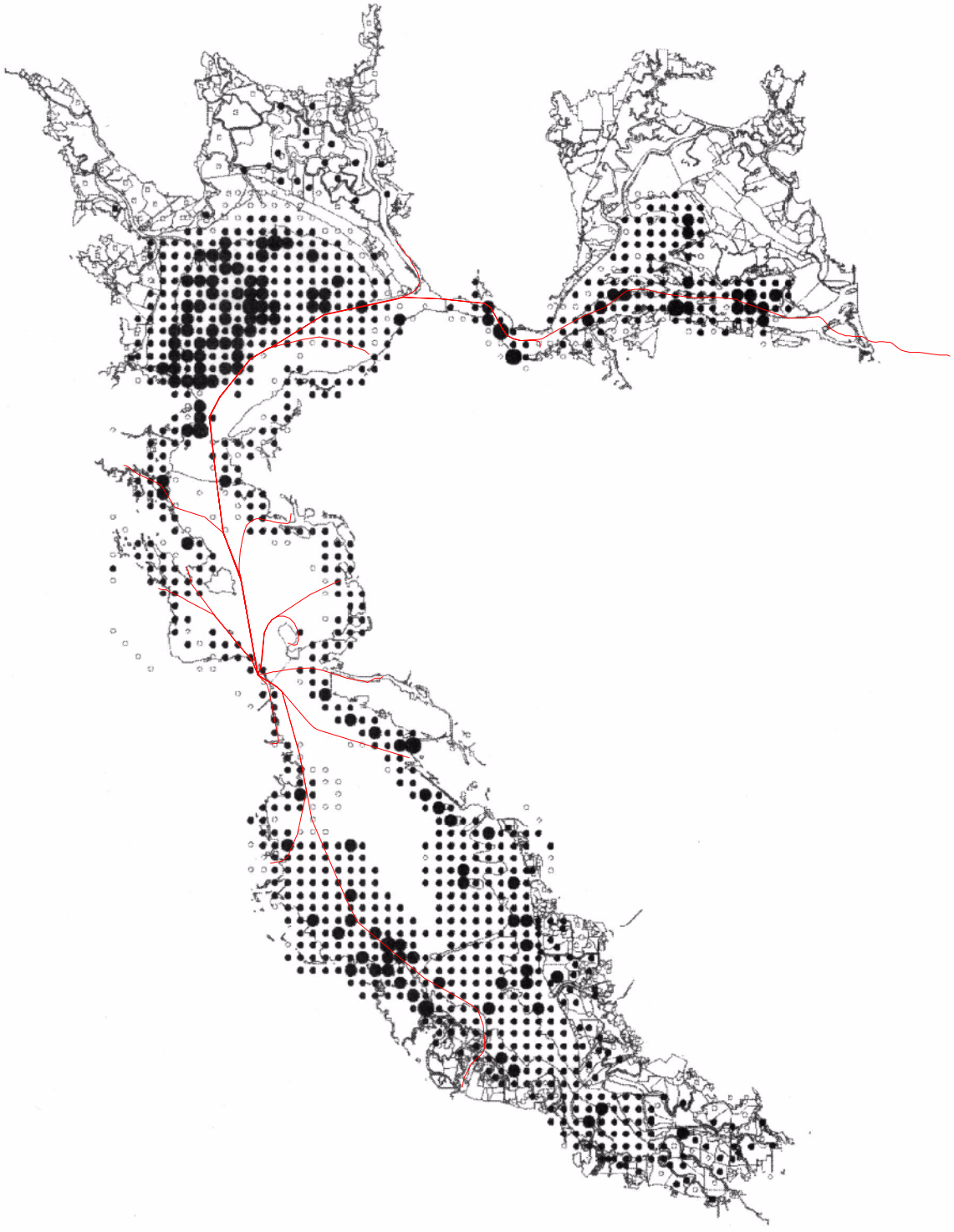

LEGEND

Transit Routes

Surf Scoter (USGS)
- 1 - 475
- 476 - 2525
- 2526 - 10000

Surf Scoter (DBWS)
- 1 - 4
- USGS Survey Site
- DBWS Survey Site

Source: Goals Project 2000
Count locations are approximate

0 9 Kilometers

N

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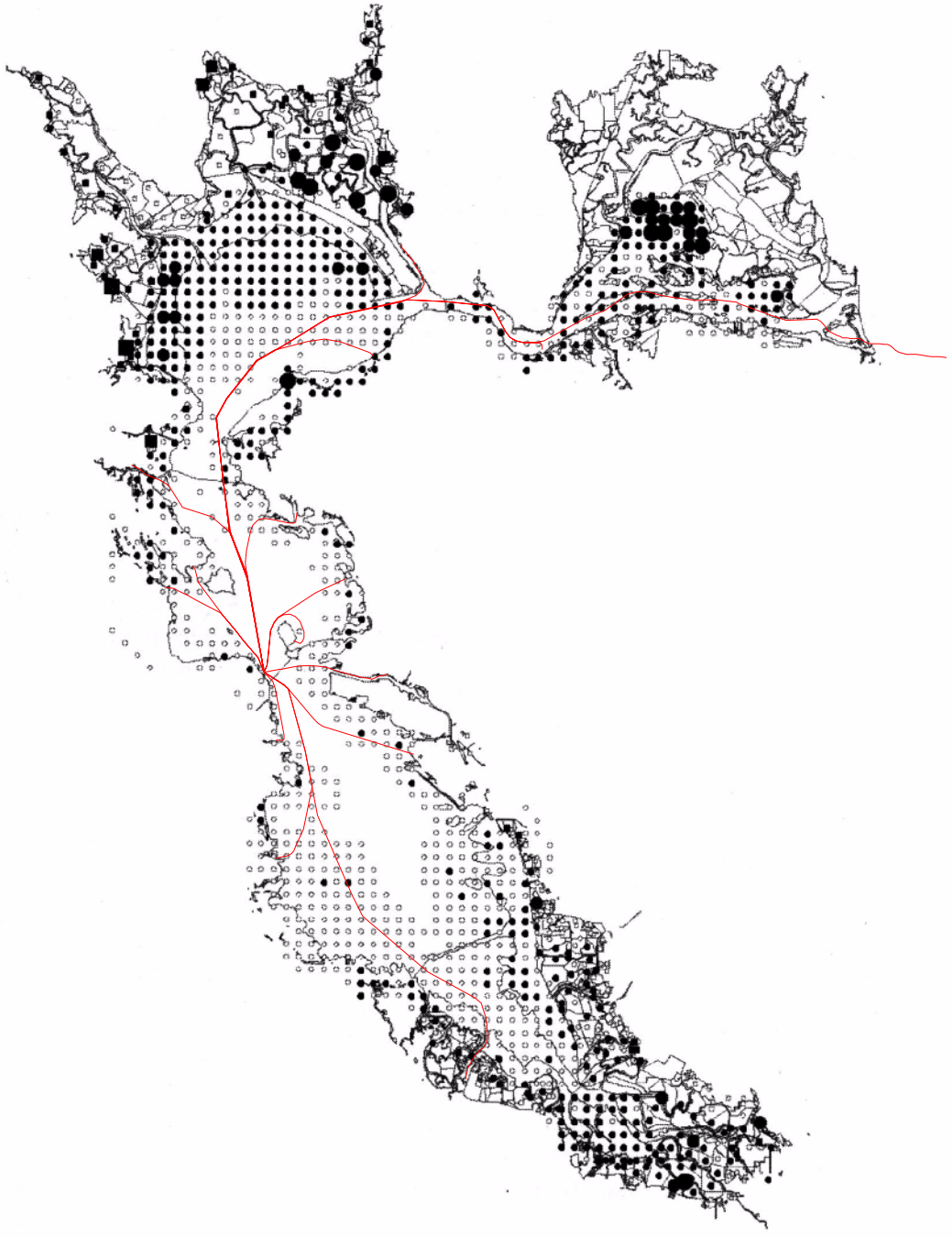
Program EIR

Project No. 28065624

MAXIMUM COUNTS OF SURF SCOTER

Figure
3.5.7



LEGEND

Canvasback (USGS)
- 1 - 450
- 451 - 1435
- 1436 - 5050
- Transit Routes

Canvasback (DBWS)
- 1 - 480
- 481 - 1125
- 1126 - 2425
- USGS Survey Site
- DBWS Survey Site

Source: Goals Project 2000
Count locations are approximate

0 8 Kilometers

N

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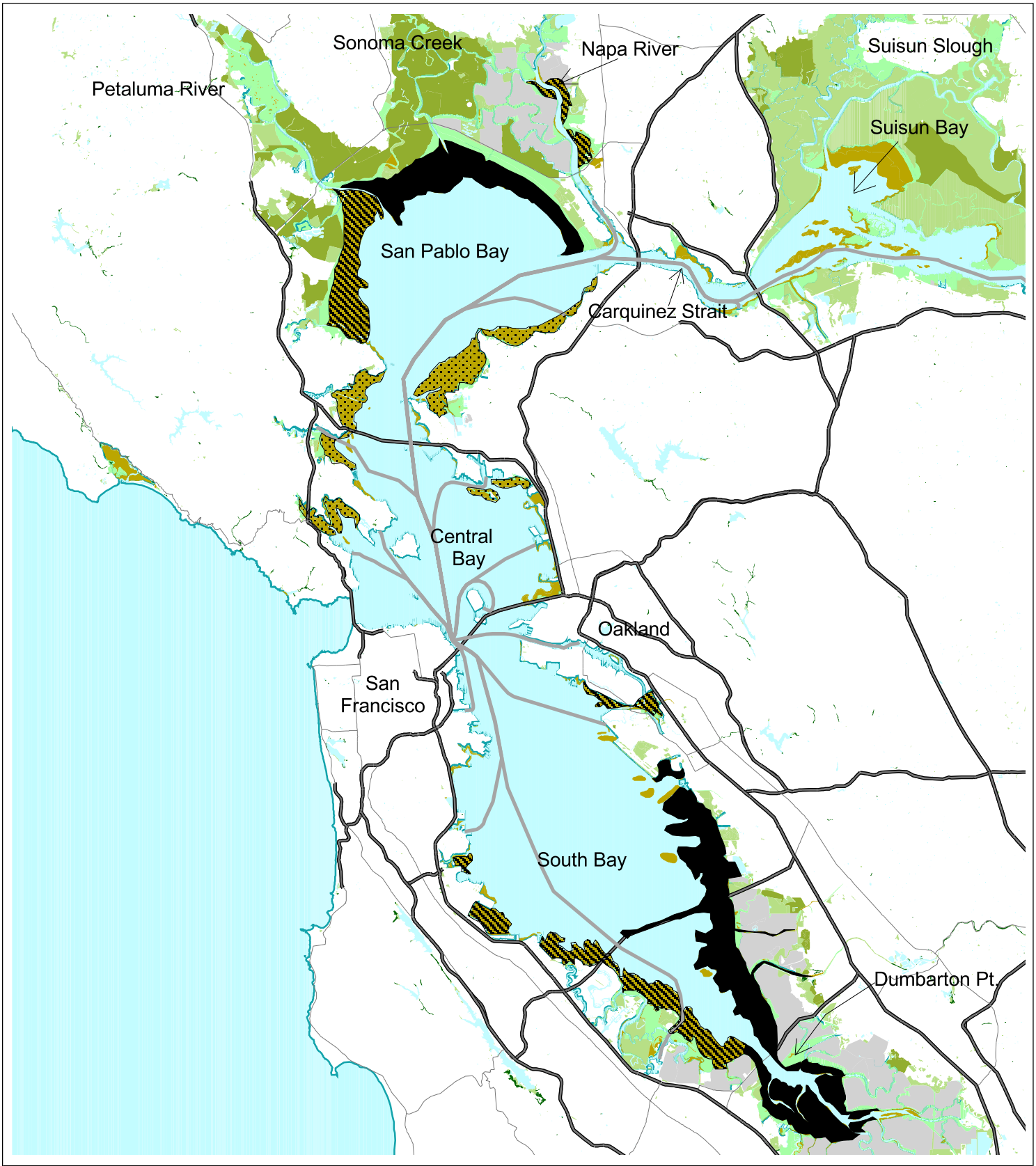
Water Transit Authority
Program EIR

Project No. 28065624

MAXIMUM COUNTS OF CANVASBACK

Figure
3.5.8



LEGEND

- High Use
- Medium Use
- Low Use

Source: Goals Project 2000

2 0 2 4 Miles

Scale 1:300,000

N

URS	Water Transit Authority Program EIR	RELATIVE USE OF DIFFERENT MUDFLAT AREAS BY SHOREBIRDS	Figure 3.5.9
	Project No. 43-00066890		

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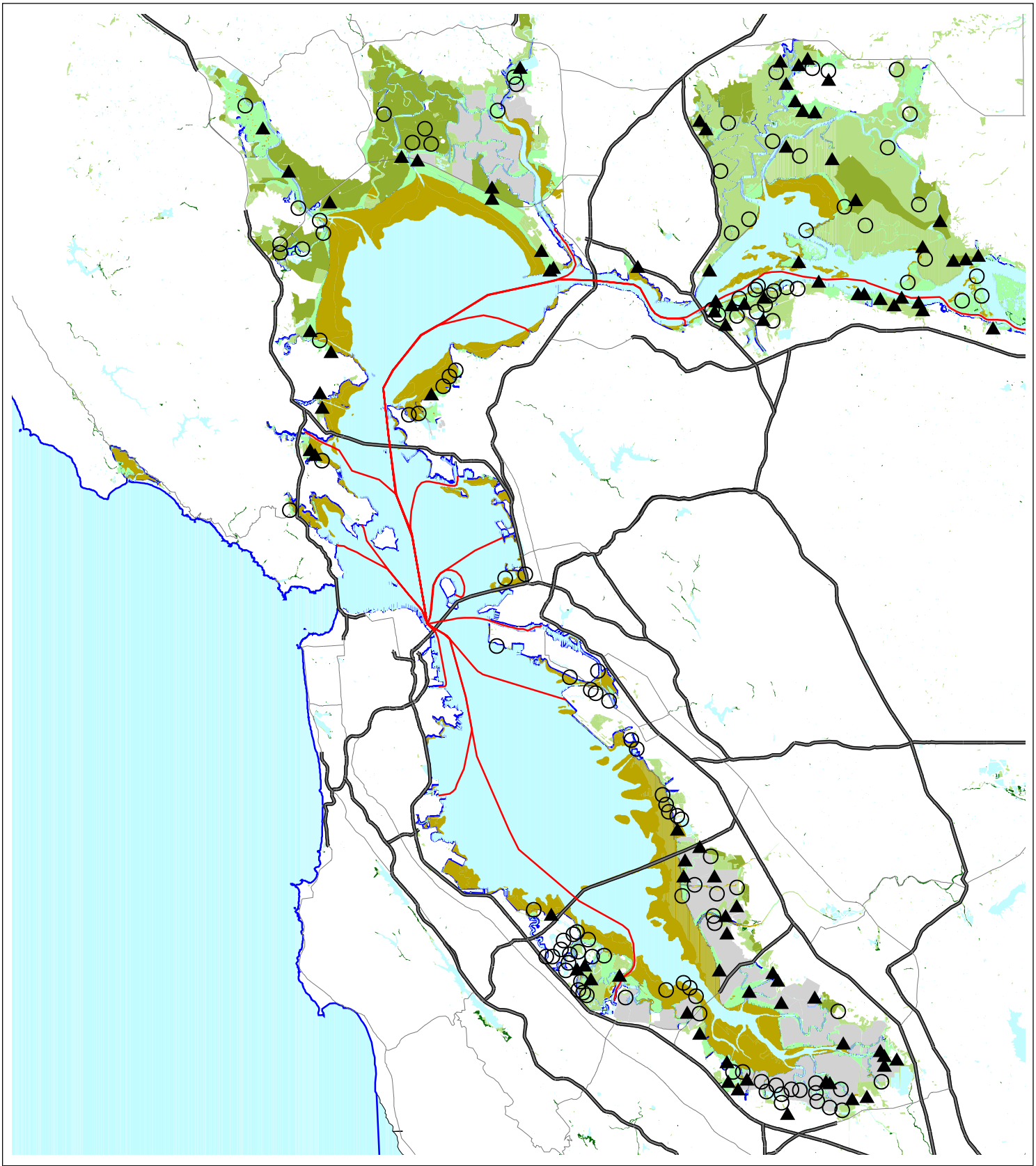

LEGEND

▲ Known presence

Transit Routes

○ Suitable Habitat

- Farmed wetlands
- Intertidal Mudflat and Rocky Shores
- Lakes and Ponds
- Open Water
- Riparian Woodland
- Salt Ponds
- Seasonal Wetlands
- Tidal Salt and Brackish Freshwater Marsh

Source: Goals Project 2001
Locations of harvest mouse habitat and presence are approximated

2 0 2 4 Miles

Scale 1:450,000

N

URS

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Project No. 43-00066890

SALT MARSH HARVEST MOUSE
Some Current Locations and Suitable Habitat

Figure
3.5.10

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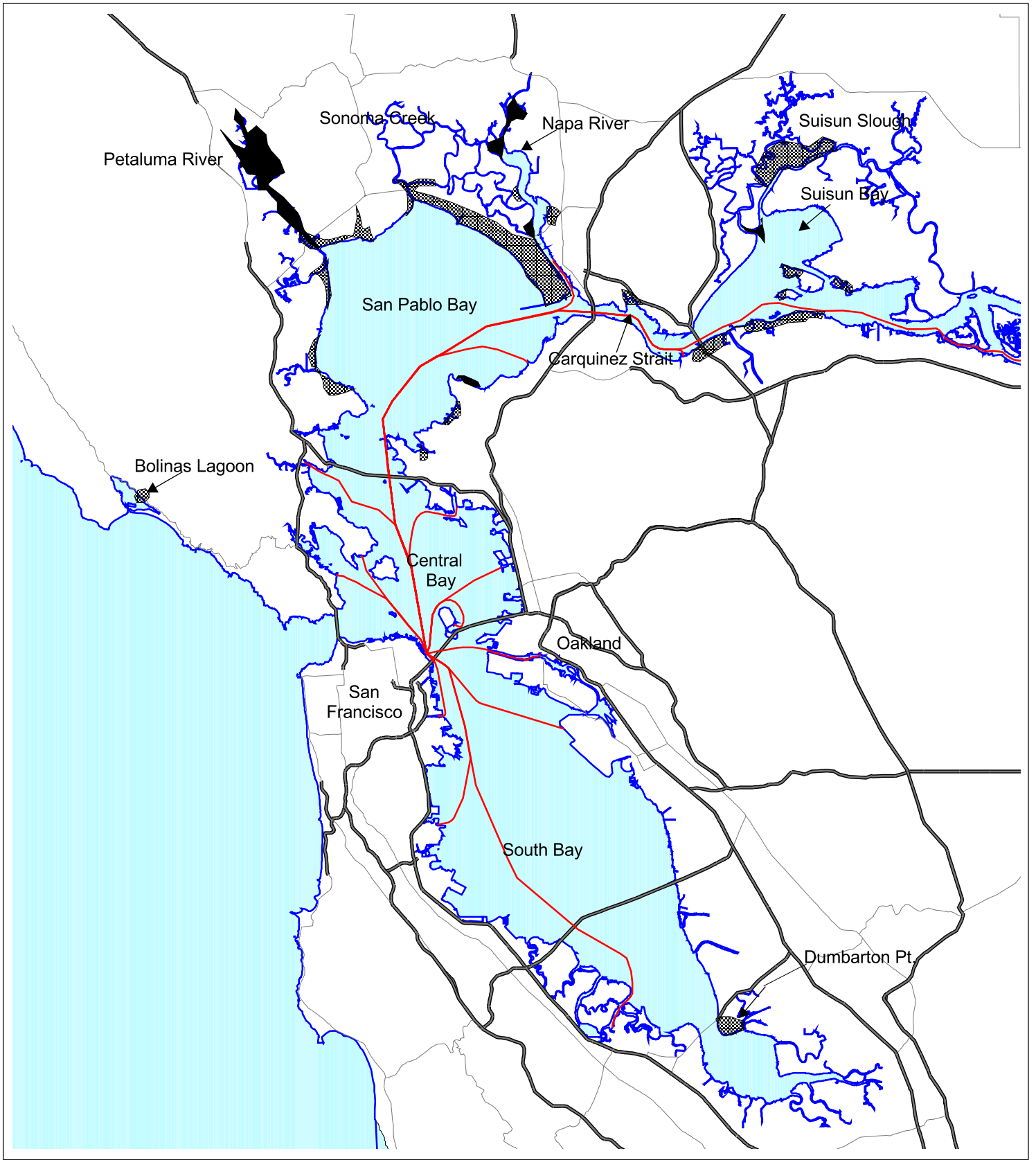

LEGEND

Low to Moderate Abundance

High Abundance

Note: areas of black rail distribution are approximated

Transit Routes

2 0 2 4 Miles

Scale 1:430,000

Source: Goals Project 2001
Abundance areas are approximate

N

URS	Water Transit Authority Program EIR	DISTRIBUTION AND RELATIVE ABUNDANCE OF BLACK RAIL (Laterallus jamaicensis coturniculus) IN SAN FRANCISCO BAY REGION	Figure 3.5.11
	Project No. 43-00066890		

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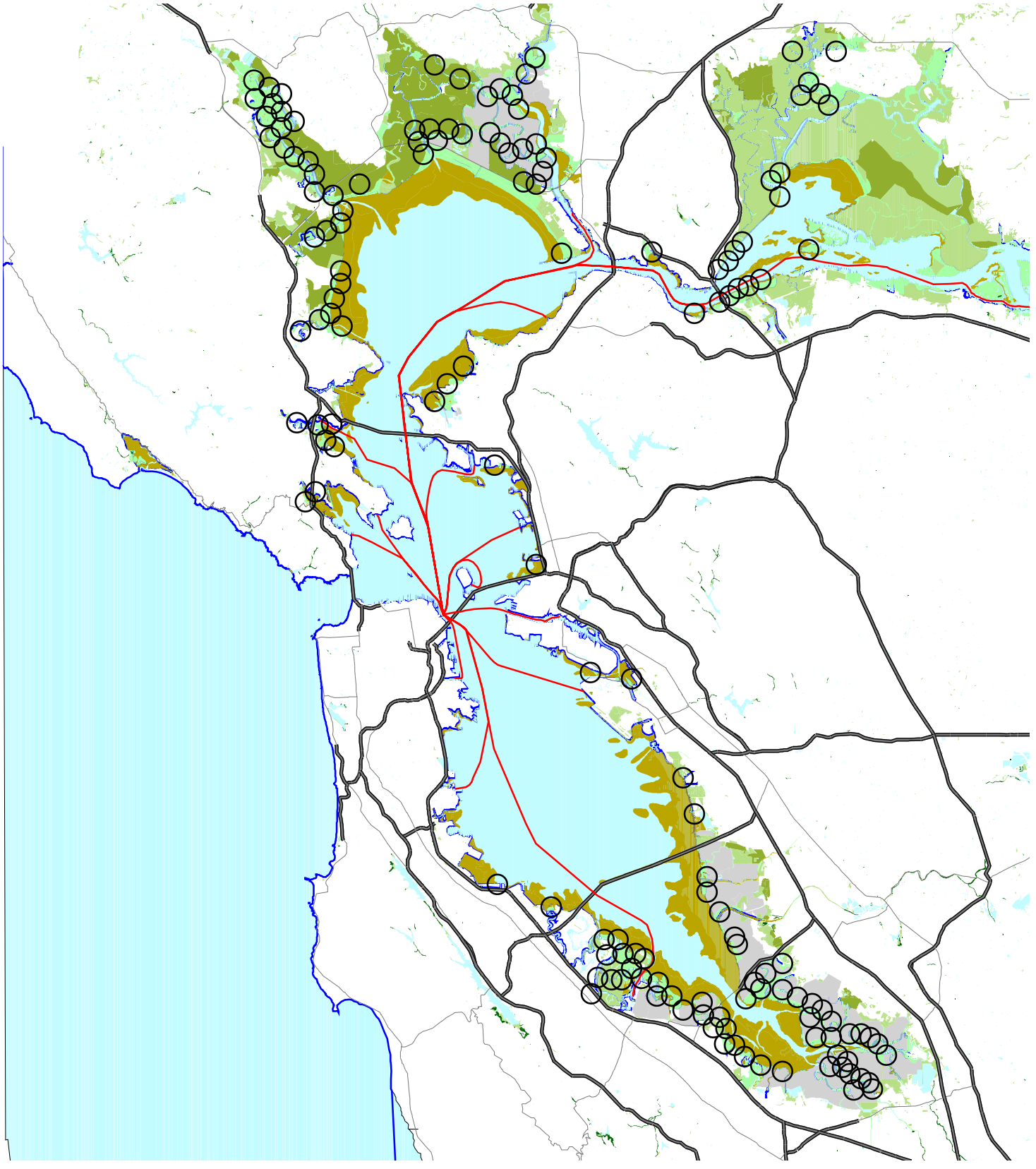

LEGEND

Clapper Rail Distribution

Transit Routes

Farmed wetlands
Intertidal Mudflat and Rocky Shores
Lakes and Ponds
Open Water

Riparian Woodland
Salt Ponds
Seasonal Wetlands
Tidal Salt and Brackish Freshwater Marsh

Source: Goals Project 1999
Locations of clapper rail distribution are approximate

2 0 2 4 Miles

Scale 1:450,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

KNOWN DISTRIBUTION OF THE CALIFORNIA CLAPPER RAIL

Figure
3.5.12

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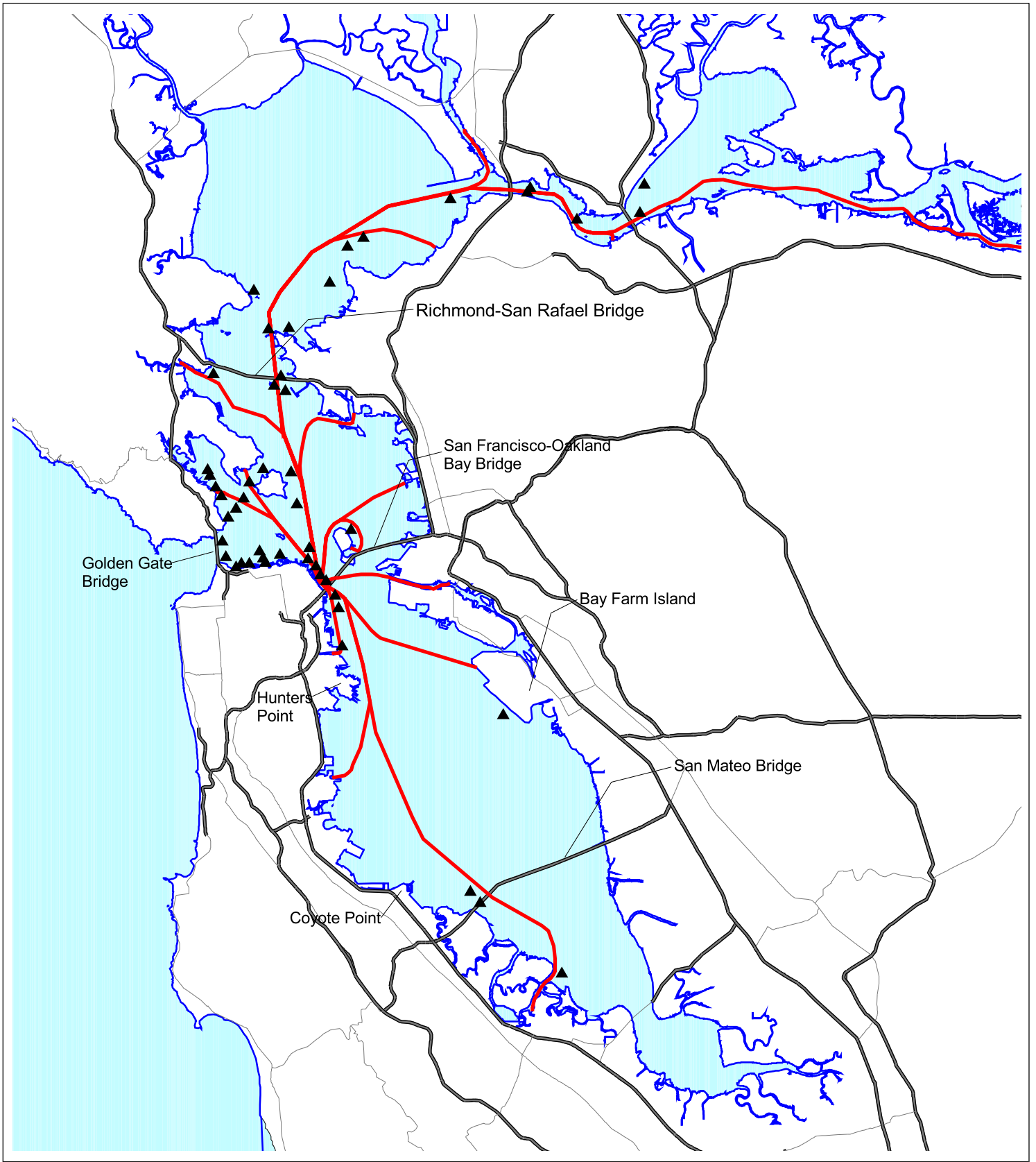

LEGEND

▲ Gray Whale Sightings

Source: The Oceanic Society
Sightings locations are approximate

2 0 2 4 Miles

Scale 1:500,000

N

URS	Water Transit Authority Program EIR	SIGHTINGS OF GRAY WHALES IN SAN FRANCISCO BAY (Spring 2000)	Figure 3.5.13
	Project No. 43-00066890		

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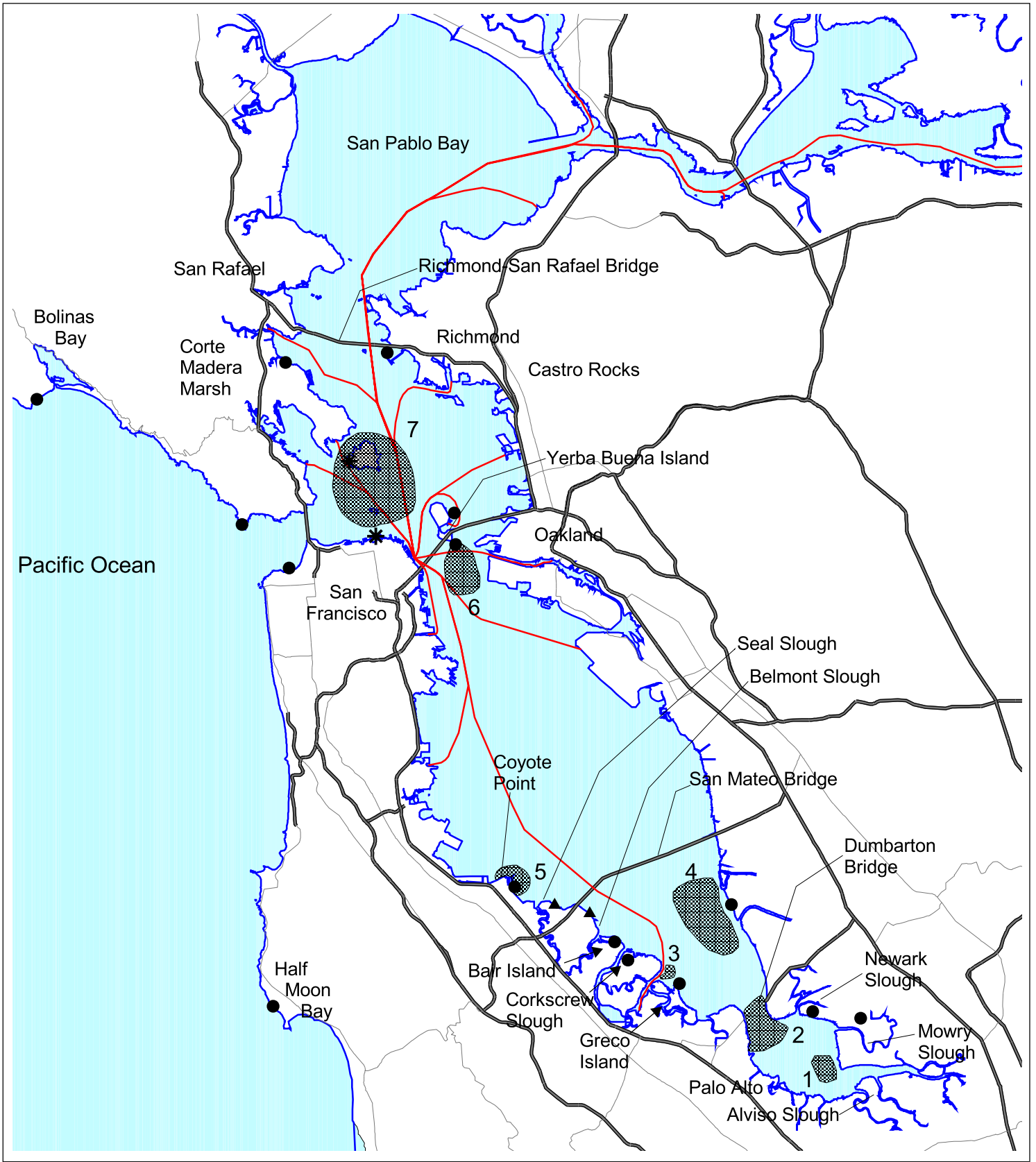

LEGEND

Transit Routes

Harbor Seal Feeding Areas (1-7)

Active Harbor Seal Haul-out Sites

Abandoned Harbor Seal Haul-out Sites

Active California Sea Lion Haul-out Sites

Sources:

Harbor Seal Information

Harvey and Torok (1994)
Kopec and Harvey (1995)
Allen (1999)

California Sea Lion Information

Goals Project (2000)

Feeding areas and haul-out sites are approximate

2 0 2 4 Miles

Scale 1:400,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

HARBOR SEAL AND CALIFORNIA SEA LION
HAUL-OUT SITES AND
FEEDING AREAS IN THE
SAN FRANCISCO BAY AREA

Figure
3.5.14

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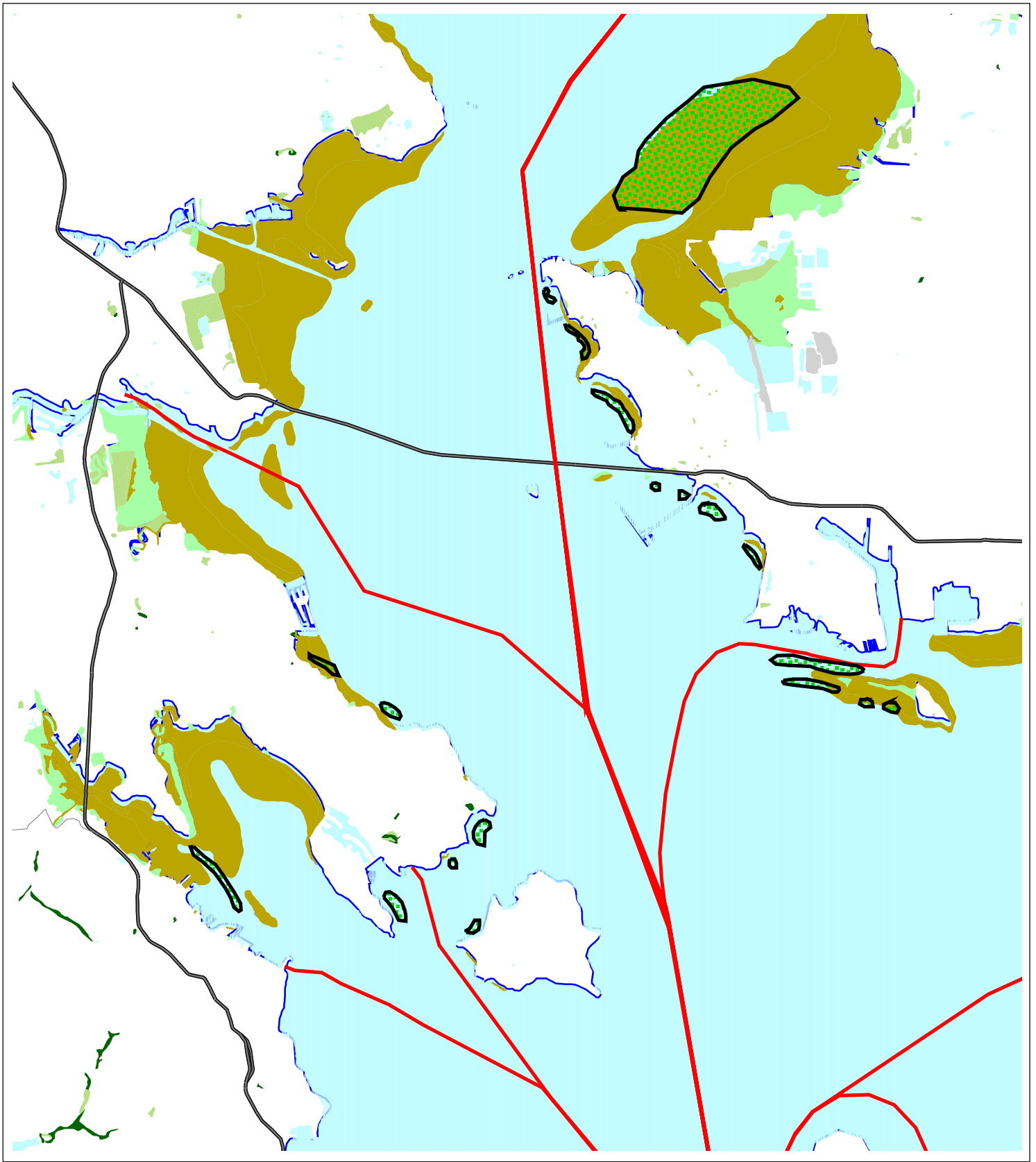

LEGEND

Location of Eelgrass Beds

Transit Routes

Farmed wetlands
Intertidal Mudflat and Rocky Shores
Lakes and Ponds
Open Water
Riparian Woodland
Salt Ponds
Seasonal Wetlands
Tidal Salt and Brackish Freshwater Marsh

Source: National Marine Fisheries Service 1989
Locations and areas of eelgrass beds are approximated

0.5 0 0.5 1 Miles

Scale 1:123,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

LOCATIONS OF EELGRASS BEDS - NORTH BAY

Figure
3.5.15

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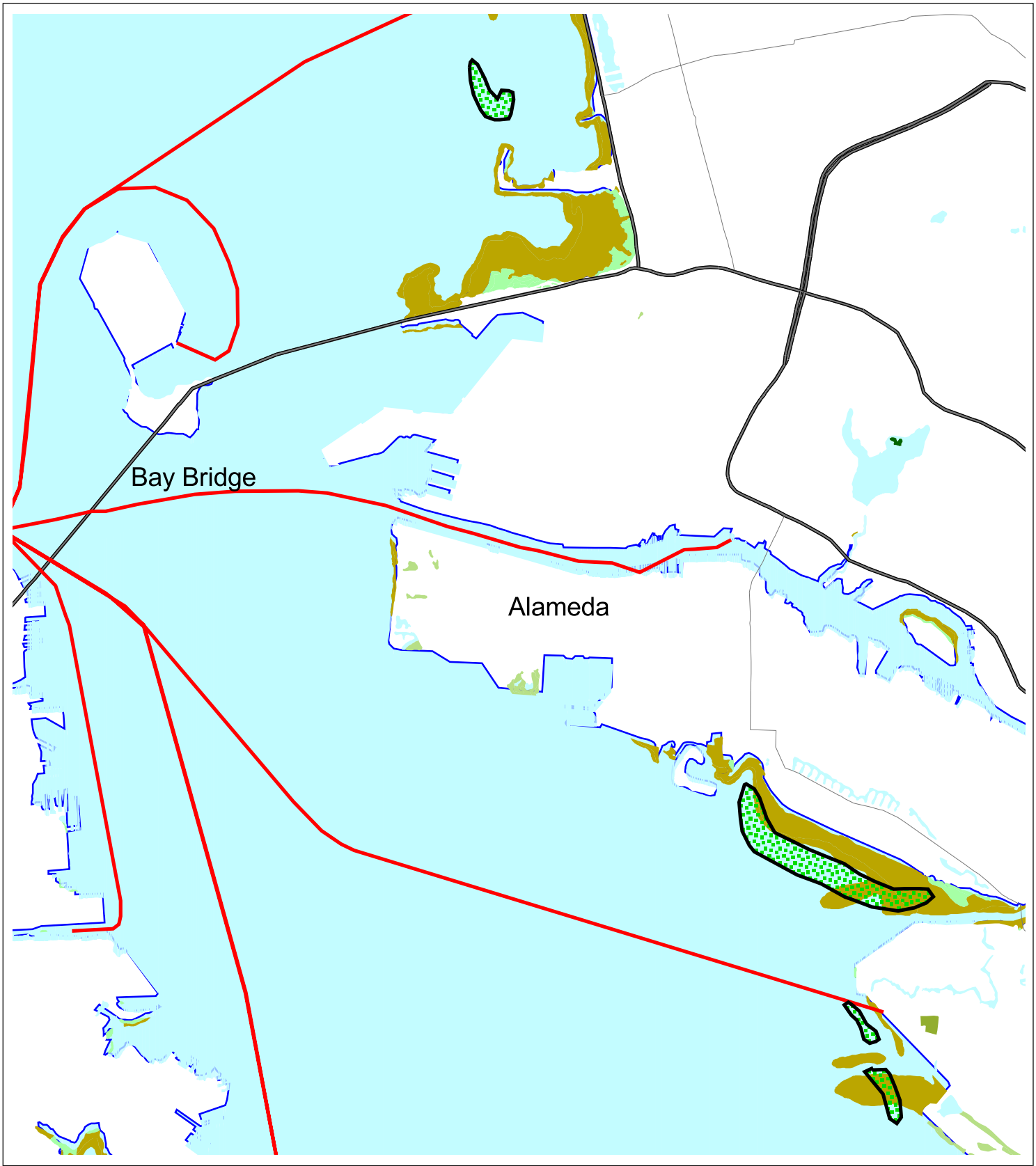

LEGEND

Location of Eelgrass Beds

Transit Routes

Farmed wetlands
Intertidal Mudflat and Rocky Shores
Lakes and Ponds
Open Water
Riparian Woodland
Salt Ponds
Seasonal Wetlands
Tidal Salt and Brackish Freshwater Marsh

Source: National Marine Fisheries Service 1989
Locations and areas of eelgrass beds are approximated

0.5 0 0.5 1 Miles

Scale 1:100,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

LOCATIONS OF EELGRASS BEDS - CENTRAL BAY

Figure
3.5.16

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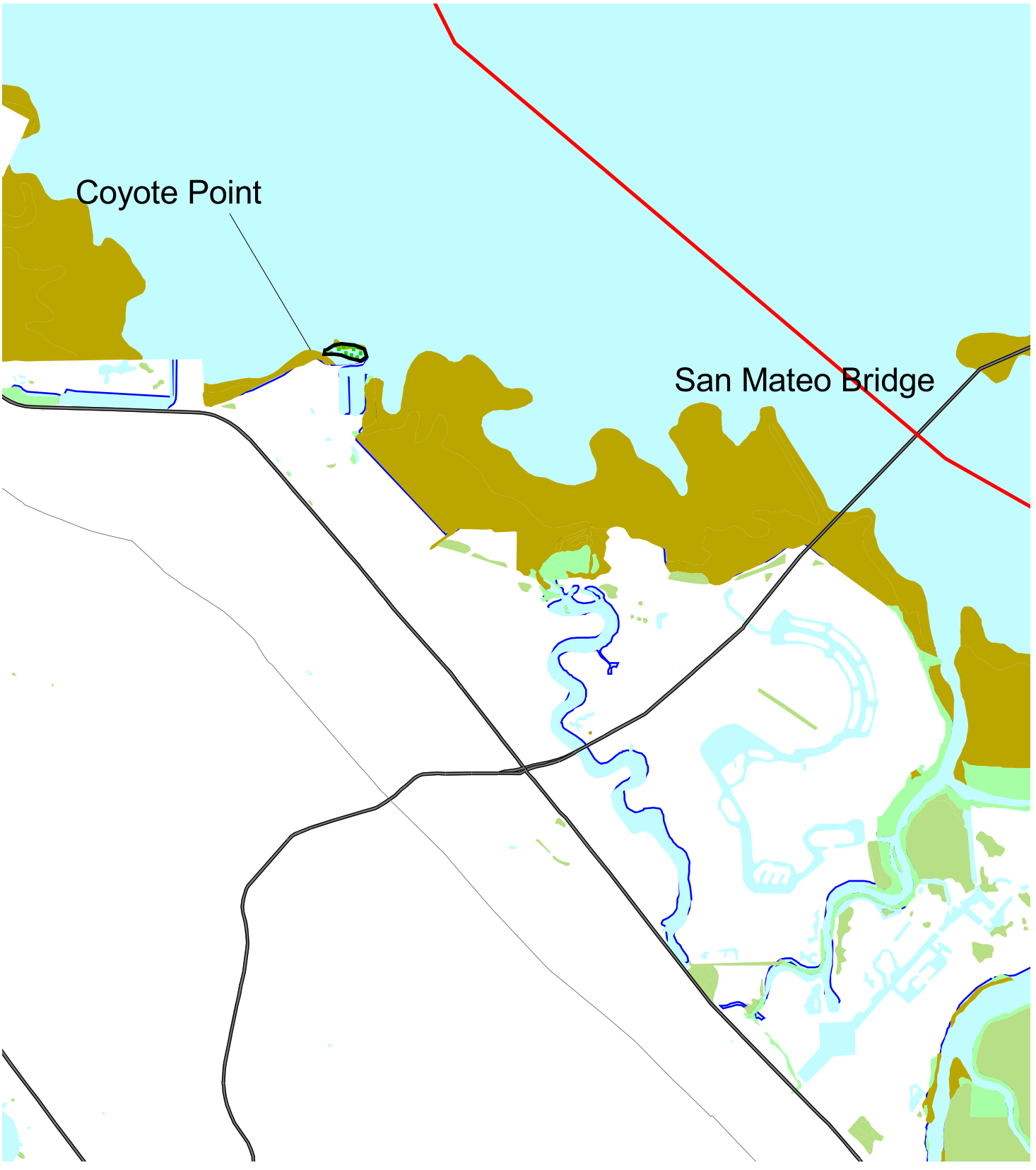

LEGEND

Location of Eelgrass Beds

Transit Routes

Farmed wetlands
Intertidal Mudflat and Rocky Shores
Lakes and Ponds
Open Water

Riparian Woodland
Salt Ponds
Seasonal Wetlands
Tidal Salt and Brackish Freshwater Marsh

Source: National Marine Fisheries Service 1989
Locations and areas of eelgrass beds are approximated

0.5 0 0.5 Miles

Scale 1:79,000

N

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

LOCATIONS OF EELGRASS BEDS - SOUTH BAY

Figure
3.5.17

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3.6 AIR QUALITY

This section describes the environmental setting of the Bay Area with respect to air quality and the regulatory controls applicable to emissions from vessels and vehicular traffic. Federal, state, and regional regulations apply to Bay Area air quality and set controls and goals for air quality criteria for the regional area. These criteria and the regional compliance with established air quality standards are summarized below. A list of acronyms and technical terms is provided at the end of this section.

3.6.1 Environmental Setting

3.6.1.1 Study Area

The proposed project area covers the entire San Francisco Bay Area Air Basin. Although ferry terminals would only be located along the perimeter of the Bay, people would be traveling from many areas within the air basin to use the ferries. Motor vehicles and vessels would be a source of air pollutants associated with the project. The project area and the air basin are under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). The air basin covers all or part of nine counties surrounding San Francisco Bay: all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara; and portions of Solano and Sonoma.

3.6.1.2 Project Setting

The Bay Area Air Basin consists of seven regions with varying meteorological, climatological, and air pollution characteristics. This section summarizes these characteristics and differences. This project is regional in nature, and there could be potential impacts from motor vehicles throughout the region. Therefore, the climate and air quality for the entire Bay Area is described, as ferry commuters could be driving from the farthest reaches of the Bay Area.

Meteorology, Climatology, and Air Quality of the Bay Area Region

The BAAQMD operates a regional air quality monitoring network for criteria pollutants, including ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 micrometers in diameter (PM_{10}). Table 3.6.1 presents a 4-year summary of ambient air quality measured at seven monitoring stations throughout the Bay Area. This table also shows the number of exceedances of the state and national ambient air quality standards at each station, for pollutants for which there were exceedances. Monitoring data from the BAAQMD network are used by the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) to designate the attainment status of the area and to classify the severity of nonattainment problems.

The Bay Area is in attainment of most pollutant standards. The exceptions are O_3 and particulate matter, the standards for which are exceeded periodically. As shown in Table 3.6.1, monitoring stations throughout the different meteorological subregions of the Bay Area reflect the same pattern: only the state O_3 and PM_{10} standards are exceeded.

In addition to criteria pollutants, both the BAAQMD and the CARB operate toxic air contaminant (TAC) monitoring networks in the San Francisco Bay Area. These stations measure

10 to 15 TACs, depending on the specific station. The TACs selected are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk.

The climate of the San Francisco Bay Area is diverse and varies widely from region to region. In general, the Bay Area is classified as having a Mediterranean climate, with warm, dry summers and mild, wet winters. In the summer, air flow generally approaches the Bay Area from the Pacific Ocean (from the west or northwest). This air, which is generally cool and moisture-laden from its movement across the Pacific Ocean, is further cooled as it flows across a cold bank of water existing off the coast of the Bay Area. This cooling often produces condensation, resulting in fog and stratus clouds along the Bay Area coast. In winter, storms are frequent. Ninety percent of the Bay Area's precipitation occurs between November and April. During winter rainy periods, inversions are weak or nonexistent, winds are often moderate, and air pollution potential is very low. During winter dry periods, inversions become strong, winds are light, and pollution potential is high. During these dry, winter periods, winds can flow out of the Central Valley into the Bay Area, bringing tule fog into the region.

The Bay Area is characterized by terrain consisting of coastal mountain ranges, inland valleys, and bays. Elevations of 1,500 feet are common in the higher terrain of this area. Normal wind flow is often distorted in many areas.

Due to the topographical diversity of the Bay Area, it is appropriate to describe the meteorology and climate of the Bay Area in more detail by discussing several of the Bay Area subregions and their microclimates. Table 3.6.1 provides a 4-year summary of ambient air quality measured at seven different air quality monitoring stations throughout the Bay Area, providing an overview of the ambient air quality of many of the Bay Area microclimates.

Carquinez Strait Region

The Carquinez Strait area is the only major sea level pass through California's Coast Range. Prevailing winds flow from west to east. During the summer and fall months, air pressure patterns become established, drawing marine air eastward through Carquinez Strait almost every day. Afternoon wind speeds of 15 to 20 mph are common throughout the straits region. Occasionally, pressure patterns will reverse, causing an east to west air flow through the strait, elevating pollutant levels in the Bay Area. This air flow pattern has low wind speeds and shallow mixing depths, thereby allowing localized emissions to build up. Also, this air mass is generally warm and contains more pollutants than the marine air flow, thereby increasing photochemical activity.

Many industrial facilities within the strait region have significant emissions. The general west-to-east flow of the winds in the straits tends to move pollutants east. Receptors to the east of the industrial facilities in the strait generally have longer term exposure to pollutants than other receptors in the region.

Average daily maximum temperatures (in degrees Fahrenheit) are in the mid to high 50s in the winter and the high 80s in the summer. Average minimum temperatures are in the high 30s to low 40s in the winter and the mid-50s in the summer. Rainfall amounts in the region vary from 13 inches annually in Antioch to 22 inches annually in Fairfield. In Table 3.6.1, the data presented for Pittsburg is representational of average ambient air quality in the Carquinez Strait region.

Diablo Valley–San Ramon Valley Region

East of the Coast Range lie the Diablo and San Ramon Valleys. The Diablo Valley is a broad valley, approximately 5 miles wide and 10 miles long. The Carquinez Strait is at its north end and the south tapers into the San Ramon Valley. The San Ramon Valley is long and narrow, approximately 12 miles long and one mile wide. Its southern end opens to the Amador Valley. The Coast Range on the west side of these valleys blocks much of the marine air from reaching the valleys. The wind speeds in these valleys are generally the lowest in the Bay Area. During the daytime, there are two weakly predominant air flow patterns: an upvalley flow and a westerly flow across the lower elevations of the Coast Range. On clear nights, a surface inversion sets up and separates the surface flow from the upper layer flow. When this occurs, the terrain channels the flow downvalley toward the Carquinez Strait. Crow Canyon gap, which is near the town of San Ramon, allows polluted air from cities near the Bay to travel into the San Ramon Valley during the summer months.

These valleys are cooler in the winter and warmer in the summer than areas closer to Bay waters. High temperatures range from the 50s in the winters to the 90s in the summers. Low temperatures in the winter are in the low to mid-40s. Tule fogs are common on clear winter nights. Rainfall averages approximately 19 inches annually.

Pollution potential is high in these valleys. In the winter, light winds at night, inversion, and terrain blocking to the east and west does not allow much dispersion of pollutants. In the summer, ozone can be transported into the valleys from both the Central Valley and the central Bay Area. Due to the narrowness of the San Ramon Valley, winter pollution buildups can be high due to automobile emissions from Interstate 680 (which runs down the center of the valley) and emissions from fireplaces and woodstoves. The data presented for Concord in Table 3.6.1 are representational of average ambient air quality in the Diablo Valley–San Ramon Valley region.

Livermore Valley Region

The Livermore Valley is a northwest-to-southeast running, sheltered inland valley bound by 1,000- to 1,500-foot hills on its east and west sides. On the western side of the valley, two gaps connect it to San Francisco Bay. The eastern side of the Livermore Valley has one major passage to the San Joaquin Valley. The valley connects to the Diablo Valley–San Ramon Valley at its northwest point and the south side of the valley terminates at the 3,000-foot Diablo range.

During winter dry periods, a weak pressure pattern exists in the valley. At night and during the early morning, cool air flows down the valley from its hills, gaps, and passes. Solar heating, which occurs during the day, can reverse this air flow. A weak temperature inversion can be present during the summer, causing afternoon winds to flow from the Bay. When a strong temperature inversion is present during the summer, air flow is minimal. Winter high temperatures range from the high 50s to the low 60s and low temperatures range from the mid- to high 30s, with extremes in the high teens and low 20s. Summer high temperatures range from the 80s to the low 90s, with extremes in the 100s, and minimum temperatures are in the low 50s. Average annual precipitation is 14 inches.

The potential for air pollution in the Livermore Valley is high, especially for photochemical pollutants. The valley traps locally generated pollutants and can be the receptor of ozone and ozone precursors from San Francisco, Alameda, Contra Costa, and Santa Clara Counties.

Occasionally in the fall, northeasterly winds flow in the area, allowing ozone to enter the valley from the San Joaquin Valley. The strong temperature inversion that often occurs in the winter allows local pollutants from automobiles, fireplaces and agricultural burning to concentrate, raising carbon monoxide and particulate levels. The data presented for Livermore in Table 3.6.1 are representative of average ambient air quality in the Livermore Valley region.

Marin County Basins Region

The Marin County Basins region is bound on the west by the Pacific Ocean, on the east by San Pablo Bay, on the south by the Golden Gate, and on the north by the Petaluma Gap. The area is mostly hilly. Most of the population lives in small, sheltered valleys on the eastern side of the hills. The western, coastal side of the region is subjected to cool marine air; often with fog in the summer and relatively warm, clear skies in the winter. The eastern side of the region has generally warmer weather and less fog than the western side. The low terrain of 800 to 1,000 feet allows for marine air to flow through the area. However, due to the wedge shape of the region, the northern sections of the area are farther from the ocean, allowing the marine air mass to be heated before it arrives.

Temperatures vary throughout the region. In the coastal area, temperatures range from the high 50s in the winter to the low 60s in the summer. San Rafael, which is near the Bay, experiences average maximum winter temperatures in the high 50s to low 60s, average minimum winter temperatures in the low 40s, average maximum summer temperatures in the high 70s to low 80s, and average minimum summer temperatures in the 50s. Inland areas generally experience temperature fluctuations a few degrees warmer and a few degrees cooler from the average temperatures along the Bay. Rainfall averages between 25 and 50 inches annually, depending on location, with some of the more mountainous regions experiencing more rainfall than most locations in the Bay Area.

The potential for air pollution is highest on the eastern side of Marin County, where the sheltered valleys and largest population centers are located. The data presented for San Rafael in Table 3.6.1 are representational of average ambient air quality in the Marin County Basins region.

East Bay Region

The East Bay region stretches from Richmond in the northwest to Milipitas in the southeast. Its western boundary is defined by San Francisco Bay and its eastern boundary by the East Bay Hills. The area is generally flat, with most of its population living between the Bay and an elevation of 500 feet.

Maritime intrusion through the Golden Gate is a dominant weather factor. Winds that enter the Golden Gate diverge as a result of the East Bay Hills in the Oakland/Berkeley area, with south-southwesterly winds in the Richmond area and northwesterly winds in the rest of the East Bay. During periods of little or no wind, the Bay can generate its own circulation system. During the winter, winds from the east or southeast are common.

Temperatures in the southern parts of the East Bay region are generally cooler in the winter and warmer in the summer than in the northern parts of the region. Summer temperatures vary from the mid-50s to the low 70s. Winter temperatures vary from the mid-30s to the mid- to high 50s. Annual rainfall averages between 14 inches in the south and 22 inches in the north.

In the northern areas, the potential for air pollution is minor. Occasionally, these areas experience light winds at night and early in the morning, which may allow elevated pollutant levels. In the southern areas, the air pollution potential is relatively high during the summer and fall months. When high pressure dominates the weather, low mixing depths and marine wind patterns can concentrate and carry pollutants from other cities to the southern part of this region, adding to the locally emitted pollutants. This polluted air is then pushed up against the East Bay Hills. Winter pollution levels are generally moderate. The data presented for Oakland in Table 3.6.1 are representative of average ambient air quality in the East Bay region.

Peninsula Region

The Peninsula region of the Bay Area extends from the area northwest of San Jose to the Golden Gate. The Santa Cruz Mountains extend up the center of the peninsula, with elevations exceeding 2,000 feet at the south end, and gradually decreasing to 500 feet in South San Francisco, where the mountain range terminates. The west side of these mountains experiences a high incidence of cool, foggy weather in the summer. The southeastern area of the peninsula experiences warmer temperatures and few foggy days. At the north end of the peninsula lies San Francisco. Because most of the topography of San Francisco is below 200 feet, the marine layer is able to flow across most of the city, making its climate cool and windy.

The coastal area has relatively high wind speeds, out of the west. Low-lying areas in the mountain range, at San Bruno Gap and Crystal Springs Gap, commonly allow the marine layer to pass across the peninsula. On mornings without a strong pressure gradient, areas on the east side of the peninsula often experience an eastern flow in the surface air layer, induced by upslope flow on the east-facing slopes and by the bay breeze.

Due to the blocking effect of the Santa Cruz Mountains, summertime maximum temperatures along the ocean coast and San Francisco are 62 to 64 degrees, while on the eastern side of the mountains, the maximum summer temperatures are in the low 80s. Daily maximum temperatures throughout the peninsula during the winter months are in the high 50s. Rainfall amounts range from 19.5 inches annually on the east side of the peninsula to 25 inches annually on the west side. The western slopes of the Santa Cruz Mountains have significantly higher annual rainfall amounts.

The potential for air pollution is highest along the southeastern portion of the peninsula because this area is protected from the high winds and fog of the marine layer, the emission density is relatively high, and pollutant transport from upwind sites is possible. In the northern areas of the Peninsula, pollutant emissions are high, but winds are generally fast enough to carry the pollutants away before they can accumulate. The data presented for San Francisco in Table 3.6-1 are representative of average ambient air quality in the Peninsula region.

Santa Clara Valley Region

The northwest/southeast-oriented Santa Clara Valley is bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, San Francisco Bay to the north and the convergence of the Gabilan Range and the Diablo Range to the south.

The wind patterns roughly parallel to the valley's northwest-southeast axis with a north-northwesterly sea breeze extending up the valley during the afternoon and early evening and a light south-southeasterly drainage flow occurring during the late evening and early morning. In

summer, air flowing northward from Monterey Bay through the Pajaro Gap at the southern end of the valley forms a convergence zone in the southern end of the valley with the prevailing north-northwesterly winds.

At the northern end of the valley, the mean maximum temperatures range from the high 70s to the low 80s during the summer and from the high 50s to the low 60s during the winter. Mean minimum temperatures range from the low 40s during the winter to the high 50s during the summer. Farther inland, where the moderating effect of the Bay is not as strong, temperature extremes are greater. Summer highs are more than 10 degrees warmer and winter nights greater than 10 degrees cooler. Annual rainfall ranges from 13 inches in the lowlands to 20 inches in the hills.

The air pollution potential of the Santa Clara Valley is high. The valley has a large population and the largest complex of mobile sources in the Bay Area, making it a major source of carbon monoxide, particulate and photochemical air pollution. In addition, photochemical precursors from San Francisco, San Mateo, and Alameda Counties can be carried along by the prevailing winds to the Santa Clara Valley, making it a major ozone receptor. Geographically, the valley tends to channel pollutants to the southeast. Meteorologically, on high-ozone/low-inversion summer days, the pollutants can be re-circulated by the prevailing northwesterly winds in the afternoon and the light drainage flow in the late evening and early morning, significantly increasing the impact of emissions. On days with high concentrations of particulates and carbon monoxide during late fall and winter, clear, calm, and cold conditions associated with a strong surface-based temperature inversion prevail. The data presented for San Jose in Table 3.6.1 are representative of average ambient air quality in the Santa Clara Valley region (BAAQMD 1999).

Existing Bay Area Pollution Sources

The BAAQMD maintains an inventory of point, area, and mobile sources within the San Francisco Bay Area air basin. Point sources include industrial plants and refineries; area sources include numerous small sources such as dry cleaners, gas stations, and paint and solvent use; and mobile sources include on-road and off-road vehicles and marine sources. The year 2000 BAAQMD emission inventory is summarized in Table 3.6.2. This is a planning inventory from the ozone attainment plan for the Bay Area, and it itemizes sources within a given source category.

Impacts of Existing Ferry Services on Bay Area Air Quality

Emissions from ferries are included in the BAAQMD planning inventory under the category of Commercial Boats, which includes ferries, fishing boats, tugs, towboats, and dredges. The year 2000 emissions from ferries alone are 0.13 tons per day of ROG and 2.42 tons per day of NO_x. Emissions from ferries represent 0.03 percent of the total Bay Area ROG emissions and 0.45 percent of total Bay Area NO_x emissions. Comparable emissions inventory data for the other pollutants, CO, SO_2, and PM_{10}, are unavailable in the planning inventory.

3.6.1.3 Regulatory Setting

The project area is subject to major air quality planning programs required by both the federal Clean Air Act, which was last amended in 1990 (42 United States Code [USC] 7401 et seq.), and the California Clean Air Act of 1988 (California Health and Safety Code Section 39600 et seq.).

Both the federal and state statutes provide for ambient air quality standards to protect public health, timetables for progressing toward achieving and maintaining ambient standards, and the development of plans to guide the air quality improvement efforts of state and local agencies. The federal plan, which is referred to as the State Implementation Plan (SIP), must contain control strategies that demonstrate attainment with national ambient air quality standards by deadlines established in the federal Clean Air Act. The state plan is called the Clean Air Plan (CAP). The CAP must show satisfactory progress in attaining state ambient air quality standards. Deadlines are not fixed for attaining state standards. The SIP and the CAP overlap and generally contain the same emissions control measures.

Both the SIP and the CAP rely on the combined emission control programs of the USEPA, the CARB, and the BAAQMD. The role of each agency in controlling emissions in the project area is described below.

Federal

The USEPA oversees state and local implementation of federal Clean Air Act requirements. They set emission standards for many of the mobile sources, such as new on-road motor vehicles, including transport trucks that are sold outside of California. The USEPA also sets emission standards for various classes of new off-road mobile sources, including locomotives that are sold throughout the country. The USEPA is also working with the International Maritime Organization to begin the process of setting international standards to lower emissions from new marine vessels that operate under that organization's protocol.

In 1999 the USEPA issued a final rule to reduce emissions from new large marine diesel engines. These emission reduction requirements take place from 2004 through 2007. This program will reduce emissions of NO_x (an ozone precursor) and PM_{10} generated by marine diesel engines larger than 50 horsepower. This rule would affect new ferry vessels and vessels with engines replaced after 2004.

State and Local

Under California law, the responsibility to carry out air pollution control programs is split between the CARB and local or regional air pollution control agencies. In the project area, the BAAQMD regulates stationary sources. The BAAQMD can require stationary sources to obtain permits, as well as impose emission standards, set fuel or material specifications, or establish operational limits to reduce air emissions.

The CARB shares the regulation of mobile sources with the USEPA. The CARB has the authority to set emission standards for on-road motor vehicles and for some classes of off-road mobile sources that are sold in California. The emission standards with the largest effect in the project area are those set for automobile, light- and medium-duty truck, California heavy-duty truck, and other diesel engines. The CARB also regulates vehicle fuels, with the intent to reduce emissions. The CARB has set emission reduction performance requirements for gasoline (California reformulated gasoline) and has limited the sulfur and aromatic content of diesel fuel to make it burn more cleanly. The CARB also sets the standards used to pass or fail vehicles in the smog check and heavy-duty truck inspection programs.

The federal, state, and regional control programs described above are directed primarily toward criteria pollutants—the pollutants for which ambient air quality standards exist. Programs are also

in place to reduce public exposure to other pollutants, such as those that present a potential hazard to public health. These pollutants are called "hazardous air pollutants" (HAPs) in federal law and "toxic air contaminants" (TACs) under California law. TACs are pollutants "which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health" (BAAQMD 1997). The federal and state programs are currently directed toward reducing TAC emissions from stationary sources. Unlike criteria pollutants, TACs have no ambient standards; however, BAAQMD regulates new or expanding stationary sources of TACs.

Transportation Conformity

Transportation projects receiving federal funding must be found to conform with the current State Implementation Plan (SIP). The SIP is a plan that describes how a state will reduce air emissions such that ambient pollutant concentrations will decrease and the state will achieve attainment of ambient air quality standards. Each region in the state submits its emissions budgets and strategies for reducing air emissions to the California Air Resources Board (CARB), which prepares the SIP.

Transportation planning is coordinated with this "conformity" process. The Regional Transportation Plan (RTP) contains a long-range plan for transportation projects and emissions budgets for those projects. The RTP must conform to the SIP by having an emissions budget from its planned projects that does not exceed the emissions budget in the SIP. For an individual project to conform to the SIP, it must be contained in a conforming RTP.

The WTA program must eventually be included in a conforming RTP if it is found to conform to the SIP. The legislation that created the WTA and mandated preparation of this EIR and IOP (refer to Section 1) did not fund specific projects. As funding is identified for water transit expansion, further review (including air quality evaluations) will have to take place to advance a more defined set of the projects to the RTP.

National and State Ambient Air Quality Standards

Criteria Pollutants

National and state ambient air quality standards have been established for CO, O_3, NO_2, SO_2, and particulate matter 10 micrometers or less in diameter (PM_{10} and $PM_{2.5}$).[1] Ambient standards specify the concentration of these "criteria pollutants" that the public can be exposed to without adverse health effects. Since individuals vary widely in their sensitivity to air pollutants, standards are set to protect more sensitive populations (i.e., children and the elderly). National and state standards are reviewed and updated periodically based on new health studies. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent. National and state ambient air quality standards are listed in Table 3.6.3. The criteria pollutants and associated adverse health effects are summarized below:

- **Carbon Monoxide.** Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood, and therefore can cause dizziness and fatigue, impair central nervous system functions, and induce angina in persons with serious heart disease. The most

[1] Other pollutants (e.g., lead) also have ambient standards, but they are not discussed in this document because emissions of these pollutants from cars and marine vessels are expected to be minimal.

important sources of high CO levels in the ambient air are passenger cars, light-duty trucks, and residential wood burning.

- **Ozone.** While O_3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing potentially harmful ultraviolet radiation, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human respiratory system and to sensitive species of plants. O_3 concentrations build to peak levels during periods of light winds, bright sunshine, and high temperatures. Short-term O_3 exposure can reduce lung function in children, make persons susceptible to respiratory infection, and produce symptoms that cause people to seek medical treatment for respiratory distress. Long-term exposure can impair lung defense mechanisms, and lead to emphysema and chronic bronchitis. Sensitivity to O_3 varies among individuals. About 20 percent of the population is sensitive to O_3, with exercising children being particularly vulnerable. O_3 is formed in the atmosphere by a complex series of photochemical reactions that involve "ozone precursors." Ozone precursors are categorized into two families of pollutants: oxides of nitrogen (NO_x) and reactive organic gases (ROGs). NO_x and ROGs are emitted from a variety of stationary and mobile sources. While NO_x is considered a criteria pollutant, ROGs are not in this category, but are included in this discussion as O_3 precursors.

- **Nitrogen Dioxide.** The major health effect from exposure to high levels of NO_2 is the risk of acute and chronic respiratory disease. NO_2 is a combustion by-product, but it can also form in the atmosphere by chemical reaction. It is a reddish-brown gas often observed during the same conditions that produce high levels of O_3. NO_2 is a precursor to O_3.

- **Sulfur Dioxide.** The major health effect from exposure to SO_2 is acute and chronic respiratory disease. Asthmatics are particularly sensitive. SO_2 can also react with water in the atmosphere to form acids (or so-called "acid rain"), which can cause damage to vegetation and man-made materials. The main source of SO_2 is the combustion of fuels containing sulfur, chiefly coal and fuel oil. California has very low levels of SO_2 because most large combustion sources burn natural gas, which contains only trace quantities of sulfur. California regulations also limit the sulfur content of gasoline and diesel fuel.

- **Particulate Matter.** Particulate matter is regulated as PM_{10} (particulate matter less than 10 micrometers in diameter). More recently it has been subdivided into coarse and fine fractions, with particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$) constituting the fine fraction. The health effects from long-term exposure to high concentrations of particulate matter are increased risk of chronic respiratory disease like asthma and altered lung function in children. Short-term exposure to high levels of particulate matter has been shown to increase the number of people seeking medical treatment for respiratory distress, and to increase mortality among those with severe respiratory problems. Particulate matter also results in reduced visibility. Ambient particulate matter has many sources. It is emitted directly by combustion sources like motor vehicles, industrial facilities, and residential wood burning, and in the form of dust from ground-disturbing activities such as construction and farming. It also forms in the atmosphere from the chemical reaction of precursor gases.

For planning purposes, regional areas like the San Francisco Bay Area are given an air quality status "label" by the federal and state regulatory agencies. Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated as "attainment areas" on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient

standards (the national and state standards are presented in Table 3.6.3), areas are designated as "nonattainment areas." An area that recently exceeded ambient standards, but is now in attainment, is designated as a "maintenance area." Nonattainment areas are further classified based on the severity and persistence of the air quality problem as "moderate" "severe" or "serious." Classifications determine the applicability and minimum stringency of pollution control requirements. In general, the more serious the air quality classification, the more stringent are the control requirements that must be contained in the regional air quality plans (see discussion above of the SIP and CAP).

Toxic Air Contaminants

As noted above, no ambient air quality standards exist for TACs. Many pollutants are identified as TACs because of their potential to increase the risk of developing cancer. For TACs that are known or suspected carcinogens, the CARB has consistently found that there are no levels or thresholds below which exposure is risk free. Individual TACs vary greatly in the risk they present; at a given level of exposure one TAC may pose a hazard that is many times greater than another. Where data are sufficient to do so, a "unit risk factor" can be developed for cancer risk. The unit risk factor expresses assumed risk to a hypothetical population, the estimated number of individuals in a million who may develop cancer as the result of continuous, lifetime (70-year) exposure to 1 microgram per cubic meter ($\mu g/m^3$) of the TAC. Unit risk factors provide a standard that can be used to establish regulatory thresholds for permitting purposes. However, this is not a measure of actual health risk because actual populations do not experience the extent and duration of exposure that the hypothetical population is assumed to experience. For noncancer health effects, a similar factor called a Hazard Index is used.

New Air Quality Standards

In July 1997, the USEPA adopted a number of changes to national ambient air quality standards for O_3 and particulate matter (USEPA 1997a,b,c,d). These new standards are discussed separately because from a regulatory standpoint they have a different status than previously adopted standards. None of the new standards is in full effect at this time because the data and information needed to develop control programs will require several years to collect.

Ozone

The USEPA adopted a new 8-hour standard that will eventually replace the existing 1-hour standard. For particulate matter, the USEPA adopted a 24-hour standard and an annual average standard for the fine fraction of particulate matter, $PM_{2.5}$ (USEPA 1997a). The USEPA retained the existing PM_{10} standards, but slightly changed the form of the 24-hour standard (USEPA 1997b).

The new O_3 standard was adopted after the USEPA found that the previous national 1-hour standard of 0.12 part per million (ppm) did not adequately protect the public from adverse health effects. Of particular concern is evidence that exposure to O_3 levels below 0.12 ppm is associated with increased hospital admissions for people with respiratory ailments, including asthma, and with reductions in lung function in children and adults who are active outdoors (USEPA 1997c). Evidence also exists that long-term exposure can cause repeated inflammation of the lung, impairment of lung defense mechanisms, and irreversible damage in lung structure, leading to premature aging of the lungs and chronic respiratory illnesses (USEPA 1997c).

Particulate Matter

The USEPA's review of its particulate standard showed "coarse" respirable particles (2.5 to 10 micrometers in size) can be inhaled and aggravate health problems such as asthma. Therefore, the USEPA chose to retain PM_{10} standards. The USEPA also reviewed studies providing epidemiological evidence that exposure to particulate matter at levels well below the existing PM_{10} standards were associated with increased hospital admissions and premature mortality (USEPA 1997b). In addition, the USEPA found that finer particles (less than 2.5 micrometers in diameter) can penetrate more deeply into lungs, and are more likely than coarser particles to contribute to more severe health effects (USEPA 1997b). Therefore, the USEPA established new standards for $PM_{2.5}$.

The USEPA has not yet designated any areas of the country as being in attainment or nonattainment for the new O_3 and $PM_{2.5}$ standards. In May 1999, a federal appeals court remanded both the new ozone and the new particulate ambient standards back to the USEPA for failing to articulate adequately its authority to set the standards. The new standard was upheld by the federal D.C. Circuit Court of Appeals on February 27, 2001. The CARB is currently in the process of evaluating the attainment status of the state's air basins with respect to the USEPA's $PM_{2.5}$ standards.

Revision of Existing Standards

California Senate Bill 25, Escutia 1999, established the Children's Environmental Health Protection Act and commissioned a report to assess health-based ambient air quality standards. This report concluded that the standards for particulate matter, ozone, and nitrogen dioxide are inadequate to protect public health. The standards for particulate matter were found to have the highest priority for revision (CARB 2000). The staff of the CARB will present a final particulate matter standards report, containing recommendations for revising particulate matter standards, to the CARB for review in May 2002. Similar reports will be written by the CARB staff for ozone and nitrogen dioxide standards are tentatively scheduled to be presented to the CARB on December 2003 and December 2004, respectively. The CARB staff is also investigating the establishment of a California standard for $PM_{2.5}$.

Diesel Particulate Matter

On August 27, 1998, the CARB formally identified particulate matter emitted by diesel-fueled engines as a TAC. Diesel-fueled engines emit TACs in both gaseous and particulate forms. The particles emitted are coated with chemicals, many of which have been identified by the USEPA as HAPs and by the CARB as TACs. Since by weight, the vast majority of diesel exhaust particles are very small (94 percent of their combined mass consists of particles less than 2.5 micrometers in diameter), both the particles and their coating of TACs are inhaled into the lungs. While the gaseous portion of diesel exhaust also contains TACs, the CARB's August action was specific to diesel particulate emissions which, according to supporting CARB studies, represent 50 to 90 percent of the mutagenicity of diesel exhaust (CARB 1998). The CARB action was taken at the end of a lengthy process that considered dozens of health studies, extensive analysis of health effects and exposure data, and public input collected over the last 9 years. The CARB's Scientific Advisory Committee has recommended a unit risk factor of 300 in a million for diesel

particulate.[2] This action will lead to additional control by CARB of diesel emissions in coming years. The USEPA has also begun an evaluation of both the cancer and noncancer health effects of diesel exhaust.

3.6.2 Impacts and Mitigation

Impact Assessment Methodology

This evaluation addresses impacts from both vehicle and ferry emissions sources for the Proposed Project and the No Project Alternative. The evaluation is based on a calculation of the total emissions from all modes of travel (ferry, car, bus) that might be affected by implementation of the Proposed Project. The different travel modes generate different rates of emissions.

The overall impacts from the system (i.e., ferries, passenger cars, and buses) were evaluated to obtain a regional, cumulative emissions estimate for the Proposed Project and the No Project Alternative. For the purposes of evaluating the significance of impacts, the estimated emissions from all travel modes were summed for each alternative. The total emissions were then compared between the Proposed Project and the No Project Alternative to determine whether the Proposed Project would result in an overall decrease or increase in emissions. This is discussed in more detail under "Significance Criteria" below. This comparative evaluation was done instead of examining the emissions from each individual source alone and comparing them to a threshold level.

Ferry and vehicle emissions are presented for criteria pollutants, which include oxides of nitrogen (NO_x), reactive organic gases (ROG), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM_{10}).

Vehicle Emissions

Vehicle emissions (passenger cars and buses) were calculated using forecasts of total vehicle miles traveled for the year 2025. Ferry emissions were calculated using the projected schedule of routes and frequencies for that same year. The emissions calculations were performed for the Proposed Project and the No Project Alternative. The year 2025 is consistent with the Metropolitan Transportation Commission (MTC) travel forecast model that was used as a basis for the vehicle forecasts.

The California Air Resources Board (CARB) model "San Francisco Bay Area EMFAC 2000" (EMFAC2000) was used to calculate regional emissions based on vehicle miles traveled (VMTs) for each alternative. At the time of the modeling, EMFAC2000 was the latest in the series of California emission factor models that calculate emissions of CO, NO_x, ROG, and PM_{10} for current and future years. This model is accepted by the CARB and most local air pollution control districts for analysis of motor vehicle emissions in California. The EMFAC2000 model reflects emissions decreases from motor vehicles in future years due to anticipated improvements in engine and fuel technology and retirement of older vehicles from the fleet. For example, year 2025 passenger car emissions of ROG, CO, and NO_x are anticipated to decrease from 1.5, 10.8,

[2] The Scientific Review Committee findings are Attachment A to CARB Resolution 98-35, August 27, 1998.

and 1.0 grams per mile, respectively, in 2002 to 0.3, 1.5, and 0.2 grams per mile, respectively, in 2025. PM_{10} emissions are not expected to change significantly.

In addition, emissions from cold-starts based on trip purpose were calculated for each alternative, using factors from the EMFAC2000 model. The cold-start emissions were incorporated into the daily total emissions calculated for passenger vehicles. Cold-starts occur after a vehicle has been off for more than four hours, and cold-start emissions are important because they represent a major portion of the total trip emissions for a vehicle. The traffic analysis included information on the number of daily trips based on the purpose of the trip (e.g. shopping, work, recreation, etc.). All home-based work trips were assumed to be in cold-start mode (i.e., the vehicle would have been off for more than four hours). Cold-start emissions were calculated by multiplying the number of cold-start trips by an emission factor of pounds of pollutant per cold-start. This calculation was done for both the morning and evening commutes to yield a total pounds-per-day emissions from cold-starts.

Ferry Emissions

Ferry emissions were estimated assuming that USEPA Tier 2 standards would be in effect. These standards require that new diesel engines manufactured after the year 2007 meet lower emissions requirements than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would have engines that would at least meet the USEPA Tier 2 standards. With the Proposed Project, the ferries would also have control devices to reduce the levels of NO_x and PM_{10}. Selective catalytic reduction (SCR) and particulate traps would reduce NO_x emissions to 10 percent of Tier 2 levels and PM_{10} emissions to 5 percent of Tier 2 levels. Therefore, for the Proposed Project emissions were assumed to be at least 85% below Tier 2 standards. These standards are included in the WTA Vessel Specifications.

The WTA evaluation considered a range of vessel types, fuels, and propulsion systems (JJMA 2002) that could be potentially used on the projected service routes. These different technologies result in various levels of emissions of NO_x, ROG, CO, SO_2, and PM_{10}. Some examples of the technologies include diesel engines fueled with natural gas, gas turbines fueled with diesel or natural gas, and diesel engines fueled with diesel with SCR and particulate traps. The WTA's evaluation of vessel technology involved a comprehensive investigation of emerging technologies and their relative suitability to Bay Area passenger service. Section 2.5 (Vessel Technology) summarizes the evaluation that was performed in coordination with the "Clean Marine Ad Hoc" Work Group. The use of SCR and particulate traps was found to currently be the most effective combination of control measures.

The ferry emissions for the WTA program were developed for the projected year 2025 using a combination of site-specific data, readily available emission factors, and current and projected operating conditions. Existing data for each ferry system were reviewed and analyzed. Future baseline emissions were based upon peak and off-peak conditions, where peak hours represented 6 hours per day and non-peak hours represented 6.5 hours per day. Baseline emissions for each period were calculated by multiplying together the total travel time from all ferries, the average horsepower rating, and the emission factors for marine diesels. Total travel time was computed for both peak and non-peak periods by: (1) dividing the total time within each period by the frequency of visits by each ferry to obtain the number of trips; (2) multiplying the number of trips for each ferry by the estimated time per trip; and (3) summing the trip times for all ferries.

For the No Project Alternative, average power outputs were assumed for each route, based on the current ferries in use on these routes. Characteristics of the current ferries are available in the working document, *New Technologies and Alternative Fuels*, prepared for the WTA (JJMA 2002). For the Proposed Project, two ferry vessel types were assumed, which is consistent with the Implementation and Operations Plan (IOP). One type would be 350-passenger with a maximum power output of 8,000 horsepower (5,966 kW). The other would be 149-passenger with a maximum power output of 2,900 horsepower (2,163 kW) (Hutchison 2002).

For the Larkspur ferry route, only the newer catamaran vessels used on this route were assumed for the No Project Alternative. The monohull boats used on this route were constructed in the 1970s and will be taken out of commission by 2025.

The ferry system schedules are presented in Appendix AIR-A. Tables 3.6.4 through 3.6.6 present the data used for the ferry emissions calculations: ferry power rating, ferry power usage, hours of operation, pollutant emission factors, and calculated emissions in pounds per day.

The significance criteria used for this study and a discussion of each of the impacts follow.

3.6.2.1 Significance Criteria

The significance criterion used in this EIR is as follows:

- Higher cumulative emissions from all travel modes for the Proposed Project than for the No Project Alternative would be considered a significant impact.

As applied to the WTA program, this involved calculation of total emissions by criteria pollutant, for each mode of travel: ferry, bus, and passenger car. These were compared to the No Project Alternative to determine whether the Proposed Project would result in overall higher or lower regional emissions. This criterion was used because it allows comparison of alternatives on a regional scale, consistent with the WTA program. This type of significance criterion was used in the 2001 Regional Transportation Plan (RTP) EIR issued by the Metropolitan Transportation Commission (MTC 2001).

3.6.2.2 Impacts

Impact A-1 **Regional cumulative emissions of NO_x, PM_{10}, CO, SO_2, CO_2, and ROG could increase as a result of the implementation of the Proposed Project.**

The evaluation of significance is based on the sum of vehicle (passenger car and shuttle bus) emissions plus ferry emissions for the Proposed Project versus vehicle emissions plus ferry emissions for the No Project Alternative. If the emissions sum of vehicles plus ferries for the Proposed Project is less than the emissions sum of vehicles plus ferries for the No Project Alternative, the impact would be considered less than significant. If, however, the sum of vehicles plus ferry emissions from the Proposed Project is greater than the sum of passenger car plus ferry emissions from the No Project Alternative, then the impact would be considered significant. This comparison was done for each of the pollutants.

The Bay Area emissions inventory is summarized in Table 3.6.7. Table 3.6.8 summarizes emissions from ferries, passenger cars, and shuttle buses for the Proposed Project and the No

Project Alternative. Tables in Appendix AIR-A present route information (frequencies, number of vessels, sailing times) for each alternative, as well as the per-route emissions.

Regional cumulative emissions of NO_x, PM_{10}, and CO from passenger cars, buses, and ferries would decrease with the Proposed Project below those for the No Project Alternative. Emissions of SO_2 and ROG would increase with the Proposed Project, by 0.3 percent and 0.02 percent respectively. The sum of ROG plus NO_x emissions (ozone precursors) would be less with the Proposed Project than for the No Project Alternative.

Greenhouse gas emissions include carbon dioxide (CO_2), methane, and chlorofluorocarbons. The predominant greenhouse gas from fossil fuel combustion is CO_2. Operation of the Proposed Project would result in an increase in CO_2 emissions.

CO_2 is not a priority pollutant and currently, there are no State or Federal standards that apply to the emissions of greenhouse gases. Therefore, there is no standard of significance against which to compare emissions increases.

CO_2 emissions from ferries were calculated using fuel consumption rates, hours of usage, and the amount of carbon in diesel fuel, which when combusted converts to CO_2. In addition, there would be a decrease in passenger vehicle miles traveled due to the proposed project. The decrease in CO_2 emissions from passenger cars was calculated using the decrease in vehicle miles traveled and the CO_2 emission factor from EMFAC2000.

The increase/decrease of emissions of various constituents for the Proposed Project (compared to the No Project Alternative) are summarized below:

Constituent	Proposed Project Emission Compared to No Project
NO_x	Net Decrease
SO_2	0.3% Increase
PM_{10}	Net Decrease
CO	Net Decrease
CO_2	Net Increase
ROG	0.02% Increase

In conclusion, small region-wide increases in SO_2 and ROG would remain with implementation of the Proposed Project. ROG is primarily of concern because it is one of the precursors of ozone. However, as noted above, the Proposed Project would result in a net decrease in both ozone precursors (NO_x and ROG combined). The Proposed Project would result in a net increase in CO_2 emissions. The remaining pollutant of concern, SO_2, is currently in attainment in the Bay Area. However, as the analysis indicates a small region-wide increase for the Proposed Project, this impact is identified as potentially significant.

Summary of Impact A-1

- Proposed Project emissions from vehicles (passenger cars and buses) plus ferries would be less than those for the No Project Alternative for NO_x, PM_{10}, and CO, resulting in a less than significant impact.
- Proposed Project emissions from vehicles plus ferries would be greater than those for the No Project Alternative for SO_2 and ROG, resulting in a significant impact.
- The sum of ozone precursors ROG plus NO_x would be less with the Proposed Project than with the No Project Alternative.
- There would be a net increase in CO_2 from the Proposed Project, resulting in a significant impact.

Future engine fuel and/or pollution control technologies that are not at present commonly used could have an effect on future emission levels. One such engine technology is the use of fuel cells instead of combustion of fossil fuels. While the 2025 emissions are based on current or 2007 technology, it is expected that by 2025, other technologies will be available and cost effective and will further reduce emissions. Emissions could be reduced or eliminated through use of these engine technologies..

The WTA is planning to continue investigating the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. One promising technology is the use of fuel cells. The WTA has investigated the use of alternative fuels for ferries in: *New Technologies and Alternative Fuels Working Document* (JJMA 2002). Alternative energy sources and engine technologies will become available and will be incorporated as they become feasible and cost-effective. However, as future technology cannot be predicted, this impact remains potentially significant

Impact A-2 **Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard.**

As vehicles in a parking area leave a ferry terminal, there could be a concentration of cold-start emissions at those locations, instead of the emissions being dispersed throughout the Bay Area at people's homes, as during the morning commute. This "clustering" of cold-start emissions during the evening commute hour could produce a violation of the one-hour carbon monoxide standard at locations near the terminal parking lots. This is a potentially significant impact.

Summary of Impact A-2

- The Proposed Project would result in cold-start emissions during the evening commute period that could lead to a violation of the short-term carbon monoxide standard, leading to a potentially significant impact.

Mitigation A-2.1: Cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access could include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access. In addition, feeder shuttle buses could be equipped with zero emission or ultra-low emission engines.

Impact After Mitigation: The effectiveness of Mitigation A-2 cannot be quantified, as the design and exact number of ferry terminals are not defined at this time. Therefore, this impact remains potentially significant.

Impact A-3 Ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel.

In 1998, the CARB formally identified particulate matter emitted by diesel-fueled engines as a toxic air contaminant (TAC). Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the USEPA as hazardous air pollutants (HAPs), and by the CARB as TACs. The vast majority of diesel exhaust particles are very small (94 percent of their combined mass consists of particles less than 2.5 microns in diameter), and both the particles and their coating of TACs can be inhaled into the lungs. While the gaseous portion of diesel exhaust also contains TACs, the CARB's 1998 action was specific to diesel particulate emissions, which, according to supporting CARB studies, represent 50 to 90 percent of the mutagenicity of diesel exhaust (CARB 1998).

Diesel particulate emissions were calculated as described above under "Ferry Emissions." For the purposes of characterizing potential air toxic impacts, the entire mass of estimated particulate matter emissions from diesel engines is considered toxic.

Since the majority of diesel particulate matter is in the fine fraction (less than 2.5 micrometers in diameter, or $PM_{2.5}$), it can remain airborne for several days. The area of impact will depend on meteorological conditions. If light to moderate wind conditions prevail in the project area, diesel particulate is likely to be dispersed widely and have its impact on a regional scale. During periods of very light wind speeds, low inversion heights, and atmospheric stability, diesel particulates may remain in the project area and have a relatively larger local impact. Because health risks relate to long-term, lifetime exposure, it is long-term average exposure to diesel particulate that is of most concern. Due to the prevailing meteorological conditions in the project area and the distance of the closest residential areas to the emissions sources, particulates in the area of local impact are expected to be well dispersed.

Emissions from the Proposed Project would be less than those for the No Project Alternative, resulting in a less than significant impact.

Summary of Impact A-3

- Proposed Project $PM_{2.5}$ emissions from ferries would be less than those for the No Project Alternative, resulting in a less than significant impact.

Impact A-4 Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water.

A fraction of the airborne pollutant emissions from ferry fuel combustion would be deposited on the Bay. The rest would be transported over land by winds. The amount of pollutants deposited on land versus on the Bay depends on several factors including the proximity of the ferry to land,

the distance the ferry travels over water, the amount of wind transporting the pollutants, and the location of the exhaust port on the ferry.

Emissions of nitrogen and sulfur oxides would be deposited as nitrates and sulfates. A portion of the particulate matter in the diesel exhaust, mostly in the fine fraction ($PM_{2.5}$), would also be deposited.

The level of nitrates would decrease with the Proposed Project below those for the No Project Alternative. However, the level of sulfates would increase with the Proposed Project.

Summary of Impact A-4

- Deposition of nitrates on the Bay from ferry emissions would decrease with the Proposed Project, resulting in a less than significant impact.
- Deposition of sulfates on the Bay from ferry emissions would increase under the Proposed Project, leading to a potentially significant impact.

Mitigation A-4.1: Use of a fuel technology that lowers SO_2 emissions would reduce sulfate emissions and subsequent deposition.

Impact After Mitigation: The effectiveness of such mitigation cannot be reasonably quantified, due to the variability of the factors affecting deposition levels. This impact would remain potentially significant.

Impact A-5 Construction of ferry terminals would create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO_x, CO, SO_2, and PM_{10} from construction equipment exhaust.

Construction-related pollutant emissions have not been quantified because the specific plans for each terminal are not defined at this time. Furthermore, the BAAQMD does not require quantification of construction emissions, but does require a discussion of construction mitigation measures. As for any construction project, there can be occasional concentrations of emissions from construction activities that temporarily approach or exceed air quality standards.

Summary of Impact A-5

- Construction emission impacts under the Proposed Project could be potentially significant.

Mitigation A-5.1: The project proponent(s) shall implement the mitigation measures contained in the BAAQMD CEQA Guidelines (BAAQMD 1999) to control fugitive dust emissions from construction activities. These measures include activities such as watering and covering exposed soil surfaces to minimize dust emissions.

Mitigation A-5.2: Measures to reduce emissions from vehicles and heavy equipment shall include: 1) Use alternative fueled construction equipment when possible; 2) Minimize idling time, for example, 5-minute maximum; 3) Properly maintain equipment; and 4) Limit the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

Impact After Mitigation: The BAAQMD considers construction impacts to be less than significant if the recommended mitigation measures are used. Each individual ferry expansion

project should employ the current BAAQMD-recommended construction emissions control measures to reduce impacts.

Impact A-6 The Proposed Project could result in concentrations of nitrogen dioxide and particulate matter above state and federal standards at the Ferry Building.

Based on the independent analysis by the BAAQMD (Appendix AIR-B), the increased ferry service to and from the San Francisco Ferry Building could add between 6 and 55 percent to the existing concentration values of nitrogen dioxide and particulate matter. The magnitude of the increases would depend on vessel design (particularly the location of the vessel exhaust in relation to passenger and public areas) and dockside idle time. Localized pollutant concentrations are highly dependent upon the height of the engine exhaust pipes.

Summary of Impact A-6

- Under the Proposed Project, local concentrations of nitrogen dioxide and particulate matter could exceed state and federal standards at the Ferry Building. This would be a significant impact.

Mitigation A-6.1: Engine exhaust pipes shall be located sufficiently high to reduce localized impacts. During their analysis, BAAQMD staff hypothesized that the location of the exhaust points was an important factor in local concentrations of air pollutants. This was tested with a model scenario wherein all future vessels would have exhaust heights at 20 feet above the waterline.

While the BAAQMD's choice of modeling the exhaust location at 20 feet above the waterline was somewhat arbitrary, the results indicate that this height would reduce the potential for unhealthy concentrations of air pollutants[3] (Murphy 2003). Therefore, exhaust points shall be located at least 20 feet above the waterline unless future modeling indicates that lower heights would reduce concentrations of pollutants to acceptable levels.

Mitigation A-6.2: Project proponents shall minimize dockside idling time at the Ferry Building.

Impact After Mitigation: Impact A-6 would be less than significant after implementation of Mitigations A-6.1 and A-6.2.

Impact A-7 The Proposed Project could result in increases of pollutants from ferry exhaust deposited directly into the Bay.

The amount of pollutants from exhaust that would be deposited in the Bay depends upon the height of the exhaust port. If the exhaust ports are located high, the predominant wind patterns in the Bay Area would transport much of the pollutants emitted from the ferries over land such that only a small amount is deposited into the Bay. However, if the exhaust ports on the new ferries are close to the water, the turbulent eddies in the boat wake could capture some of the emissions, resulting in an increased amount of pollutants deposited into the Bay.

[3] BAAQMD notes, however, that this result may only be valid if ferry service equals or is less than the frequency proposed in the December 2002 IOP.

Summary of Impact A-7

- Under the Proposed Project, pollutants from exhaust could be deposited in the Bay due to turbulent eddies in the vessel wake if the exhaust ports are located near the waterline. This could be a potentially significant impact.

Mitigation A-7.1: Implement Mitigation A.6-1, which is to locate exhaust pipes at least 20 feet above the waterline.

Impact After Mitigation: Impact A-7 would be less than significant after implementation of Mitigation A-7.1.

Impact A-8 **Equipment and boats used for dredging of the harbor at the Hercules/Rodeo terminal would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines.**

Air pollutant emissions associated with dredging activities were estimated assuming that just less than 50,000 cubic yards (yd^3) of material would need to be dredged. Due to the nature of the project, a number of assumptions were made in order to estimate the air emissions. It was assumed that the dredging would occur on a barge with a capacity of 4,000 yd^3 of dredge material. One 800 hp engine was assumed to power the dredging operation and one tugboat was assumed to be required to move the barge to the release point in the Bay. There are a number of areas in the Bay where dredge material can be dumped. It was assumed that there would be a four hour round trip between the dredging point and the release point. The entire process was assumed to take twelve and a half 10-hour days. One round trip to the release point would be completed each day. The emissions and emission factors used are summarized in Table 3.6.9.

Summary of Impact A-8

- Dredging for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years. This is a potentially significant impact.

Mitigation A-8.1: Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval.

Mitigation A-8.2: Utilize dredging contractors with the best available emission controls on their equipment.

Impact After Mitigation: With implementation of Mitigations A-8.1 and A-8.2, Impact A-8 would be less than significant.

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Table 3.6.1

Ambient Air Quality (1997-2000)

	1997	1998	1999	2000
Ambient Ozone levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 1-hour Concentration	0.099	0.147	0.156	0.138
Measured days>State standard	2	13	8	2
Measured days>National standard	0	2	2	1
Highest 8-hour Concentration	0.081	0.109	0.122	0.094
Measured days>National standard	0	6	6	1
Livermore-Old 1st Street				
Highest 1-hour Concentration	0.114	0.146	0.146	0.137
Measured days>State standard	3	21	14	5
Measured days>National standard	0	6	2	2
Highest 8-hour Concentration	0.084	0.11	0.116	0.11
Measured days>National standard	0	10	5	2
Oakland-Alice Street				
Highest 1-hour Concentration	0.079	0.056	0.081	0.072
Measured days>State standard	0	0	0	0
Measured days>National standard	0	0	0	0
percent year coverage	99	79	98	98
Highest 8-hour Concentration	0.062	0.045	0.059	0.048
Measured days>National standard	0	0	0	0
Pittsburg-10th Street				
Highest 1-hour Concentration	0.087	0.097	0.098	0.107
Measured days>State standard	0	4	2	1
Measured days>National standard	0	0	0	0
Highest 8-hour Concentration	0.067	0.089	0.087	0.08
Measured days>National standard	0	1	1	0
San Francisco-Arkansas Street				
Highest 1-hour Concentration	0.068	0.053	0.079	0.058
Measured days>State standard	0	0	0	0
Measured days>National standard	0	0	0	0
Highest 8-hour Concentration	0.059	0.046	0.057	0.043
Measured days>National standard	0	0	0	0
San Jose-4th Street				
Highest 1-hour Concentration	0.094	0.147	0.109	0.073
Measured days>State standard	0	4	3	0
Measured days>National standard	0	1	0	0
Highest 8-hour Concentration	0.068	0.091	0.084	0.061
Measured days>National standard	0	1	0	0
San Rafael-4th Street				
Highest 1-hour Concentration	0.106	0.074	0.102	0.071
Measured days>State standard	1	0	2	0
Measured days>National standard	0	0	0	0
Highest 8-hour Concentration	0.073	0.058	0.08	0.058
Measured days>National standard	0	0	0	0

Table 3.6.1 - Continued

Ambient Air Quality (1997-2000)

	1997	1998	1999	2000
Ambient CO levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 8-hour Concentration	3.03	3.75	3.11	2.7
Livermore-Old 1st Street				
Highest 8-hour Concentration	2.53	2.36	2.91	--
Oakland-Alice Street				
Highest 8-hour Concentration	3.58	4.58	5.23	3.43
Pittsburg-10th Street				
Highest 8-hour Concentration	3.19	2.65	3.27	2.68
San Francisco-Arkansas Street				
Highest 8-hour Concentration	3.45	3.96	3.68	3.19
San Jose-4th Street				
Highest 8-hour Concentration	6.11	6.27	6.28	7.03
San Rafael-4th Street				
Highest 8-hour Concentration	2.64	3.3	2.92	2.26
Ambient NO_2 levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 1-hour Concentration	0.076	0.066	0.079	0.074
Annual Average	0.016	0.016	0.018	0.016
Livermore-Old 1st Street				
Highest 1-hour Concentration	0.082	0.071	0.094	0.073
Annual Average	0.018	0.019	0.02	0.017
Oakland-Alice Street				
Highest 1-hour Concentration	--	--	--	--
Annual Average	--	--	--	--
Pittsburg-10th Street				
Highest 1-hour Concentration	0.07	0.064	0.087	0.054
Annual Average	0.014	0.014	0.015	0.013
San Francisco-Arkansas Street				
Highest 1-hour Concentration	0.067	0.08	0.103	0.074
Annual Average	0.02	0.02	0.021	0.02
San Jose-4th Street				
Highest 1-hour Concentration	0.118	0.083	0.128	0.114
Annual Average	0.025	0.025	0.026	0.025
San Rafael-4th Street				
Highest 1-hour Concentration	0.067	0.062	0.087	0.057
Annual Average	0.016	0.017	0.018	0.016
Ambient SO_2 levels (ppm)				
Concord-2975 Treat Blvd.				
Highest 24-hour Concentration	0.008	0.007	0.012	0.005
Annual Average	0.001	0.002	0.002	0.002
Livermore-Old 1st Street				
Highest 24-hour Concentration	--	--	--	--
Annual Average	--	--	--	--
Oakland-Alice Street				
Highest 24-hour Concentration	--	--	--	--
Annual Average	--	--	--	--

Table 3.6.1 - Continued

Ambient Air Quality (1997-2000)

	1997	1998	1999	2000
Pittsburg-10th Street				
Highest 24-hour Concentration	0.008	0.016	0.01	0.009
Annual Average	0.002	0.003	0.002	0.002
San Francisco-Arkansas Street				
Highest 24-hour Concentration	0.007	0.005	0.007	0.008
Annual Average	0.001	0.001	0.002	0.002
San Jose-4th Street				
Highest 24-hour Concentration	--	--	--	--
Annual Average	--	--	--	--
San Rafael-4th Street				
Highest 24-hour Concentration	--	--	--	--
Annual Average	--	--	--	--
Ambient PM_{10} levels (micrograms/cubic meter)				
Concord-2975 Treat Blvd.				
Highest 24-hour Concentration	75.6	65.9	63.8	53.8
Measured days>State standard	2	1	3	1
Measured days>National standard	0	0	0	0
State annual geometric mean	17.4	16.5	18.1	16.1
National annual arithmetric mean	19.4	17.9	20.8	17.8
Livermore-Old 1st Street				
Highest 24-hour Concentration	61.6	62.3	86.6	67.5
Measured days>State standard	2	2	3	2
Measured days>National standard	0	0	0	0
State annual geometric mean	22	19.4	22.6	19.1
National annual arithmetric mean	24.3	21.3	25.6	21.2
Oakland-Alice Street				
Highest 24-hour Concentration	--	--	--	--
Measured days>State standard	--	--	--	--
Measured days>National standard	--	--	--	--
State annual geometric mean	--	--	--	--
National annual arithmetric mean	--	--	--	--
Pittsburg-10th Street				
Highest 24-hour Concentration	--	--	72	55.5
Measured days>State standard	--	--	2	1
Measured days>National standard	--	--	0	0
State annual geometric mean	--	--	20.9	13.8
National annual arithmetric mean	--	--	28.9	16.3
San Francisco-Arkansas Street				
Highest 24-hour Concentration	81	52.4	77.9	63.2
Measured days>State standard	3	1	6	2
Measured days>National standard	0	0	0	0
State annual geometric mean	22.4	20.2	22.6	21.6
National annual arithmetric mean	24.9	21.7	26.4	24

Table 3.6.1 - Continued

Ambient Air Quality (1997-2000)

	1997	1998	1999	2000
San Jose-4th Street				
Highest 24-hour Concentration	78	92	114.4	76.1
Measured days>State standard	3	3	5	7
Measured days>National standard	0	0	0	0
State annual geometric mean	23.7	22.5	25.4	23.7
National annual arithmetric mean	25.8	25	28.7	26.7
San Rafael-4th Street				
Highest 24-hour Concentration	72	52.4	75.6	39.5
Measured days>State standard	2	1	2	0
Measured days>National standard	0	0	0	0
State annual geometric mean	20.2	18.7	19.5	18.1
National annual arithmetric mean	21.9	20.1	22	19.5

Notes:

1. Data obtained from the California Air Resources Board Internet Site.
2. CO, NO_2, and SO_2 levels did not exceed state or federal standards during this period.
3. Annual data capture of PM_{10} for Pittsburg in 1999 was 52% and for San Rafael in 2000 was 88%.
4. Annual data capture of CO for Livermore in 1999 was 73% and for Oakland in 1998 was 84%.
5. Annual data capture of ozone for Oakland in 1998 was 79%.

Table 3.6.2
2000 Planning Inventory for the Bay Area

Source Category	VOC (tpd)	NO_z (tpd)
INDUSTRIAL COMMERCIAL PROCESSES		
Petroleum Refining Facilities:		
Basic Refining Processes	0.10	6.49
Wastewater (Oil-Water) Separators	3.53	--
Wastewater Treatment Facilities	0.09	--
Cooling Towers	2.35	--
Flares and Blowdown Systems	0.08	1.36
Other Refining Processes	0.54	--
Fugitives	8.93	--
Subtotal	***15.6***	***7.9***
Chemical Manufacturing Facilities:		
Sulfur Manufacturing	0.03	0.07
Coatings and Inks Manufacturing	0.70	--
Resins Manufacturing	0.02	--
Other Chemicals Manufacturing	0.74	2.20
Fugitives (all manufacturing) – Valves and Flanges	1.70	--
Subtotal	***3.2***	***2.3***
Other Industrial Commercial Processes:		
Bakeries	1.30	--
Cooking	1.07	--
Wineries	0.88	--
Other Food and Agricultural Processes	0.26	--
Metallurgical	0.04	0.01
Asphalt Concrete Plants	0.03	0.03
Glass and Related Products Manufacturing	0.02	0.87
Stone, Sand and Gravel	0.04	--
Oil Production Fields	0.05	--
Gas Production Fields	0.19	--
Waste Management	4.22	0.25
Semiconductor Manufacturing	0.78	--
Flexible and Rigid Discs Manufacturing	0.02	--
Fiberglass Products Manufacturing	0.52	--
Rubber Products Manufacturing	0.22	--
Plastic Products Manufacturing	0.72	0.03
Contaminated Soil Aeration	3.06	--
Soil Vapor Extraction and Air Stripping	0.30	
Other Industrial Commercial	0.90	0.23
Subtotal	***14.6***	***1.4***
PETROLEUM PRODUCTS/SOLVENT EVAPORATION		
Petroleum Refinery:		
Storage Tanks	7.48	--
Loading Operations	2.74	--
Subtotal	***10.2***	***--***

Table 3.6.2 - Continued
2000 Planning Inventory for the Bay Area

Source Category	VOC (tpd)	NO_z (tpd)
Fuels Distribution:		
Natural Gas Distribution	0.45	--
Bulk Plants (Gasoline Only)	0.70	--
Bulk Plants and Terminals (Non-gasoline)	0.06	--
Loading Trucks	0.41	--
Trucking	0.15	--
Gasoline Filling Stations	9.80	--
Aircraft Fueling	2.82	--
Recreational Boat Fueling	0.93	--
Ferry and Fishing Boats Fueling	0.20	--
Other Fueling	0.20	--
Subtotal	***15.7***	***--***
Other Organic Compound Evaporation:		
Industrial Degreasing	3.33	--
Commercial Degreasing	2.26	--
Dry cleaners	0.15	--
Printing	6.75	--
Adhesives and Sealants	8.98	--
Structures Coating	26.00	--
Industrial/Commercial Coating	30.70	--
Storage Tanks	1.51	--
Lightering	0.09	--
Ballasting	1.85	--
Marine Vessel Cleaning and Gas Freeing	0.72	--
Sterilizers	--	--
Marine Loading (Non-refinery)	0.22	--
Asphalt Paving	0.33	--
Other Organics Evaporation	0.67	--
Subtotal	***83.6***	***--***
COMBUSTION – STATIONARY SOURCES		
Fuels Combustion:		
Domestic	2.10	12.00
Cogeneration	0.76	6.16
Power Plants	0.17	30.20
Oil Refineries External Combustion	0.40	32.90
Glass Melting Furnaces – Natural Gas	--	4.21
Reciprocating Engines	0.34	4.83
Turbines	0.14	2.37
Other External Combustion	1.18	21.80
Subtotal	***5.1***	***114.5***
Burning of Waste Material:		
Incineration	0.75	1.30
Planned Fires	0.10	0.01
Subtotal	***0.9***	***1.3***

Table 3.6.2 - Continued
2000 Planning Inventory for the Bay Area

Source Category	VOC (tpd)	NO_z (tpd)
COMBUSTION – MOBILE SOURCES		
Off-Highway Mobile Sources:		
Lawn, Garden, and Other Utility Equipment	6.57	1.29
Transportation Refrigeration Units	0.23	1.84
Farm Equipment	1.28	6.55
Heavy Duty Industrial/Construction Equipment	2.37	22.40
Light Duty Industrial/Construction Equipment	22.20	72.10
Locomotive Operations	0.48	10.60
Off-Road Motorcycles	1.18	0.12
All Terrain Vehicles	0.46	0.02
Four-Wheel Drive Vehicles	0.10	0.08
Ships Maneuvering	0.11	3.28
Ships Berthing	0.29	1.73
Ships In-Transit	0.15	5.70
Commercial Boats	0.69	4.33
Recreational Boats	16.40	1.71
Subtotal	***52.5***	***131.8***
Aircraft:		
Commercial Aircraft	3.16	15.00
General Aviation	0.91	0.21
Military Aircraft	6.06	4.55
Agricultural Aircraft	--	--
Airport Ground Support Equipment	0.17	0.49
Subtotal	***10.3***	***20.2***
On-Road Motor Vehicles:		
Light Duty Passenger	116.8	106.5
Light Duty Trucks	44.10	62.00
Medium Duty Trucks	7.98	13.20
Light Heavy Duty Trucks	2.09	14.40
Medium Heavy Duty Trucks	1.68	14.20
Heavy Heavy Duty Trucks	2.79	31.00
Heavy Duty Buses	0.52	4.82
Motorcycles	1.78	0.99
Subtotal	***177.7***	***247.1***
Further Reductions due to Reformulated Gasoline	2.5	--
Subtotal	***175.3***	
MISCELLANEOUS OTHER SOURCES		
Construction Operations	--	--
Farming Operations	--	--
Entrained Road Dust	--	--
Accidental Fires	0.41	0.13
Animal Waste	4.00	--
Wind Blown Dust	--	--
Agricultural Pesticides	2.95	--
Non-Agricultural Pesticides	1.53	--
Consumer Products (No pesticides)	41.70	--
Other Miscellaneous Sources	0.19	0.07
Subtotal	***50.8***	***0.2***
TOTAL	**438**	**527**
Banking Emissions:	7.56	7.69
GRAND TOTAL:	**445**	**534**

Source: BAAQMD. 1999. SF Bay Area Ozone Attainment Plan

Table 3.6.3

State and Federal Ambient Air Quality Standards

(as of January 2002)

Pollutant	Averaging Time	California Standards	National Standards	Bay Area State Status/ Classification	Bay Area National Status/Classification
Photochemical Oxidants	8 hour	--	0.08 ppm	--	Unclassified/Not Designated
	1 hour	0.09 ppm	0.12 ppm	Nonattainment	Nonattainment/ Unclassified
Carbon Monoxide	8 hour	9.0 ppm	9 ppm	Attainment	Attainment
	1 hour	20 ppm	35 ppm	Attainment	Attainment
Nitrogen Dioxide	Annual Mean	--	0.053 ppm	--	Attainment
	1 hour	0.25 ppm	--	Attainment	--
Sulfur Dioxide	Annual Mean	--	0.03 ppm	--	Attainment
	24 hour	0.04 ppm	0.14 ppm	Attainment	Attainment
	1 hour	0.25 ppm	--	Attainment	--
Fine Particulate Matter (PM_{10})	Annual Arithmetic Mean	--	50 $\mu g/m^3$	--	Attainment
	Annual Geometric Mean	30 $\mu g/m^3$	--	Nonattainment	--
	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$	Nonattainment	Unclassified/Not Designated
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	--	15 $\mu g/m^3$	--	Unclassified/Not Designated
	24 hour	--	65 $\mu g/m^3$	--	Unclassified/Not Designated

Notes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter - PM_{10}, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM_{10} annual standard), then some measurements may be excluded. In particular, measurements are excluded that CARB determines would occur less than once per year on the average.
2. National standards other than for ozone, particulates, and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 µg/m3. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of 98th percentiles is less than 65 µg/m3. Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM_{10} is met if the 3-year average falls below the standard at every site. The annual $PM_{2.5}$ standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.
3. National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.
4. A 1999 federal court ruling blocked the implementation of the 8-hour ozone standard. Its status is unclear as of January 2002.
5. In August 1998, the Bay Area was redesignated to nonattainment-unclassified for the national 1-hour ozone standard.
6. In April 1998, the Bay Area was redesignated to attainment for the national 8-hour carbon monoxide standard.
7. Statewide VRP Standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Table 3.6.4

Summary of Ferry Power Usage

FERRY POWER RATING AND HOURS OF OPERATION			
Year 2025 No Project			**Year 2025 Proposed Project**
Ferry Power Rating (kW) - Service Speed			**Large Ferry Power Rating (kW)**
Larkspur	4,296.9		- Service Speed 5,369.1
Alcatraz	2,147.7		- Slow Speed 424.2
Sausalito	872.5		**Small Ferry Power Rating (kW)**
Tiburon	2,148		- Service Speed 1,946.3
Vallejo	3,548		- Slow Speed 284.2
Alameda	2,148		
Oakland	2,148		**Total Transit Hours (hr/day)**
Harbor Bay	1,383		large ferry 115.0
			small ferry 180.0
Ferry Power Rating (kW) - Slow Speed			**Total Power Usage (kW-hr)**
Larkspur	339		large ferry 480,800
Alcatraz	170		small ferry 278,515
Sausalito	127		**Total Idle Hours (hr/day)** 68.7
Tiburon	170		
Vallejo	280		
Alameda	170		
Oakland	170		
Harbor Bay	202		
Total Transit Hours (hr/day)			
Larkspur	19.6		
Alcatraz	4.4		
Sausalito	15.7		
Tiburon	10.3		
Vallejo	19.4		
Alameda	8.7		
Oakland	7.2		
Harbor Bay	4		
Total Daily Power Usage (kW-hr)			
Larkspur	65,680		
Alcatraz	7,389		
Sausalito	10,889		
Tiburon	17,178		
Vallejo	53,674		
Alameda	14,502		
Oakland	12,046		
Harbor Bay	4,929		
SUM:	186,288		
Total Idle Hours (hr/day)	22.6		

Notes: Power at service speed is 90% of rated power. Slow speed power is between 8% and 14% of service speed power.

Table 3.6.5

Criteria Pollutant Emission Factors for Ferries

Running Emission Factors (lb/kW-hr)	**Year 2025 No Project[1]**	**Year 2025 Proposed Project[2]**
NO_x Emission Factor	0.0157	0.0016
SO_2 Emission Factor	0.0005	0.0007
PM Emission Factor	0.0009	0.0000
CO Emission Factor	0.0009	0.0009
VOC Emission Factor	0.0008	0.0004
Idle Emission Factors		
NO_x Emission Factor	0.1250	0.0131
PM Emission Factor	0.0057	0.0003
CO Emission Factor	0.2086	0.2086
VOC Emission Factor	0.0278	0.0149

Notes:
1) EPA Tier II
2) With SCR and Particulate Traps

Table 3.6.6

Summary of Criteria Pollutant Emissions from Ferries

Emissions (lb/day)	**Year 2025 No Project**	**Year 2025 Proposed Project**	**Increase in Emissions from Future Baseline (lb/day)**
NO_x Emissions (lb/day)	2,929	1,249	**-1,680**
SO_2 Emissions (lb/day)	101	550	**449**
PM Emissions (lb/day)	175	37	**-137**
CO Emissions (lb/day)	169	684	**515**
VOC Emissions (lb/day)	155	338	**183**

Note: Transit Hours (hrs/day) x Ferry Power (kW) x Emission Factor (lb/kW-hr) + Idle Hours (hrs/day) x Idle Emission Factor (lb/hr) = Pollutant Emissions (lbs/day)

Table 3.6.7

Existing (Year 2000) Bay Area Emissions Inventory-

Total Bay Area Summer Average Emissions (tons/day)

Source	Year 2000[1]					Predicted Year 2006[2]				
	PM_{10}	**ROG**	**NO_x**	**SO_2**	**CO**	**PM_{10}**	**ROG**	**NO_x**	**SO_2**	**CO**
Petroleum Refining Processes	1	25	3	36	--	1	14	1	N/A	N/A
Other Industrial/Commercial Processes	18	13	3	9	--	16	12	3	N/A	N/A
Organic Compounds Evaporation	--[3]	121	--	--	--	--	132	--	N/A	N/A
Combustion	9	5	82	10	72	44	6	56	N/A	N/A
Off-Highway Mobile Sources[4]	12	70	179	25	541	9	54	154	N/A	N/A
Aircraft	2	11	21	1	57	3	12	25	N/A	N/A
On-Road Motor Vehicles	10	238	353	2	2,317	9	176	207	N/A	N/A
Other Miscellaneous Sources	173	70	8	4	15	103	49	--	N/A	N/A
Total	**225**	**553**	**648**	**88**	**3,002**	**185**	**455**	**446**		

Notes:

1) Source: BAAQMD Website http://www.baaqmd.gov
2) Source: BAAQMD 2001
3) "--" means less than 0.1%
4) Construction and farming operations, entrained road dust, and wind-blown dust.

Table 3.6.8

Emission Estimates for Year 2025 No Project vs. Proposed Project (lbs/day)

FERRIES			
Emission	**Year 2025 No Project**	**Year 2025 Proposed Project**	**Increase over No Project (difference)**
NO_x	2,929	1,249	**-1,680**
SO_2	101	550	449
PM_{10}	175	37	**-137**
CO	169	684	515
CO_2	226,000[a]	796,000$_a$	570,000
ROG	155	338	183
PASSENGER VEHICLES			
Emission	**Year 2025 No Project**	**Year 2025 Proposed Project**	**Decrease over No Project (difference)**
NO_x	63,830	63,779	**-51**
SO_2	N/A	N/A	
PM_{10}	6108	6,104	**-5**
CO	709,019	708,449	**-570**
CO_2	N/A	N/A	**-144,000[b]**
ROG	71,181	71,123	**-58**
BUSES TO NEW FERRY TERMINALS			
Emission	**Year 2025 No Project**		**Emissions Increase over No Project (lb/day)**
NO_x	N/A		7
SO_2	N/A		
PM_{10}	N/A		1
CO	N/A		48
CO_2	N/A		
ROG	N/A		8
FERRY + PASSENGER VEHICLES + BUSES NET INCREASE/DECREASE OVER NO PROJECT (lbs/day):			
	NO_x	**-1,723**	
	SO_2	449	
	PM_{10}	**-141**	
	CO	**-7**	
	CO_2	426,000	
	ROG	134	

[a] Based on fuel consumption rates of 340 gal/hr at service speed for large ferries and 123 gal/hr at service speed for small ferries. Fuel consumption decreases at slow speed and idle.

[b] Based on a vehicle mile traveled reduction of 142,460 miles per day

Table 3.6.9

Criteria Pollutant Emissions from Dredging at Hercules/Rodeo

Diesel Engine Emission Factors (g/hp-hr)					
	HC	NOx	CO	PM_{10}	SO_2
Tug Engine	0.3	5.3	0.3	0.3	0.2
Dredging Engine	1.0	6.9	8.5	0.4	0.2

Tug emission factors the same as those used in the EIR.
Dredging engine factors from CARB Off-Road Engine Standards for engines
larger than 750 hp. (http://www.arb.ca.gov/msprog/offroad/offroadstandards.pdf)

Pollutant Emissions Associated with Dredging					
	HC	NOx	CO	PM10	SO2
Tug Engine (lb/day)	9.5	187.3	10.7	10.7	6.0
Dredging Engine (lb/day)	17.6	121.7	149.9	7.1	3.5
TOTAL (lb/day)	**27.2**	**309.0**	**160.7**	**17.8**	**9.5**
Tug Engine (ton)	0.06	1.17	0.07	0.07	0.04
Dredging Engine (ton)	0.11	0.76	0.94	0.04	0.02
TOTAL (ton)	**0.17**	**1.93**	**1.00**	**0.11**	**0.06**

Tug engine assumed to be 4,000 hp, and the dredging engine 800 hp.
Tug will operate 4 hours per day round trip and the dredge assumed to operate 10 hours per day.
Total dredging operation assumed to last for 12.5 days.

3.7 LAND USE

This section describes the existing land uses and communities around the Bay Area potentially involved with the project. The environmental setting of this report is divided into four sections: (1) the regional setting of the Bay Area; (2) the existing land use setting of each potential ferry terminal site; (3) a description of the land use and community resources potentially affected; and (4) the regulatory setting.

The regional setting is based largely on the data provided by the Association of Bay Area Governments (ABAG) in their publication *Projections 2002* (ABAG 2001). The existing land use setting of each proposed terminal location is based on a summary review of city and county general plans, regional census data, and other terminal site information already gathered by ARUP (ARUP 2001) for the WTA ferry expansion project. The data collection process focused primarily on the local settings.

A variety of land use and community attributes were identified for each community within which a potential ferry terminal facility is proposed or would be expanded as a result of the project. Most of the land use information was acquired from general plans. Existing land uses as well as planned future developments were identified. To expedite the data gathering process, a questionnaire was developed and mailed out to the planning department of each local jurisdiction (see Appendix LU-A). Planning agencies were requested to respond to the questionnaire. Follow-up phone calls were made to gather missing information.

Census data from the 2000 Census were reviewed to help describe the potentially affected communities with respect to race/ethnicity and income. Specifically, low-income and minority communities were identified to evaluate whether the proposed project could result in disproportionate adverse effects on these communities.

Table 3.7.1 contains a summary of the land use data collected for each potential terminal location. Table 3.7.2 contains the racial summary of each community potentially affected by the project. Table 3.7.3 compares the median income of each community potentially affected by the project to the low-income threshold for the county. Table 3.7.4 presents the census tracts considered to be minority and/or low-income communities.

3.7.1 Environmental Setting

3.7.1.1 Regional Setting

The San Francisco Bay Area consists of nine counties that cover roughly 4.5 million acres. According to ABAG, approximately 17 percent of this total acreage had been developed by the year 2000. Most of the Bay Area's population and economy is situated along the perimeter of San Francisco Bay (the Bay) in the older, larger cities such as San Francisco, Oakland, and San Jose. However, the majority of new residential and commercial land use development is occurring in the peripheral cities located in the valleys surrounding the Bay, such as Santa Rosa, Fairfield, and Livermore (ABAG 2001).

The communities in the Bay Area situated along the waterfront, such as those that could be involved with the proposed project, were historically focused on industrial and commercial land use. Many of the rail lines that serviced these areas still run along large stretches of Bay

shoreline, and large areas of cities still have active industrial areas on the waterfront. More recently, portions of the Bay shoreline have been the focus of redevelopment projects and recreational projects to renew people's connection to the Bay. ABAG is working on the San Francisco Bay Trail, which will one day provide a continuous recreational trail around the Bay. Industrial and commercial land uses have also continued to develop, but in more select areas around the Bay.

3.7.1.2 Existing Land Uses at Proposed Terminal Sites

The expansion and enhancement of ferry services would affect a wide range of land uses and communities along the Bay shoreline. Brief descriptions of potential local settings for new or enhanced terminal locations are provided below. The descriptions note when planning departments have identified potential changes in land use for a particular area, as some areas may have changed by the time a ferry terminal site is considered. The numbers in parentheses correspond to terminal locations shown on Figure 2.1. More detail on each potential ferry terminal site is contained in Tables 3.7.1 through 3.7.3.

Alameda – Harbor Bay (14) The existing ferry terminal at Harbor Bay Parkway and Mecartney Road on the northwest side of Bay Farm Island, Alameda, is located within a single-family residential area. The terminal was built as a requirement of the part of the Harbor Bay Business Park development, an employment center for 85 companies located approximately one-half mile south of the terminal site.

Alameda Main Street (15) The existing ferry terminal is located on Main Street along the Oakland Estuary. The site is between the former U.S. Naval Air Station Alameda and the Alameda Gateway site. Due to redevelopment plans for these areas, significant changes will occur including mixed-use business park development with office, commercial, and light industrial uses.

Pittsburg/Antioch (46) A potential ferry terminal could be located at the marina in Antioch. The site is surrounded by a parking lot, boat slips, restaurants, and commercial uses. Adjacent to the marina is a downtown setting with commercial, office, and residential land uses. Alternatively, a ferry terminal could be located at the Pittsburg Marina/Central Harbor, Contra Costa County. The waterfront area is immediately adjacent to the downtown core of Pittsburg with urban commercial and residential areas. There are few visual and physical connections between downtown and the water.

Berkeley/Albany (7) This terminal site would be located at the foot of University Avenue. The area includes a marina, restaurants, and a hotel, as well as recreational uses.

Hercules/Rodeo (28) Hercules is a rapidly growing city stretching from San Pablo Bay to the rolling coastal hills. The City of Hercules has proposed mixed-use development along the waterfront, primarily single-family residential and commercial. The Rodeo Marina is surrounded by a retail, commercial, and residential area and the Lone Tree Regional Shoreline.

Larkspur (1) The existing ferry terminal complex in Larkspur, Marin County, includes four vessel slips, a parking lot, bus parking, fuel storage, and maintenance and administration offices. Across the street is Larkspur Landing, an outdoor shopping complex with retail businesses and restaurants.

Vallejo/Mare Island (25) A ferry terminal is proposed for service to Mare Island, a former naval shipyard. The island currently has many old military buildings, some of which are occupied by businesses and some of which are vacant or closed. Reuse plans call for creating a job center with mixed land uses such as industrial and office as well as residential units, a regional park, expansion of the golf course, and the construction of a bridge at the southern end of the island.

Martinez (24) A ferry terminal is proposed in the vicinity of the Martinez Yacht Harbor at the end of North Court Street. The harbor extends into the Carquinez Strait and is surrounded by the Martinez Regional Shoreline Park to the east and west and the Martinez Waterfront Park to the south. The parks form a half-mile buffer between downtown Martinez and the harbor. Other potential sites could include areas near the Martinez Intermodal Station.

Mission Bay (12) Ferry service is proposed to the Mission Bay Redevelopment Area, approximately 1 mile southeast of downtown San Francisco. The site is currently an industrial area and former rail yard proposed for redevelopment as a dense urban neighborhood with housing, offices, retail, parks, and a school.

Oakland/Jack London Square (16) The existing ferry terminal is at the end of Clay Street within the commercial/retail district of Jack London Square. This active area includes restaurants, small shops, entertainment, residential units, and office space and is within walking distance of downtown Oakland.

Oyster Point (19) A ferry terminal is proposed at the end of Oyster Point Boulevard in the Oyster Point Marina/Park. The marina is surrounded by a shoreline park extending north and south along the Bay. The area inland of this park includes primarily low-density offices, technology parks, and light industrial areas with very few housing units.

Redwood City (21) The proposed ferry terminal site in Redwood City is on a narrow spit of land adjacent to Redwood Creek and surrounded by wetlands and salt evaporation beds. Commercial development is the primary land use planned for the area, including a large existing development at Pacific Shores. The Port of Redwood City is serving a growing industrial role for the delivery of bulk construction materials to the South Bay.

Richmond (4) Given Richmond's extensive waterfront, there are a variety of potential locations for a ferry terminal, including the existing decommissioned terminal at the end of Harbor Way South. The shoreline in the vicinity of the existing terminal includes a vacant parking lot, debilitated historical industrial factory, the Port of Richmond shipping yard, a small park, and R&D office facilities. Redevelopment of this area may include new land

uses such as office, research and development, residential, mixed-use development, parks, promenades, and open space.

Sausalito (3) The existing ferry terminal is located in the middle of downtown Sausalito, Marin County, and is easily accessible from the shopping area of central downtown. The picturesque town includes boutiques, restaurants and public parks. Multifamily housing dominates the nearby residential area.

San Francisco Ferry Building (20) The historic San Francisco Ferry Building is currently being redeveloped as a major retail/commercial structure. The project will result in new and improved ferry terminal facilities and enhanced public access and aesthetic character. The surrounding area includes high-rise buildings with offices, retail, and restaurants.

Tiburon (2) The existing Tiburon ferry terminal is located on the west end of Tiburon near the Belvedere border and looks directly across to Angel Island. Main Street, the downtown retail area with boutiques, restaurants, and other small-scale retail, is directly adjacent to the terminal. An adjoining multiple-unit residential area quickly gives way to lower-density residential as the distance from downtown increases.

Treasure Island (6) A ferry terminal is proposed on Treasure Island, in San Francisco Bay between San Francisco and Oakland. The island is composed of the natural island of Yerba Buena and the artificial Treasure Island. The site is a decommissioned military base with offices, housing, warehouses, and other structures. The Draft Reuse Plan emphasizes publicly oriented uses such as recreation, entertainment, retail, and hospitality.

Vallejo (25) The existing Vallejo ferry terminal provides service from Mare Island Way in Memorial Park. The terminal is adjacent to Vallejo's city hall, main post office, and library and is close to downtown Vallejo. In addition, the redevelopment of Mare Island may generate increased ferry ridership. Buildout of the former base will include a variety of uses including residential, wetland research center, regional park, an 18-hole golf course, dredge ponds, schools, and light industrial.

3.7.1.3 Potentially Affected Land Uses and Communities

This section describes the range of identified land use and community attributes potentially affected by the Proposed Project. The discussions of the first three sections on land use designations, zoning, and future developments summarize the data presented in Table 3.7.1. The discussion on race and ethnicity is supported by Table 3.7.2, and the discussion on income is supported by Table 3.7.3.

Land Use Designations

The Proposed Project would potentially affect a wide range of land use designations. Most of the terminals that already exist are designated as Public Institutional, Public Facility, Public Trust, or Parks and Open Space, and are compatible with the policies of the local general plan.

The land use patterns along the waterfronts of the various cities and counties was generally consistent, with the Industrial and Open Space/Recreational land use designations being the most common. This is consistent with the historical uses and present goals for use along the Bay shoreline. Interestingly, many of the areas surrounding the existing ferry terminals had these same designations, which may be attributed to the fact that many city and county planning agencies consider ferry terminals to be consistent land uses in industrial and open space/recreation areas.

The exact locations of many of the proposed new ferry terminal sites are unknown at this time. These sites could be located in a variety of places along the shoreline within each city or county. However, most of the proposed new terminal locations are in areas with existing maritime characters and can be considered "mixed-use," as more than one type of land use is designated along the waterfront. Most of the mixed uses are dominated by industrial uses, which are mixed with commercial and residential land uses.

Although most of the locations where new ferry service is proposed are defined by the presence of a population center, residential land uses are not common directly on the shoreline.

Zoning

Zoning ordinances support the land use designations in a local general plan. Zoning details the allowable use of a parcel, to ensure that it is used consistently with the general plan. Just as the proposed project would involve a large range of land use designations, it would also require compliance with a large range of related zoning regulations. As stated above, the existing ferry terminal facilities tend to be compatible with industrial and open space/recreation land uses. This may be attributed to the fact that ferry terminals are considered allowable uses in these areas by the local zoning ordinances. The zoning regulations that support commercially designated areas may also state ferry terminals as an allowable use.

Future Developments

Some of the proposed new ferry terminal sites would be located in areas where a Specific Plan, Master Plan, Management Plan, or other proposed local development plan has been proposed or adopted. When a large development or redevelopment project is proposed, involving more than one type of land use, the city or county responsible for adopting the development will usually require that a Specific Plan be prepared for incorporation into the local general plan. These types of local plans are opportunities for ferry services and terminals to be incorporated into the future land uses of an area.

It appears that some of the locations identified for potential new ferry terminals would be compatible with redevelopment plans that are currently being considered or have already been adopted by various city and county planning agencies. The Naval Air Station in Alameda is an example of a proposed redevelopment project that could incorporate a ferry terminal.

Other potential ferry terminal sites that could be incorporated into a local planning process under way include but are not limited to Richmond, whose planning department is currently considering plans to redevelop a part of the waterfront; Pittsburg, whose community development department is considering a new marine/waterfront commercial village; South San Francisco, whose planning department is expecting significant growth in the area east of U.S. 101 near Oyster Point; Antioch, whose community development department is currently

overseeing the development of a large mixed-use waterfront development called Rivertown; and Redwood City, whose planning and redevelopment agency is developing a new Waterfront Plan.

The GGNRA is conducting a separate study to address access to the various areas under their jurisdiction, including potentially increasing ferry services and creating new ferry terminals. Potential terminal sites, including existing piers, are being identified, along with encumbrances to landside access and potential transit linkages to support visitor flow. As part of the analysis, GGNRA is also examining the carrying capacity of the terminal sites and the natural resources which would be affected by water transit, along with the need for landside facilities once visitors arrive (GGNRA 2002). The exact sites being considered by GGNRA are still under study at this point. Although future GGNRA ferry terminals are still under study at this time, they may be compatible with three proposed ferry terminal locations, such as at Fort Mason, Fort Baker, and the Presidio. Federal environmental review and site-specific management planning is required before any development project is undertaken on GGRNA property. The GGNRA project is further described in Section 2.6.

In a few cases, such as at Alameda and Treasure Island, a new ferry terminal has been specifically proposed as part of an adopted Specific Plan or similar local plan. The City of Alameda Transportation Plan identifies the relocation of the existing ferry terminal to Seaplane Lagoon and the 1996 Reuse Plan for Treasure Island emphasizes the goal of making the island accessible to urban residents by ferry.

The proposed terminals at Alameda and Treasure Island are notable because the local agencies are already considering new ferry terminal facilities that may lead to a change in a land use designation and/or the construction of a ferry terminal facility independent of the WTA process.

Race and Ethnicity

The Bay Area is a diverse region in terms of race and ethnicity. According to the 2000 Census, the largest percentage (50 percent) of people in the nine-county Bay Area consider themselves white and not of Hispanic lineage. Twenty percent consider themselves Hispanic, 20 percent consider themselves Asian/Pacific Islander/Other, 7 percent consider themselves African American, and 3 percent consider themselves a mix of more than one race/ethnicity (U.S. Census Bureau 2001).

Race and ethnicity data were collected to determine whether the Proposed Project would have a disproportionate adverse impact on minority communities. Because the racial composition of a community or neighborhood can change drastically over small distances within one city's jurisdiction, racial and ethnic data were collected at the census tract level. Table 3.7.2 lists the 54 potentially affected census tracts and the top races/ethnicities for each census tract. In some instances, census tract information overlapped two potential ferry terminal sites; however, census tracts were only counted once. The Oakland Army Base and Treasure Island had no census data.

Although demographic surveys such as the U.S. Census categorize people generally and may not completely describe the level of diversity of a community, demographic data on race and ethnicity are important to consider in the analysis of potential impacts (both positive and negative) that may result from selecting the location of a transportation facility such as a ferry terminal.

Income

Income data are important to the environmental review process because, like race/ethnicity data, they help describe the community that could be served or adversely affected by constructing and operating a ferry terminal. Low-income neighborhoods are of particular concern because they tend to be more susceptible to redevelopment projects that deem these neighborhoods "blighted." Although the decision to redevelop a low-income neighborhood can only be made by the city or county government, it can be encouraged by regional projects such as the Proposed Project.

Income data by census tract were collected to determine whether the Proposed Project could have a disproportionate adverse impact on low-income communities. For the purposes of this analysis, one census tract was considered to be one neighborhood/community. As stated above, in some instances census tract information overlapped two potential ferry terminal sites; however, census tracts were only counted once in the analysis.

The California Department of Housing and Community Development (HCD) recently published income limits for the year 2002 (HCD 2002). HCD establishes income limits by household for the U.S. Department of Housing and Urban Development (HUD) programs in the state of California. These limits are published by county, which administers federal and state housing programs at the local level.

Table 3.7.3 presents a comparison of median household income to the county low-income limit for all of the communities potentially affected. For the purposes of this analysis, when the median household income in a census tract is below the low-income limit for the county, the community is considered low income. Because the average household size in all of the counties potentially affected is between 2 and 3 persons, the low-income limit used is based on a 3-person household. As stated above, the Oakland Army Base and Treasure Island had no census data.

3.7.1.4 Regulatory Setting

National Environmental Policy Act of 1972

Although the Proposed Project does not currently have federal involvement, it is possible that future actions at the local level may require compliance with the National Environmental Policy Act of 1972 (NEPA). NEPA is the federal process through which environmental effects are analyzed. It is required when a proposed action requires a federal permit or entitlement, is jointly carried out by a federal agency, will be federally funded, or will occur on federal land. For example, potential routes and terminals may be funded in part by a federal grant or agency, which would require the local project sponsor to comply with NEPA. Construction of new docks could require permits from the U.S. Army Corps of Engineers (USACE). Such permits could trigger environmental review under NEPA.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, was issued to all federal departments on February 11, 1994. This order requires federal lead agencies to ensure rights established under Title IV of the Civil Rights Act of 1964 are considered as part of analyzing environmental effects. Therefore, any proposed action under NEPA requires an Environmental Justice analysis to determine impacts to low income and minority communities.

California Environmental Quality Act

At the state level, the California Environmental Quality Act (CEQA) (California Public Resources Code Sections 21000-21178) and the CEQA Guidelines (14 California Code of Regulations [CCR] 15000-15387) are the primary policies that require projects to analyze potential impacts to land uses and communities. Essentially, CEQA requires that projects identify all potential impacts to environment and reduce their significance to a less-than-significant level. Unlike NEPA, however, CEQA does not require an environmental impact analysis to consider potential community impacts that are not physical in nature. In particular, land use impacts must be considered under CEQA; however, consideration of impacts to low-income or minority populations is not required.

CEQA requires that every project determine its consistency with local plans. Consistency with the adopted local general plan is one of several criteria for determining whether a project will have a significant effect under the provisions of CEQA. Specifically, an Initial Study must contain an examination of whether the project would be consistent with existing zoning, plans, and other applicable land use controls (Section 15063(d)(5) of the CEQA Guidelines). Please refer to City and County General Plans and Ordinances, below, for more discussion on the local land use controls.

San Francisco Bay Plan

Development in or within 100 feet of the San Francisco Bay is subject to the jurisdiction of the San Francisco Bay Conservation and Development Commission (BCDC) and would require BCDC approval. The goals and policies of BCDC are described in the San Francisco Bay Plan (Bay Plan), which was adopted in 1968 and incorporated by the California Legislature into the McAteer-Petris Act in 1969 (BCDC 2002). The Bay Plan contains findings about the value of the Bay, policies to guide future uses of the Bay, and maps that apply these policies to the Bay and its shoreline. Part Four of the Bay Plan contains findings and policies pertinent to development of the Bay and shoreline. Policies from the "Recreation" and "Public Access" subsections are described below.

Recreation (last amended October 2002)

This section states that as the population of the Bay region increases, more people are expected to use their leisure time in water-oriented recreational activities. It predicts that many more water-oriented recreational facilities will be needed to accommodate the needs of Bay Area residents and visitors. The Bay Plan maps include about 5,800 acres of potential new parks along the approximately 1,000-mile shoreline, as well as 4,400 acres of parkland that could be created if military use of the properties ceases (particularly near the Golden Gate). The Bay Plan states that water-oriented recreational facilities should be well distributed around the shores of the Bay, to the extent consistent with criteria specified elsewhere in the Bay Plan. Recreational facilities should not, however, preempt sites needed for ports, waterfront industry, or airports, but efforts should be made to integrate recreational uses into these facilities to the extent that they might be compatible. The Bay Plan also advises that waterfront land needed for parks and beaches by the year 2020 should be reserved now to preserve them from being used for other purposes. These facilities need not be built all at once, however.

Public Access (last amended March 2001)

This section states that, although public access to the Bay shoreline has increased since adoption of the Bay Plan in 1968, additional public access is still needed. Public agencies have limited funds for providing or improving shoreline access, but private capital can provide public access in association with a wide variety of shoreline developments. Any proposed fill project should enhance public access to the Bay to the maximum extent feasible in accordance with Bay Plan policies. In addition to the public access provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, including airport development. In those cases where public access is inconsistent with the project because of public safety considerations or significant use conflicts (such as significant adverse effects on wildlife), in-lieu public access should be provided, preferably near the project site.

Public access as a condition of development should be permanently guaranteed and should be consistent with the development project, as well as with the physical environment of the Bay and shoreline. Access to and along the waterfront should be provided by walkways or trails and should be convenient to parking and/or public transit. In addition, the BCDC, special districts, and federal, state, regional, and local jurisdictions should cooperate to provide new public access areas, especially to link the entire series of shoreline parks, regional trail systems, and existing public access areas to the extent feasible, without additional Bay filling or adversely affecting natural resources. BCDC's *Public Access Design Guidelines* (BCDC 2001) should be used in siting and designing public access associated with a proposed project. The Design Review Board should advise the BCDC on the adequacy of the public access proposed.

City and County General Plans and Ordinances

The California State Legislature, pursuant to Government Code Section 65300, requires each city and county jurisdiction in the state to prepare a local general plan. The general plan is the primary planning document that establishes policies to regulate the development, function, and use of land within the boundaries of each city or county jurisdiction. With respect to the proposed project, the enhancement of an existing terminal or the development of a new one must conform to the policies of the local general plan.

General plans are required to contain the following elements or chapters: land use, circulation, housing, conservation, open space, noise, and safety. Although all seven elements carry equal weight, the land use element is integral to carrying out local planning because it designates the pattern and scope of development. Land use designations are one of the primary tools cities and counties use to establish a comprehensive plan that is used to guide development. Examples of land use designations include Low Density Residential, Open Space, General Agriculture, and Light Industrial. Land use designations are supported by general plan policies that generally define how land can and cannot be used.

General plan policies are supported by local ordinances, such as zoning ordinances, which describe the specific requirements for developing a parcel within an identified land use designation. Zoning ordinances are important to the planning process because they define the specific allowable uses for each type of land use designation. Land uses may be classified in the zoning ordinance as principally permitted, conditionally permitted, or permitted under other

special circumstances. Under most zoning ordinances, principally permitted land uses require a simplified land use permitting process, whereas Conditional Use Permits and other special circumstance use permits have additional criteria for being considered allowable.

When a city or county desires to amend its general plan to make a change to an existing land use designation, it must go through an environmental review under CEQA to address the potential impacts that may occur as a result. More specifically, if any aspect of a general plan, element, or amendment, either individually or cumulatively, may lead to a significant impact on the environment, regardless of whether the overall impact of a project is adverse or beneficial, the city or county must prepare a draft Environmental Impact Report (EIR) (14 CCR 15063(b)). Furthermore, even if a proposed project is consistent with the land use designation, if it requires a Conditional Use Permit or similar special circumstance permit under the zoning ordinance, then CEQA compliance is required. These CEQA entitlements are an important step in the local planning process because they require local agencies to comply with state environmental regulations when making changes to the pattern or scope of planned development within their jurisdiction.

The local policies regarding either a Conditional Use Permit for allowing an otherwise noncompatible designation, or CEQA compliance due to a change in land use designations, could influence the local planning process with respect to the Proposed Project. This is especially true in areas where new ferry terminals are proposed because they may not be compatible with the existing land use designations.

3.7.2 Impacts and Mitigation

3.7.2.1 Significance Criteria

Impacts would be considered significant if they would:

- **Cause community displacement.** Implementation of the Proposed Project would have a potentially significant impact if it would result in the displacement of existing houses or businesses, either directly or indirectly.
- **Disrupt community cohesion.** Implementation of the Proposed Project would have a potentially significant impact if it would physically divide or otherwise substantially disrupt a community, either directly or indirectly.
- **Result in disproportionate physical impacts to low-income or minority communities.** Implementation of the project would have a potentially significant impact if the Proposed Project would cause adverse physical impacts to low-income or minority persons. The following criteria were used for determining low-income and minority communities:
    - ***Low-income:*** A community is defined as low-income when the median household income of a census tract is below the 2002 California Department of Housing and Community Development (HCD) low-income limit for the parent county.
    - ***Minority Community:*** A minority community is defined as having at least 70 percent of the population belong to of one or more minority groups (as compared to a 50 percent average for the Bay Area as a whole) (MTC 2001).

Because formal federal environmental review and compliance is not required at this Program EIR stage, these definitions are not based strictly on federal guidelines. In terms of low-income, the most recent HCD data were used, based on federal (HUD) standards for determining low-income. The definition of a minority community was taken from the Metropolitan Transportation Commission (MTC) EIR for their 2001 Regional Transportation Plan (RTP), which is the most recent analysis of potential adverse environmental impacts to minority communities conducted by a regional transportation agency in the Bay Area.

3.7.2.2 Impacts

Construction and Operational Impacts

Proposed Project ferry terminal locations are primarily located at existing port or maritime facilities. Nine of the proposed new terminal locations for the Proposed Project would require construction of new ferry terminals. Treasure Island is the only location identified that has already adopted plans for developing a new ferry terminal. In most cases the development of a new terminal would require revising or amending local land use policies, such as land use designations and zoning ordinances.

As discussed in Section 3.7.1.4 (Environmental Setting), CEQA review is required for general plan amendments to change a land use designation, or to issue Conditional Use Permits (or similar permits) required under local zoning ordinances. Therefore, any impact to an existing land use that may occur as a result of constructing a new ferry terminal or other facility would require additional CEQA review. The development and implementation of a specific terminal would require site-specific CEQA review for proposed new terminals.

Of the seventeen ferry terminal locations included in the Proposed Project, eight currently have ferry service (Table 3.7.1). All but one of the potential new terminal locations (Hercules/Rodeo) already have port or maritime land uses at the site. Depending on the specific land uses and the objectives for land use planning at and near each terminal location, a waterfront planning process should be used to consider surrounding land uses and local objectives to ensure that terminals will be a compatible use.

Impact LU-1 **The Proposed Project includes ferry terminal locations in developed urban areas that primarily have port or maritime land uses, but do not currently have ferry terminal facilities. The development of new ferry terminals in urban locations could result in the displacement of existing land uses.**

New water transit facilities in developed areas without existing operational ferry terminals may result in the displacement of residences, offices, or industrial facilities. The possible expansion of existing terminal facilities as a result of the Proposed Project could also result in displacement impacts; however, it is anticipated that this would occur in limited circumstances. As discussed below, planning for terminals would be performed in conjunction with local planning to minimize these effects.

As noted previously, eight of the seventeen terminal locations already have ferry terminals and service, and all but one of the seventeen have existing port or maritime facilities that may be relatively compatible for adding new service. One example is the Richmond location, where previous ferry service has been provided and there are plans for the revitalization of the waterfront area, which could be compatible and potentially enhanced with ferry service. It is

also noted that the area needed for new or expanded ferry transit terminals is not substantial, on a regional level. For example, the maximum total affected shoreline area for the Proposed Project is less than one half of one percent of the Bay Area shoreline.

Because the specific size, type, configuration, and location of each proposed new terminal and its associated facilities are unknown, potential displacement impacts cannot be determined. However, in the event it is necessary, it is important to note how displacement impacts might occur generally, and to identify the considerations that the project proponent(s) and local agencies would need to incorporate into future site-specific environmental review under CEQA.

The terminal locations included in the Proposed Project were selected based on favorable ridership projections, cost effectiveness, potential for local support, and/or potential for implementation related to existing or planned land uses. Implementation of the Proposed Project would have a very low potential for displacement impacts to people or businesses.

Some ferry terminals could be developed as an amenity to or in conjunction with other developments that have displacement impacts of their own, such as a Specific Plan or Redevelopment Plan. If the construction of a ferry terminal is adopted as part of a larger development, it will be the responsibility of the project sponsor to consider displacement impacts for that entire project, including the terminal. The potential impacts associated with these larger development projects may require analysis as part of an environmental review process. Specific displacement impacts would be considered at that time.

Although property acquisition impacts could occur for ferry services, they could also occur as an indirect or cumulative impact due to street widening or reconfiguration to provide better access to a terminal.

If people and businesses do not own the property or unit where they live or work (i.e., renters), they may not be able to obtain the benefits afforded to displaced property owners. When required to move out of a rental property as a result of a redevelopment project, relocation can be made difficult by the high cost of living in the Bay Area or an increase in time spent traveling to and from a job. When considering a terminal location, proponents of specific projects would have to take into account the potential impacts to renters that can result from displacing homes and businesses, especially in low-income neighborhoods.

Summary of Impact LU-1

- The Proposed Project minimizes land use conflicts and potential displacement issues by focusing expansion on only the most promising new terminal locations, which are primarily in existing port or maritime areas. However, its implementation could still involve acquisition of property necessary to expand or create ferry passenger terminals or other facilities. This action could potentially include residential or business properties. Although the significance of displacement impacts cannot be quantified at the regional level due to a lack of site-specific information, it remains a potentially significant impact. The decision to displace homes or businesses must be made with the participation of local governments. Displacement impacts most often result from redevelopment or property acquisition requirements. While at this time, no information indicates that any displacements will be required, until site-specific analysis is conducted, this remains a potentially significant impact.

Mitigation LU-1.1: Site-specific projects shall consider project alternatives that avoid displacement of homes or businesses. Displacement impacts to homes and businesses shall be addressed as part of the terminal site selection process, and be avoided through design measures. Proposals for terminals with potentially significant impacts due to the displacement of homes and/or businesses will likely not be approved without appropriate mitigation.

In the unusual circumstance that displacement is unavoidable, project proponents shall prepare and execute mitigation in the form of a relocation assistance plan or equivalent. If federal transportation funds will be used for a ferry terminal project, compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, shall be required. Relocation plans typically consider:

- Criteria for replacement housing;
- Reimbursement criteria for moving costs and/or differential housing costs (including rents); and
- Reimbursement criteria for businesses, including costs associated with searching for a new space, and business (i.e., patronage) lost due to the relocation.

Impact After Mitigation: With implementation of Mitigation Measure LU-1.1, this impact is considered less than significant.

Impact LU-2 Construction of new ferry terminals and associated landside facilities could disrupt or divide established neighborhoods. This impact has the potential to be significantly adverse or beneficial, depending on how much the community supports or opposes the location of the terminal.

The Proposed Project terminal locations are primarily within existing port, maritime, and waterfront areas. Therefore, disruption to existing neighborhoods should be avoidable or minimal. Nine proposed new terminals are included with the Proposed Project. It is anticipated that significant neighborhood or community disruption or division impacts would not occur at Proposed Project terminal locations. These types of impacts would still have to be determined or verified with each local terminal planning process. At a regional level, they are not expected to be significant.

Construction may also disrupt existing neighborhoods due to noise, dust, and traffic. These potentially disruptive impacts will be analyzed on a project-by-project basis as part of the environmental review under CEQA, but are most often minimized to a less than significant level through project design features and best management practices. Furthermore, construction-related impacts are temporary and would not result in permanent changes in an established community.

Because most of the ferry terminals will be "origin" terminals (they will be places where trips originate), people from around the Bay Area will need access to the terminals by private vehicle, bus, or other forms of transit. The following locations were identified where trips might travel through residential areas:

Facility	Nearest Highways	Approximate Driving Distance to Nearest Highway (miles)	Approximate Percent of Driving Distance in Residential Area
Hercules/Rodeo	I-80	1 – 1.5	100
Martinez	SR 4; I-680	3; 2.5	100; 25
Mission Bay	I-280; US 101	> 1	75
Pittsburg/Antioch	SR 4	1.5	50
Richmond	I-580	1	50

The volume of riders, the dispersed locations of the existing and planned ferry terminals, and the frequency of ferry transits are not expected to result in any substantial change to the regional highways listed above. In the event that existing local roadways must be widened or modified for access to a terminal or parking facilities are planned, there is a potential need for right-of-way acquisition. In some cases, this may involve impacts to existing local land uses. The need for property acquisition would be determined at the time each terminal is advanced for specific planning and further environmental and community review. At a regional level, it is not anticipated that significant right-of-way or property acquisition would be required for the Proposed Project, and planning and implementation of the Proposed Project terminals and any needed access improvements are unlikely to occur simultaneously.

Summary of Impact LU-2

- The Proposed Project includes nine new ferry terminals located within South San Francisco and Treasure Island, the Peninsula, and the East Bay. With the exception of one terminal (Hercules/Rodeo), all are within existing ports or maritime areas. At a regional level, the implementation of these terminals is not considered a significant impact to existing communities. Specific community impacts may occur at a local level related to some necessary property acquisition and land use changes, depending on each terminal site. These effects must be evaluated when each of the terminal plans is advanced for further review. Based on the terminals included in the Proposed Project, these impacts are not anticipated to be significant, but should be considered at the time each route and terminal are advanced for implementation. This is a potentially significant impact.

Mitigation LU-2.1: Local agencies desiring ferry service should identify parcels along their waterfronts that would facilitate a ferry terminal through a waterfront planning process or other type of terminal location study. Any potential terminal site must be analyzed with consideration to the surrounding land uses in order to ensure the terminal will be a compatible use and will minimize land use impacts. Projects should include project design elements that improve terminal accessibility while maintaining community cohesion.

Impact After Mitigation: With implementation of Mitigation Measure LU-2.1, this impact is considered less than significant.

Impact LU-3 **Implementation of the Proposed Project could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods.**

As the regional transportation agency, MTC identified low-income and minority neighborhoods (referred to as "Disadvantaged Communities") in the Bay Area to determine whether funding for the 2001 RTP would result in an inequitable allocation of funds to non-disadvantaged communities. MTC's Equity Analysis found that the 2001 RTP would increase spending in disadvantaged communities as compared to the previous plan. As did the MTC, the WTA analyzed the potential for the Proposed Project to result in disproportionate adverse impacts to low-income and minority neighborhoods in the Bay Area.

Community impacts from implementation of the Proposed Project could be beneficial or adverse. Increased transit opportunities would be a positive impact to a community, especially if ferry service were integrated with other transportation modes. In addition, if a new terminal was constructed, low-income and minority communities could benefit from increased local economic opportunity. Potential adverse impacts to low-income and minority communities include displacement of homes and businesses, or community disruption.

The Proposed Project could result in disproportionate adverse impacts to low-income and minority communities if care is not taken to minimize or avoid the displacement of homes and businesses or substantial disruption of these communities. As discussed under Impacts LU-2 and LU-3, there is a potential for these community impacts to occur.

Table 3.7.4 presents the census tracts considered to be minority and/or low-income communities. These could potentially be affected by the Proposed Project, either directly by the construction of a new terminal or expansion of an existing terminal, or indirectly by growth that could occur as a result of installing a terminal. Of the 54 census tracts potentially affected by the Proposed Project, 23 (42.6 percent) are considered low-income communities and 9 (16.6 percent) are considered minority communities. Information on income and poverty levels are only reported by the U.S. Census at the tract level, making further assessment of the type of communities potentially affected near the terminal locations difficult at this program EIR level of evaluation without further site-specific information gathering.

As shown, the Proposed Project could impact low-income or minority communities. Because at this time it cannot be determined where physical impacts would occur as a result of implementing the project, disproportionate adverse impacts cannot be assessed at this time. However, new terminal locations should be recognized not only for the potential to adversely impact low-income or minority neighborhoods, but also for the potential to positively impact the local community by creating a new form of accessible regional transportation. Locations where there is a potential beneficial impact include Berkeley/Albany, Hercules/Rodeo, Martinez, Mission Bay, Pittsburg/Antioch, Redwood City, and Richmond.

Summary of Impact LU-3

- Implementation of the Proposed Project could result in positive or adverse impacts to low-income and minority communities. Specific site location characteristics have not yet been analyzed for this program-level analysis, although some of the overall communities where

new terminals are included in the Proposed Project are identified as low-income. The physical displacement of homes and/or businesses (if any) or the substantial disruption of an established neighborhood could have an adverse impact, while increased transportation options and potential for greater economic opportunities would be positive impacts.

Mitigation LU-3.1: The terminal site selection process shall consider project alternatives to avoid adverse physical impacts to the low-income and minority neighborhoods. This would include site and terminal access design that minimizes residential acquisition. Terminal planning shall also involve local community input to help identify opportunities to avoid adverse impacts and enhance local planning efforts. Depending on the specific site and local land use planning, the project proponent may work with the local, city, or county to develop specific plans that address appropriate land use designations in the vicinity of the terminals.

If federal money will be used for the construction of a ferry terminal, compliance with NEPA will be required, and the federal lead agency's guidelines for addressing Environmental Justice shall be adhered to. If required, the federal Environmental Justice process will supersede the requirement to comply with adopted WTA criteria.

Mitigation LU-3.2: Implement Mitigations LU-1.1 and LU-2.1.

Impact After Mitigation: Implementation of Mitigations LU-1.1, LU-2.1, and LU-3.1 would reduce Impact LU-3 to a less than significant level. However, until further study at the local level is conducted to identify site-specific criteria or standards for identifying and mitigating impacts to low-income and minority communities, this impact remains potentially significant.

Impact LU-4 New or modified ferry terminals would be located along the shoreline, and could affect and/or enhance existing public use and access to and along the Bay shoreline.

Policies to protect and enhance public and recreational use and access to and along the Bay shoreline are included in the Bay Plan (BCDC 2002) and BCDC's *Public Access Design Guidelines* (BCDC 2001), as well as some local and general plans. New and expanded ferry terminal facilities could provide public access to the shoreline, and would impact shoreline access only where it would interfere with existing pathways, trails, parking, viewpoints, or other access locations along the shoreline. As each terminal is advanced forward for local approval and development, public access will be evaluated and included to meet the requirements of the Bay Conservation and Development Commission and local land use authorities.

Summary of Impact LU-4

- Adverse impacts to existing shoreline access and recreational uses from expansion or development of ferry terminal facilities is not considered a significant impact at the regional level, as no direct impacts to parks or trails are identified at this stage of evaluation. Terminal plans will potentially have to include measures for public access to gain regulatory permit approvals from BCDC or local authorities, depending on individual site conditions. This impact is not considered significant, but should be evaluated as terminal planning is advanced. Any public access would have to be appropriate and compatible with safe ferry operations.

Mitigation LU-4.1: Incorporate public access to and/or along the Bay shoreline in the planning for terminal locations or expansion. This may include trails, parking set aside for shoreline users, viewpoints, disabled access, etc.

Mitigation LU-4.2: Incorporate the shoreline access guidelines described in The *Terminal Architecture and Engineering – Terminal Design Guidelines* prepared for the WTA (Parsons Brinkerhoff 2002). The guidelines include Shoreline Access for pedestrians and bicycles, and viewpoints to provide views of the shore, bay, and the loading/ unloading of the ferries

Impacts After Mitigation: With implementation of Mitigation Measure LU-4.1, this impact is considered less than significant.

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Please refer to Appendix LU-A for a comprehensive list of planning departments contacted for this report.

Table 3.7.1
Land Use and Community Matrix

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Alameda	Alameda Planning and Building Department	Alameda	Public Institutional	Expansion of the ferry is proposed in the Transportation Plan, including relocation to the Seaplane Lagoon at Alameda Point to avoid Estuary marine traffic and provide a better connection with the Mission Bay development area	M-2 Manufacturing	Y	Y	Y	Parking; Maritime uses; small manufacturing buildings	This location is adjacent to the Alameda Point redevelopment area, and significant changes are expected here as a result. Tentative plans include a business park, residential, community and mixed-use land uses	None Identified
Alameda Harbor Bay Isle	Alameda Planning and Building Department	Alameda	Residential; Commercial Retail	Ferry service required for business park	R-1-PD Residential, Planned Development	Y	Y	Y	Harbor Bay Business Park; Residential; Commercial	There are still vacant areas where new office buildings could be built	All new developments have to adhere to Harbor Bay Business Park Association's guidelines for signage, height, size, etc.
Antioch	Antioch Community Development Department	Antioch	Rivertown	Upgrade the Marina area for better connection between people and commercial areas	M2 – Industrial District (in the process of trying to change zoning in the City)	Y	N	Y	Parking lot, boat slips, restaurants, commercial uses at the Marina. Adjacent downtown with commercial, office, and residential land uses	Focus Policy Area in the General Plan to bring more commercial uses to the area. An application for a 2-story office building in downtown was approved.	Design Review Board reviews all new buildings. General Plan design guidelines are very generic. Design requirements are site dependent, usually takes in elements from the surrounding area.
Berkeley/ Albany	Berkeley Planning and Development Department	Berkeley	Waterfront/ Marina	Policy 9 – ferry service	SP – Specific Plan (from 1986 Waterfront Specific Plan)	Y	N	Y	Marina, restaurants, hotel, and recreational uses	None Identified	None Identified
Ferry Building (SF)	San Francisco Planning Department	San Francisco	General Commercial/ Public Trust	Reinforce recreational use of this area as terminus of Market St. and terminal for commuter and recreational ferries. Improve physical access to the waterfront.	C2 – Community Business District	Y	Y	Y	Facilities for ferry service; Golden Gate Transit operates from north of the BART ventilation structure behind the Ferry Building. Adjacent is Pier One, a commercial development that also houses the Port of SF office. Across the Embarcadero is Justin Herman Plaza, a major public gathering spot and open space.	Currently undergoing renovations and redevelopments to include major retail/ commercial uses. New facilities for ferry passengers will include covered and accessible landing facilities and newly designed structures. Also, new promenades for public access and new terminals for increased commuter ferry service capacity are planned.	Create a plaza with a strong urban design setting for the Ferry Building.
Hercules/ Rodeo	Contra Costa County, Community Development Agency	Contra Costa County	Mixed-Use (downtown), Commercial Recreation, Parks and Recreation, Industrial, Commercial	Rodeo: Establish mixed uses along waterfront and downtown to make it a community "focal point"	Data not available	N	N	Y	Railroad tracks run along the entire shoreline. Waterfront has mixed uses; residential, industrial and commercial.	Hercules: New Town Center, Rodeo: redevelopment of the mixed-use area downtown.	Development along the shoreline must improve access. Shoreline is Rodeo's most prominent natural resource.
Larkspur	Larkspur Planning Department	Larkspur	Ferry Terminal; Public Facilities; Commercial; Shoreline/Marsh conservation	None Identified	Terminal; Study District; PD – Planned Development	Y	Y	Y	Commercial, office buildings	Mixed-use redevelopment proposal for hotel, offices, residential unit, and corporation yard for the City Sanitary District	According to City of Larkspur staff, there could be visual and aesthetic issues at this site.
Martinez	Martinez Community Development Department	Martinez	Park and Recreation, Special Study Area	General Plan 30.721: Contains policies pertaining to the waterfront. Highest priority placed on conservation, park, and recreational uses along the waterfront.	M-OS/RF Mix Use Open Space and Rec. Facilities. Surrounding area is Light Industrial, Institutional, Single-Family Residential, Medium Density Residential, and Central Commercial	Y	N	Y	Martinez Waterfront Park and the Martinez Regional Shoreline Park form a 0.5-mile buffer between downtown Martinez and the Yacht Harbor. Nearby urban land use is mostly commercial and some residential with some light industrial parcels to the southwest of the possible terminal site.	A Marina Development Area is being contemplated (i.e., the Special Study Area land use designation), but no redevelopment plans have been adopted.	Any waterfront development must be consistent with the recreational and park land uses promoted within the Waterfront Park and Marina area.
Mission Bay	San Francisco Planning Department	San Francisco	Residential/ Commercial	This site must incorporate walkable, bikeable, and transit-friendly elements.	Low-, medium- and high-density residential, office, commercial-industrial, neighborhood shopping, and open space.	Y	N	Y	Currently in transition from an industrial area and former rail yard into a mix-use community with housing, jobs, retail, open space, parks, and a school	First of the development blocks currently under construction, including housing units, corporate science and technical campus, health science campus for UCSF, retail space, hotel, and a public school.	Public access to the shoreline and adequate parks and public open space.

Table 3.7.1 -Continued
Land Use and Community Matrix

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Oyster Point	South San Francisco Planning Department	South San Francisco	Coastal Commercial	The City would like new developments to include uses that generate high revenues (i.e., hotels) that can help pay for maintenance of the Marina area and its debts. The City is supportive of introducing ferry service to this area.	Surrounding area is Coastal Commercial.	Y	N	Y	Shoreline park, small hotel, restaurants, office park, R&D buildings, and some parking lots	Part of the City's "East of 101" planning area, where significant potential growth is expected. Permit has been approved for 2 small office buildings, and plan underway for full service hotel. New developments will require adequate parking, especially if water transit services are introduced.	Policies allude to enhancement of waterfront shoreline and its accessibility. The City does not have specific details about design guidelines such as waterfront view preservation.
Pittsburg	Pittsburg Community Development Department	Pittsburg	Marine Commercial; Residential	5-P-13 to 16 of the General Plan: Undertake efforts to develop a waterfront activity center featuring a cluster of Marine Commercial uses with pedestrian amenities, focus on visitor attractions and traditional marine services, and provide access to the waterfront and open space at the center of the new Marine Commercial center	Downtown Medium and High Density Residential; Marine Commercial facilities	Y	N	Y	Mainly residential at the harbor, waterfront downtown is mostly commercial, office, residential. Across the slough from the waterfront area is Brown's Island Regional Shoreline Preserve.	A proposed marine/waterfront commercial village may feature marine-oriented repair and sales, restaurants, professional offices, industrial incubators, and specialty retail activities	Development standards (Floor Area Ratios, max building heights, etc.) in Table 5-2 of General Plan; Preservation and enhancement of historic structures unique to downtown
Redwood City	Redwood City Planning and Redevelopment Agency	Redwood City	R&D office uses; light and heavy industrial	A future Waterfront Plan is under consideration	IP – Industrial Park, GI – General Industrial	Y	N	Y	Seaport Conference Center, wetlands, salt evaporation beds, delivery of bulk construction materials and bulk recycling for the Port of Redwood City	Waterfront Plan is the only redevelopment plan under consideration.	None Identified
Richmond	Richmond Planning Department	Richmond	Industrial; Commercial, Residential; Recreation	Richmond Redevelopment Agency will consider new direction for waterfront land use, will likely recommend denser development than has been considered previously	None Identified	Y	N	Y	Vacant parking lot, debilitated historical industrial factory. Nearby, Port of Richmond shipping yard, small park, and R&D office facilities in the 0.25 mi radius, but isolated from waterfront.	Focus of extensive revitalization and planning effort by the City. Plan includes significant increase of R&D/office, residential and mixed-use land uses, as well as parks, promenades, open spaces, a Westshore business park, and historical preservation.	Focus of waterfront amenities
Sausalito	Sausalito Community Development Department	Sausalito	Public Institutional	CP-3.2.1-2 of General Plan: Promote increase patronage of ferries while protecting the area from overuse, support ferry providers for better service and efficient loading area, increase ferry information provided to passengers as alternatives to automobiles	Public	Y	Y	Y	Small park/plaza (open space) on either side of the ferry terminal, parking lot, commercial downtown across the street. Residential units beyond commercial downtown.	Possible proposal for building restroom facilities near the ferry terminal/downtown, but no applications yet.	Any new development will have to go through the design review; generally preserve waterfront views; and fit with existing architectural characteristics.
Tiburon	Tiburon Planning and Building Department	Tiburon	VC (Village Commercial) and P (Public/ Quasi-Public)	Office use not allowed on ground floor of Main Street in this area	VC – typical comm. uses w/ a conditional use permit; P- allows public parks and open space	Y	Y	Y	Restaurants and retail stores (small); Public park		Downtown Design Handbook provides specific guidelines for all private and public improvements in the downtown area. A ferry access project was constructed in Spring 2002. The project improved pedestrian and bike access to the existing ferry landing.
Treasure Island	San Francisco Planning Department	San Francisco	Public/Marina	1996 Draft Reuse Plan emphasizes publicly oriented recreational, entertainment, retail, and hospitality uses that can take advantage of the island's location. Goal is to make island accessible to urban residents by ferry	Marina	Y	N	Y	Closed Naval Station, some historic buildings	New ferry terminal, waterfront promenades, bike and pedestrian paths, recreational and entertainment facilities, and residential community.	Preserve historic structures and island's waterfront views; public promenade and open area around the entire island with parks and plazas to help connect the island to the bay setting
Vallejo	Vallejo City Hall Planning Department	Vallejo	Waterfront Commercial	Waterfront Downtown Plan (under EIR process) would increase the intensity of development, connect waterfront area with downtown, and make the waterfront area more accessible to the walking public	CW – Waterfront shopping and service. If Waterfront Downtown Plan is approved, rezoning to Planned Development Zoning.	Y	Y	Y	Surface parking for ferry passengers; Public facilities; commercial; high- density residential	The Waterfront Downtown Plan would result in a multi-level parking structure, 1,400 residential units, commercial uses, hotel, office space, new open space, emphasis on new walkable business district. Georgia St. would go from downtown to waterfront.	Reopening old grid of streets (e.g., opening Georgia St.) and establishing new street corridors; keeping waterfront view open for hill residents; make sure new developments (e.g., large parking structure) are visually attractive

Notes: 1) A new terminal would be located at Pittsburg or Antioch.

Table 3.7.2
Race/Ethnicity Analysis

Facility	Census Tract #[1]	Top Four Ethnicities (%)[1]				Minority Community?[3]
		African American	Asian[2]	Caucasian	Hispanic	
Alameda Point	4277.00	0.00	29.30	54.00	9.20	No
Alameda Point	4286.00	0.00	34.70	49.00	8.30	No
Alameda/Harbor Bay Isle	4283.01	0.00	32.00	52.00	6.50	No
Alameda/Harbor Bay Isle	4283.02	0.00	40.00	51.00	3.80	No
Alameda/Main St.	4274.00	10.00	0.00	66.70	14.20	No
Alameda/Main St.	4275.00	4.70	0.00	67.50	12.20	No
Alameda/Main St.	4276.00	30.60	33.40	20.80	0.00	Yes
Antioch	3050.00	6.00	0.00	63.00	35.00	No
Antioch	3060.01	5.30	0.00	76.60	20.80	No
Antioch	3060.02	4.10	0.00	73.70	20.60	No
Berkeley/Albany	4204.00	0.00	47.80	27.30	13.80	Yes
Berkeley/Albany	4219.00	13.20	15.00	61.50	0.00	No
Berkeley/Albany	4220.00	26.80	0.00	46.80	13.50	No
Berkeley/Albany	4221.00	25.60	0.00	42.40	25.20	No
Berkeley/Albany	4222.00	16.60	15.20	55.50	0.00	No
Ferry Building	105.00	0.00	17.10	77.90	3.20	No
Ferry Building	106.00	0.00	62.20	33.50	3.00	No
Ferry Building	115.00	0.00	69.40	21.70	3.40	Yes
Ferry Building	179.01	8.20	16.30	67.30	0.00	No
Hercules/Rodeo	3580.00	0.00	14.60	62.50	17.00	No
Hercules/Rodeo	3591.01	17.70	27.70	43.00	0.00	No
Hercules/Rodeo	3592.03	20.20	38.60	29.20	0.00	Yes
Hercules/Rodeo	3592.04	15.60	53.70	21.60	0.00	Yes
Larkspur	1192.00	0.00	4.00	92.00	2.90	No
Larkspur	1200.00	0.00	2.90	93.10	3.70	No
Larkspur	1211.00	0.00	4.30	89.00	5.40	No
Larkspur	1212.00	0.00	7.10	85.70	5.50	No
Martinez	3160.00	22.50	0.00	56.70	15.60	No
Martinez	3170.00	0.00	2.40	83.40	11.10	No
Martinez	3200.01	0.00	2.30	76.10	2.40	No
Mission Bay	226.00	11.50	9.60	71.80	0.00	No
Mission Bay	607.00	10.60	24.20	56.30	0.00	No
Oakland (Jack London Square)	4020.00	25.00	0.00	25.00	35.70	Yes
Oakland (Jack London Square)	4032.00	15.80	19.00	47.60	0.00	No
Oakland (Jack London Square)	4033.00	8.40	77.40	8.70	0.00	Yes
Oyster Point	6023.00	0.00	16.90	46.60	43.50	No
Pittsburg	3090.00	32.70	0.00	42.10	19.20	No
Pittsburg	3100.00	15.90	0.00	38.60	59.00	No
Redwood City	6102.00	0.00	0.00	0.00	0.00	No
Redwood City	6102.02	14.00	0.00	51.00	40.00	No
Redwood City	6103.02	5.00	0.00	71.00	24.00	No
Richmond	3780.00	8.10	0.00	80.60	9.10	No
Richmond	3790.00	68.00	0.00	11.00	23.00	Yes
Richmond	3800.00	31.80	0.00	35.50	18.90	No
Richmond	3820.00	68.00	0.00	11.60	10.90	Yes

Table 3.7.2 - Continued
Race/Ethnicity Analysis

Facility	Census Tract #[1]	Top Four Ethnicities (%)[1]				Minority Community?[3]
		African American	Asian[2]	Caucasian	Hispanic	
Sausalito	1290.00	45.90	0.00	36.40	8.20	No
Tiburon	1230.00	0.00	1.80	94.90	2.10	No
Tiburon	1242.00	0.00	3.20	89.50	4.00	No
Treasure Island	No Data	0.00	0.00	0.00	0.00	No
Vallejo	2507.01	33.20	0.00	30.90	32.30	No
Vallejo	2509.00	35.50	0.00	31.20	19.90	No
Vallejo	2515.00	25.20	0.00	41.30	25.70	No
Vallejo	2516.00	23.20	0.00	42.60	27.50	No
Vallejo	2517.01	23.70	0.00	40.70	18.10	No
Total Average:		**13.40**	**13.50**	**50.79**	**12.76**	

Notes: 1) 2000 US Census Data
2) Includes Pacific Islander and Other
3) Based on MTC Equity Analysis. A minority community is defined as a having at least 70 percent of the population share be one or more minority group (as compared to a 50 percent average for the Bay Area as a whole). (MTC 2001)
4) A new terminal would be located at Pittsburg or Antioch.

Table 3.7.3
Low Income Analysis

Facility	County	Census Tract No.	Median Household Income ($)[1]	County Low Income Limit ($)[2]	Potentially Low Income?
Alameda Point	Alameda	4277.00	77,047	52,200	No
Alameda Point	Alameda	4286.00	82,873	52,200	No
Alameda/Harbor Bay Isle	Alameda	4283.01	121,754	52,200	No
Alameda/Harbor Bay Isle	Alameda	4283.02	121,754	52,200	No
Alameda/Main St.	Alameda	4274.00	42,804	52,200	Yes
Alameda/Main St.	Alameda	4275.00	52,197	52,200	Yes
Alameda/Main St.	Alameda	4276.00	43,993	52,200	Yes
Antioch[4]	Contra Costa	3050.00	47,798	52,200	Yes
Antioch[4]	Contra Costa	3060.01	58,974	52,200	No
Antioch[4]	Contra Costa	3060.02	88,818	52,200	No
Berkeley/Albany	Alameda	4204.00	36,383	52,200	Yes
Berkeley/Albany	Alameda	4219.00	69,081	52,200	No
Berkeley/Albany	Alameda	4220.00	44,588	52,200	Yes
Berkeley/Albany	Alameda	4221.00	49,106	52,200	Yes
Berkeley/Albany	Alameda	4222.00	56,359	52,200	No
Ferry Building	San Francisco	105.00	160,753	73,300	No
Ferry Building	San Francisco	106.00	52,554	73,300	Yes
Ferry Building	San Francisco	115.00	32,698	73,300	Yes
Ferry Building	San Francisco	179.01	86,916	73,300	No
Hercules/Rodeo	Contra Costa	3580.00	53,981	52,200	No
Hercules/Rodeo	Contra Costa	3591.01	81,565	52,200	No
Hercules/Rodeo	Contra Costa	3592.03	91,553	52,200	No
Hercules/Rodeo	Contra Costa	3592.04	93,337	52,200	No
Larkspur	Marin	1192.00	133,049	73,300	No
Larkspur	Marin	1200.00	118,068	73,300	No
Larkspur	Marin	1211.00	101,422	73,300	No
Larkspur	Marin	1212.00	89,056	73,300	No
Martinez	Contra Costa	3160.00	41,972	52,200	Yes
Martinez	Contra Costa	3170.00	46,728	52,200	Yes
Martinez	Contra Costa	3200.01	76,096	52,200	No
Mission Bay	San Francisco	226.00	67,179	73,300	Yes
Mission Bay	San Francisco	607.00	55,526	73,300	Yes
Oakland (Jack London Square)	Alameda	4020.00	80,852	52,200	No
Oakland (Jack London Square)	Alameda	4032.00	50,651	52,200	Yes
Oakland (Jack London Square)	Alameda	4033.00	50,889	52,200	Yes
Oyster Point	San Mateo	6023.00	76,334	73,300	No
Pittsburg	Contra Costa	3090.00	60,639	52,200	No
Pittsburg	Contra Costa	3100.00	48,155	52,200	Yes

Table 3.7.3 - Continued
Low Income Analysis

Facility	County	Census Tract No.	Median Household Income ($)[1]	County Low Income Limit ($)[2]	Potentially Low Income?
Redwood City	San Mateo	6102.00	57,191	73,300	Yes
Redwood City	San Mateo	6102.02[3]	57,191	73,300	Yes
Redwood City	San Mateo	6103.02	64,682	73,300	Yes
Richmond	Contra Costa	3780.00	108,199	52,200	No
Richmond	Contra Costa	3790.00	38,880	52,200	Yes
Richmond	Contra Costa	3800.00	64,325	52,200	No
Richmond	Contra Costa	3820.00	57,904	52,200	Yes
Sausalito	Marin	1290.00	60,758	73,300	Yes
Tiburon	Marin	1230.00	280,842	73,300	No
Tiburon	Marin	1242.00	218,657	73,300	No
Treasure Island	San Francisco	No Data	No Data	No Data	No Data
Vallejo	Solano	2507.01	51,959	41,200	No
Vallejo	Solano	2509.00	26,515	41,200	Yes
Vallejo	Solano	2515.00	46,847	41,200	No
Vallejo	Solano	2516.00	44,706	41,200	No
Vallejo	Solano	2517.01	92,504	41,200	No

Notes:

1) ABAG data. Median Income based on 1995 dollars. Projection to 2000 dollars was made using a 1.189 multiplier.
2) Low Income Limit for a 3-person household published February 2002 by the Calif. Dept. HCD. Since the average persons per household in every county potentially affected by the project was between 2 and 3, a 3-person household low income limit was used. HUD bases low income limits on a 4-person household, and uses a factor of 0.9 to determine low income limits for 3-person households.
3) Census tracts that were split up into two tracts for the 2000 US Census from one 1990 US Census tract. Partial census tracts. Data presented are from larger tract from the 1990 US Census.

Table 3.7.4
Minority and/or Low-Income Communities

Facility	Census Tract No.	Low-Income Community?	Minority Community?
Alameda Point	4277.00	No	No
Alameda Point	4286.00	No	No
Alameda/Harbor Bay Isle	4283.01	No	No
Alameda/Harbor Bay Isle	4283.02	No	No
Alameda/Main St.	4274.00	Yes	No
Alameda/Main St.	4275.00	Yes	No
Alameda/Main St.	4276.00	Yes	Yes
Antioch	3050.00	Yes	No
Antioch	3060.01	No	No
Antioch	3060.02	No	No
Berkeley/Albany	4204.00	Yes	Yes
Berkeley/Albany	4219.00	No	No
Berkeley/Albany	4220.00	Yes	No
Berkeley/Albany	4221.00	Yes	No
Berkeley/Albany	4222.00	No	No
Ferry Building	105.00	No	No
Ferry Building	106.00	Yes	No
Ferry Building	115.00	Yes	Yes
Ferry Building	179.01	No	No
Hercules/Rodeo	3580.00	No	No
Hercules/Rodeo	3591.01	No	No
Hercules/Rodeo	3592.03	No	Yes
Hercules/Rodeo	3592.04	No	Yes
Larkspur	1192.00	No	No
Larkspur	1200.00	No	No
Larkspur	1211.00	No	No
Larkspur	1212.00	No	No
Martinez	3160.00	Yes	No
Martinez	3170.00	Yes	No
Martinez	3200.01	No	No
Mission Bay	226.00	Yes	No
Mission Bay	607.00	Yes	No
Oakland (Jack London Square)	4020.00	No	Yes
Oakland (Jack London Square)	4032.00	Yes	No
Oakland (Jack London Square)	4033.00	Yes	Yes
Oyster Point	6023.00	No	No
Pittsburg	3090.00	No	No
Pittsburg	3100.00	Yes	No
Redwood City	6102.00	Yes	No
Redwood City	6102.02	Yes	No
Redwood City	6103.02	Yes	No
Richmond	3780.00	No	No
Richmond	3790.00	Yes	Yes
Richmond	3800.00	No	No
Richmond	3820.00	Yes	Yes
Sausalito	1290.00	Yes	No
Tiburon	1230.00	No	No
Tiburon	1242.00	No	No
Treasure Island	No Data	No Data	No
Vallejo	2507.01	No	No
Vallejo	2509.00	Yes	No
Vallejo	2515.00	No	No
Vallejo	2516.00	No	No
Vallejo	2517.01	No	No
TOTALS		23 = Yes	9 = Yes
PROJECT TOTALS	54 Project Tracts	42.6% of project total	16.6% of project total

3.8 AESTHETICS

This section describes the visual and aesthetic resources setting potentially affected by the expansion and enhancement of ferry service throughout the Bay Area.

3.8.1 Environmental Setting

San Francisco Bay is a world-renowned scenic resource, combining water, islands, urban skylines, bridges, and mountains in picturesque and impressive vistas. San Francisco Bay extends from the Sacramento River Delta to the marshlands of Santa Clara County, a total of 548 square miles and 1,000 miles of shoreline. The shoreline of the Bay is lined with commercial, industrial, and residential land uses; points of historic, natural, and cultural interest; recreational areas such as beaches, fishing piers, boat launches; and over 130 parks and wildlife preserves. It is viewed and appreciated from many locations throughout the region. As stated in the San Francisco Bay Plan (BCDC 2002), "Probably the most widely enjoyed 'use' of the Bay is simply viewing it – from the shoreline, from the water, and from afar".

Hills and mountains surround San Francisco Bay. The north-south Coastal Range runs just east of San Francisco and the famously rugged coast is in full dramatic character along the Marin Coast and the Golden Gate. The East Bay hills frame the cities of Oakland and Berkeley and the topography of San Francisco is also famously hilly, providing a dynamic city skyline contrasted against the water and coastal hills.

Islands such as the hilly and forested Angel Island, the historic Alcatraz Island, and the man-made Treasure Island help define the visual character of the Central Bay. They are a dramatic landscape viewable throughout the Central Bay. They also provide spectacular views of San Francisco, the Marin coastline, the hills of the East Bay, and Bay waters extending north and south.

Other unique visual features of the Bay Area include the salt ponds of the South Bay and Suisun Marsh in the North Bay, which contribute to the natural and visual diversity of the area. Wildlife is also a highlight of the Bay's visual character. People can watch seals, shorebirds, and deer in regional parks. In the spring, after mild but wet winters, the Bay is surrounded by colorful displays of native wildflowers.

The cities, towns, and industry along the Bay are evidence of the large population of people living and working around the Bay. The built environment heavily defines the visual character of the Bay shoreline. For example, residential areas along or within the nearby hills of Marin County, Point Richmond, or the Marina District of San Francisco are noted by many as memorable skylines. Along the Carquinez Strait, the views are a mix of industrial and petro-chemical refiners and tanker wharves, interspersed with open shoreline and marsh.

3.8.1.1 Local Visual Setting

The expansion and enhancement of ferry services would affect a wide range of visual settings along the Bay shoreline. Section 3.7.1.2 (Land Use) summarizes land uses around each existing and potential terminal location, which provides additional understanding of the local visual settings. The potential settings range from highly urban landscapes to undeveloped shoreline

parks. General types of visual settings are described below to provide context to potential and existing terminal locations that may be included in the WTA plan.

Urban Environment

Ferry terminals in San Francisco and Oakland are surrounded by dense development including warehouses, high-rise buildings, commercial, and housing. The urban environment provides a unique visual resource and views to and from the Bay, including skylines and shoreline development. Historic structures, such as the Ferry Building in San Francisco or more modern developments such as Jack London Square in Oakland, are examples of the varied urban context behind new or enhanced terminals.

Suburban Environment

Waterfront communities around the Bay provide varied visual settings for potential ferry terminals. These areas are generally less densely developed and have open Bay views due to lower buildings, waterfront promenades, and marinas. Existing terminal facilities at Larkspur, Vallejo, and Alameda are transportation and commuter hubs and are surrounded by retail, business, and residential land uses. Potential terminal locations identified in this EIR, such as Antioch or Pittsburg may utilize existing ports or marinas to develop similar transportation hubs. In some locations, such as the Berkeley marina, the local marina or shoreline is separated from the city center and neighborhoods by freeways, railroads, and/or undeveloped lands.

3.8.1.2 Regulatory Setting

McAteer-Petris Act

Under the McAteer-Petris Act, the Bay Conservation and Development Commission (BCDC) regulates development within the first 100 feet inland from the Bay. One of BCDC's primary roles is to review proposed development or changes to the shoreline for their aesthetic and visual impact. BCDC has appointed a Design Review Board that evaluates projects and makes recommendations in light of the San Francisco Bay Plan Part IV, Appearance, Design, and Scenic Views, Policies 1-15 (BCDC 2002). Some of the criteria relevant to the WTA program include the following:

- To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.
- All bay front development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore.
- Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline.

- To enhance the maritime atmosphere of the Bay Area, ports should be designed, whenever feasible, to permit public access and viewing of port activities by means of (a) view points (e.g., piers, platforms, or towers), restaurants, etc., that would not interfere with port operations, and (b) openings between buildings and other site designs that permit views from nearby roads.

Local Regulations

Aesthetic and visual resource regulations vary from location to location based upon the City and County General Plans, Ordinances, and Policies. These local regulations must be identified on a project-by-project basis. Pertinent local aesthetic policies currently in place are listed in Table 3.7.1 of the Section 3.7 (Land Use).

State Scenic Highway Program

The State Scenic Highway Program, created by the State Legislature in 1963, was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway is officially designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a Scenic Highway.

When a city or county nominates an eligible scenic highway for official designation, it defines the scenic corridor, which is land generally adjacent to and visible to a motorist on the highway. The agency then must adopt or document ordinances to preserve the scenic quality of the corridor.

3.8.2 Impacts and Mitigation

3.8.2.1 Methods

This programmatic assessment of visual and aesthetic impacts due to proposed water transit service expansion is a qualitative analysis. It is broad-based and regional in nature and does not provide a detailed local visual and aesthetic impact assessment. Broad types of visual and aesthetic impacts were assessed because they could occur at any location throughout the Bay due to increased ferry services.

The issues considered in the analysis include views to and from the Bay, the visual quality of new or enhanced structures, light and glare, and the aesthetic quality of construction or ferry activity along the shoreline. The assumption was made that visual and aesthetic impacts of increased ferry services would be most prominent at the existing and potential terminal locations. Therefore, the assessment focused more heavily on these areas.

3.8.2.2 Significance Criteria

Impacts would be considered significant if they:

- Would have a substantial adverse effect on a scenic vista or degrade the existing visual character or quality of the site and its surroundings;

- Would substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway; or
- Would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

3.8.2.3 Impacts

Impact V-1 **The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay.**

The types of impacts that could occur through construction of terminals, enhancement of existing terminals, and expansion of ferry service are summarized below. These impacts would be localized. Region-wide, these structures would affect a relatively small portion of the 1,000 miles of Bay shoreline. The Proposed Project represents only nine potential new terminals. All but one of these terminals (Hercules/Rodeo) would be at already developed shoreline areas. Localized site-specific visual impact analyses of potential terminal locations were not performed for this program-level EIR.

- Block Bay views: New shoreline development could result in new structures or docked vessels. It is possible that in some instances these structures could be visible or even block or restrict existing views of the Bay.
- Construct unsightly buildings: Without careful planning and design, new terminals could result in unattractive development that negatively affects shoreline views.
- Create light and glare: Safety lighting for facilities, walkways, and parking lots could create a new source of light and glare that negatively affects the surrounding community and/or wildlife.
- Construct a building that is inappropriate to a waterfront location: Inappropriate terminal designs could result in parking areas or other inappropriate structures along the waterfront.

Proposed ferry service expansion may also result in positive impacts to visual resources and the aesthetics of the Bay:

- Enhance Bay views: New terminal designs could provide new or enhanced opportunities to view the Bay from piers, platforms, and the ferries themselves.
- Improve the aesthetics of shoreline development: New terminal development could revitalize areas of the shoreline that currently do not take advantage of the Bay setting. Improving areas that currently have debris, contamination, or inappropriate development could result in an enhancement of public views to and from the Bay through the construction of terminals designed to visually complement the Bay and provide public access to the waterfront.

Planning of any development or change in or near the shoreline of the San Francisco Bay is subject to considerable regulatory review by local, state, and federal resource and permitting agencies. Site and terminal planning and its associated regulatory review process for all proposed ferry terminal projects would follow the BCDC Bay Plan policies on appearance, design, and scenic views (BCDC 2002). The policies provide guidelines for enhancing the visual quality of development around the Bay while preserving views of the Bay and shoreline. In

addition, the BCDC Design Review Board would review all proposed development that affects the appearance of the Bay in accordance with the Bay Plan. Local, city, and county ordinances, regulations, and policies would also apply on a project-by-project basis.

Summary of Impact V-1

- The Proposed Project would involve the construction of new terminals and could involve the improvement of existing terminals. These could have potentially significant impacts on views of the Bay or the visual character of waterfront areas. Light and glare could also have potentially significant impacts on wildlife. Potential impacts to wildlife are addressed in Impact B-21 in the Biology Section (3.5).

Mitigation V-1.1: When feasible, the following shall be included in ferry terminal design:

- Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares;
- Design terminals and layout to integrate with the surrounding landscape and historical structures to preserve, and take advantage of, existing views of the Bay and shoreline.
- Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways;
- Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay; and
- Vessels should be standardized to support system-wide operations and to work interchangeably at all terminals. Vessel berthing should be configured so as to allow maximum feasible visual access to the Bay.

Mitigation V-1.2: The WTA established Intermodal and Architectural Design Guidelines (ARUP 2001) that shall be considered in the planning and design of new and enhanced ferry terminals (Parsons Brinckerhoff 2002). The design objectives may include, but are not limited to, making the ferry system more attractive, integrating terminals with the local urban context, and taking advantage of waterfront views. The ideal terminal facility will serve as a catalyst to ferry service expansion in the Bay Area. The specific design of each terminal facility should be developed at a local level to ensure compatibility with the surrounding visual environment. In addition, site-specific studies on the potential impacts of light and glare on wildlife may be necessary to determine appropriate mitigations. This would be most relevant for the Hercules/Rodeo site, which is the only proposed new terminal site that would not be in an area having existing maritime uses.

Impact After Mitigation: The WTA design guidelines would promote aesthetic planning criteria that guide the initial development of projects in a manner consistent with preservation of views and scenic resources. In addition, future development of projects will not proceed without meeting BCDC and local planning requirements. At some sites, Impact V-1 could still be potentially significant after implementation of Mitigations V-1.1 and V-1.2.

Impact V-2 An increase in the number of ferryboats operating on San Francisco Bay could impact views of the Bay or degrade the visual character of the Bay.

The current ferry services use 15 boats systemwide, with over 80,000 trips annually. Ferries share the Bay with commercial, military, and recreational boats making their way to and from the eight ports and 21 marine terminals throughout the Bay. Views of the Bay therefore include many types of vessels.

The proposed expansion of ferry service under the Proposed Project would expand service by approximately four times. Ferry activity on the Bay would increase from approximately 85 daily trips to a projected 336 daily trips.

The potential visual impact of additional ferryboats making trips across the Bay is subjective. It could be seen as an enhancement of the maritime atmosphere and Bay views similar to existing views, which include ferry services, shipping activity, and recreational boating. It could also be seen as a detriment to views of the Bay. There are no established significance criteria that provide a framework to determine whether increased ferry vessels on the Bay would be considered a significantly detrimental impact. Increases in service may be relatively unnoticeable to most Bay Area residents and travelers. In addition, the visual impact would be partially minimized by the concentration of routes along some common alignments. Given the total volume of boat traffic on the Bay, and the maritime history of the Bay, the impact on visual resources of expanded ferry service is expected to be less than significant.

Summary of Impact V-2

- The Proposed Project would result in an increase in the number of vessels operating on San Francisco Bay. This could have an adverse impact on scenic views of the Bay or the visual quality of waterfront areas. Given the variety of vessels plying the Bay and the frequency of their passage, it is expected that additional ferries would have a less than significant impact on scenic views.

Impact V-3 Increased ferry operations could increase the amount of visible exhaust over the Bay.

Visible exhaust plumes from existing ferry engines are the result of various conditions, but can indicate that an engine is not completely burning the fuel. Incomplete combustion results in unwanted pollutant emissions. These emissions can include particulates that may be visible in the exhaust, resulting in darkened plumes. Internal combustion engine emissions also include a large proportion of water vapor, a normal product of combustion, which may also be visible under certain conditions (such as very cold temperatures or an engine that is not completely warmed up).

For the Proposed Project, all ferries proposed for new routes would be based on state-of-the-art engine and fuel technology that would have minimal or nonexistent plumes. The modern ferry vessels on current routes would also use the clean technology (SCR and particulate traps). This technology goes beyond U.S. Environmental Protection Agency (USEPA) Tier 2 standards in reducing emissions. By the year 2025, it is assumed that all ferries operating on the Bay will be based on the cleaner technology and visible exhaust plumes would be significantly reduced or nonexistent. Therefore, visual impacts from exhaust plumes are considered to be less than significant.

Summary of Impact V-3

- The Proposed Project would increase the number of ferries and trips on the Bay, but all boats would use clean technologies. As a result, visible exhaust plumes would be minimal or nonexistent. Therefore, visual impacts from exhaust plumes are considered to be less than significant. No mitigation is required.

Impact V-4 Expanded and enhanced ferry services, including terminals and additional ferry boats, would not impact scenic resources within a State Scenic Highway.

Sections of Bay Area Highways 280, 580, and 680 have been designated as scenic corridors under the State Scenic Highway program but do not provide motorists with expansive or continuous views of the Bay. Therefore, these corridors would not be affected by an increase in visible ferries on the Bay or the construction of new terminals along the shoreline.

Summary of Impact V-4

- The Proposed Project includes additional terminals and an increase in the number of vessels operating on San Francisco Bay. This development and boat activity would not be highly visible to motorists and it does not represent a visual impact to scenic resources within a State Scenic Highway.

Impact V-5 Expanded and enhanced ferry terminals and services throughout San Francisco Bay could result in light and glare impacts.

Ferry terminal facilities could include structures, parking lots, roadways, and pedestrian and bicycle facilities that would be lit for public safety. Terminals proposed within or adjacent to existing marinas, ports, or shoreline development would add to existing light and glare, but may not necessarily create a substantial new source. Potential terminal facilities in parkland or less developed areas would be more likely to create a new source of light and glare, and this impact could be adverse and significant. New light sources may represent a potentially significant impact to light-sensitive land uses such as nearby residential areas.

Increased ferry trips on the Bay would add to the existing vessels that already cross Bay waters. Early morning or late day/evening vessel trips would show navigation lighting as well as cabin and deck lighting. The increase in frequency of trips and new routes to terminals not currently serviced would increase and introduce these sources of light on the Bay and at terminals, but it would be transitory and the lighting would not be a substantial source of glare to light-sensitive land uses. Therefore, this vessel lighting would not be considered adverse or significant.

Summary of Impact V-5

- The Proposed Project would include the construction of new terminals and possibly the improvement of existing terminals. These could result in potentially significant light and glare impacts.

Mitigation V-5.1: Ferry terminal designs will be required to develop site-specific lighting plans. Outdoor lighting shall be focused and directed to the specific location (e.g., roads, walkways), be

shielded to avoid the production of glare, and minimize up-light and light spill. Fixtures shall be located, aimed or shielded to minimize stray light to or across property boundaries. Light design shall use down-cast, low glare, shields, or equivalent designs to minimize light and glare on surrounding land uses.

Impact After Mitigation: Impact V-5 would be minimized through Mitigation V-5.1, but the potential remains for significant impacts depending on site-specific locations and settings, and applicable local regulations. This impact remains potentially significant.

References

ARUP. 2001. Draft Working Paper: Intermodal and Terminal Access Study Terminal Good Practice Design Guidelines. Prepared for Water Transit Authority. November.

Bay Area Water Transit Initiative. www.bayareacouncil.org.

Caltrans. Scenic Highway Program. http://www.caltrans.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm.

Parsons Brinckerhoff. 2002. Draft Working Paper: Terminal Architecture and Engineering Terminal Operational Design Parameters. Prepared for Water Transit Authority. April.

San Francisco Bay Conservation and Development Commission (BCDC). 2002. San Francisco Bay Plan. October.

3.9 CULTURAL RESOURCES

Cultural resources can be the material artifacts of past human activity or historic buildings and structures. These nonrenewable resources may be found in both onshore and nearshore locations (marine and terrestrial settings) throughout the San Francisco Bay area. Land and marine cultural resources often include, but are not limited to:

- Prehistoric and historic archaeological sites
- Historic sites or districts
- Important or exemplary buildings or structures
- Culturally modified landscapes
- Locations of culturally important events
- Shipwrecks or other maritime resources

This technical report includes limited prehistoric and historic site locational information. Generally, the documents and data related to prehistoric sites are considered confidential and are only made available to qualified cultural resource specialists, project managers, or other pertinent individuals on a need-to-know basis.

3.9.1 Environmental Setting

3.9.1.1 Study Area

The study area for cultural resources included the San Francisco Bay and its embayments, the Carquinez Strait and Suisun Bay to Antioch at the San Joaquin River, and Half Moon Bay. This project does not have a defined Area of Potential Effect (APE), which is a formal study area defined in concurrence with a lead federal agency under NEPA. Within the study area defined for this program, a bibliographic survey was conducted to provide an overview of classes of resources known to the Bay Area, to establish a general baseline for known cultural resources within the project study area, and to anticipate the types of resources that might be potentially encountered with implementation of each project alternative.

3.9.1.2 Native American Consultation

No locations of Traditional Cultural Properties (TCPs) are known within the programmatic project area. As a professional courtesy, Native American communications are considered confidential and should only be made available to qualified cultural resource specialists, pertinent project managers, or other Native Americans on a need-to-know basis. The TCPs recognized by the California Native American Heritage Commission (NAHC) are also considered confidential. Native American correspondence at this programmatic level was limited to a TCP search conducted by the NAHC.

3.9.1.3 Bibliographic Survey

A screening-level research study was conducted at the Northwest Information Center (NWIC) of the California Historic Resources Information Service (CHRIS). The following USGS 7.5' Series quadrangle maps were also reviewed: Petaluma River, Petaluma Point, Mare Island, San Quentin, Richmond, Benicia, Vine Hill, Honker Bay, Antioch North, San Francisco North, San Francisco South, Oakland West, Hunters Point, San Leandro, Montara Mountain, San Mateo, Redwood Point, Half Moon Bay, Woodside, Palo Alto, and Mountain View.

Known site locations recorded in the general vicinity of the various project areas were noted. This overview is the first step in the identification of known resources. Once defined projects moves forward and project actions are refined, detailed records searches would be conducted. This work should be conducted in conjunction with appropriate marine and terrestrial archaeological field reconnaissance to identify areas of low sensitivity or potential areas of sensitivity where mitigation or other actions many be required.

Typical Settings for Cultural Resources within the San Francisco Bay Environs

The Proposed Project actions are primarily located in a coastal marine setting. The Proposed Project include terminal and routes that fall within the following geographic settings:

The Onshore Environment

Project actions in an onshore environment might include expansion of existing ferry terminal facilities, construction of new terminal facilities, or construction or repair/maintenance facilities. The onshore environment is defined here as "dry land" and does not include facilities located on piers.

The Bay Shoreline Environment

Project actions in the Bay shoreline environs might include expansion of existing piers, construction of new piers, expansion of terminal facilities located on piers, or construction of terminal facilities on piers

The Offshore Environment that Extends Out from the Bay or Coastal Shoreline

Project activities in the offshore environment are primarily related to underwater activities that include dredging, dredge spoil disposal, buoy placement, and related maintenance of ferry corridors through shallow draft waters

Cultural resources that have been recorded in the above environments, or have the potential to be located in the aforementioned geographic settings, include:

- Wharves
- Piers
- Shipwrecks
- Prehistoric sites
- Other (resources such as airplane wrecks, historic dump or disposal sites, historic structures, etc.).

Prehistory

General information concerning the regional prehistory and chronology has been primarily synthesized from Moratto (1984) and Chartkoff and Chartkoff (1984). Ethnohistoric information has been gathered from Levy (1978b; 1978a), Johnson (1978), and Kelly (1978).

Controversial Early Evidence from the Region

Although it cannot be ruled out that sites or evidence might exist in the Bay Area dating to extremely early human occupation, none has been identified to date. Some investigators have postulated hominid occupation in other regions of California (e.g., Leakey, Simpson, and Clements 1968, 1969; Leakey et al. 1972; Schuiling 1972, 1979) but no corroborative cultural or skeletal evidence of a similar age exists in the Americas.

Regional Overview

This section provides a regional overview of the prehistoric and historic periods relevant to the San Francisco Bay Area.

Paleoindian – Early Holocene Period

Early Holocene finds are typologically attributed to a Western Pluvial Lakes Tradition, often recognized as the Lake Mojave Stemmed Tradition or simply the Stemmed Point Tradition (Moratto 1984). In Central California, a number of isolated finds are attributed to the Fluted Point or Stemmed Point Traditions. These sites typically contain chipped stone crescents, gravers, scrapers, choppers, perforators, expedient ground stones and various fluted/stemmed points, and geographically appear along paleo-shorelines, piedmont zones of former grasslands, and in mountain pass areas associated with fossil lakes. Sites from this period are not known within the study area, although they could be present within these environs.

Early Period and Millingstone Horizon

Millingstone Horizon sites are found in both coastal and inland settings (Wallace 1955; Leonard 1971). The Millingstone period, also called the Millingstone culture, extends to at least 6000 B.P. and probably as far back as 8500+ B.P. (cf. Warren 1968; Wallace 1955). The stone tool assemblage during this cultural period trends toward core/cobble tools and an abundance of ground stone implements (manos and metates), while projectile points appear less frequently. Hard-seed processing became one of the major components of subsistence during this period. Overall, the economy appears to have been based on plant collecting supplemented by fishing and hunting.

In the Bay Area, archaeological localities such as the Scotts Valley site, SCr-177 (Cartier 1982; 1993; cf. Erlandson 1994; and Moratto 1984), and SCl-178, situated in the Santa Clara Valley (Moratto 1984; Erlandson 1994), provide evidence for early Holocene activities in the broader San Francisco Bay Area. The immediate San Francisco Bay environs have not yielded extensive Early Period evidence. This occurrence can be attributed to a combination of factors including fluctuating shorelines, eustatic sea level changes, extensive and dynamic wetlands which can preclude resource preservation, and anthropogenic activities such as extensive coastal marine development around San Francisco Bay. Although resources from this period are not common around San Francisco Bay, their presence cannot be ruled out by mere lack of current evidence.

The Intermediate Period

The Intermediate period (Wallace 1955) has also been called the Hunting period or Middle Horizon (Beardsley 1948). About 5,000 years ago, the Millingstone culture began to gravitate toward animal proteins and marine resources. A higher percentage of projectile points and smaller chipped stone tools are present during the Intermediate period.

In the Bay Area, this period of occupation is often referred to as the Ellis Landing Facies (Beardsley 1954), named for a shellmound situated in a salt marsh in Richmond. Excavated by Nels Nelson in the early 1900s (e.g., Nelson 1910), the Ellis Landing mound (Cco-295) yielded stratified cultural materials that allowed Nelson to identify an "upper" and "lower" cultural sequence. The upper component contained perforate charmstones, incised bone tubes, saucer-shaped *Olivella* beads, stemmed projectile points, and mortars with flared sides (Moratto 1984). The lower level contained spatulate bone objects, rectilinear and triangular *Haliotis* pendants, *Olivella* saucer and saddle-shaped beads, red ochre, cobble mortars, grooved sinker stones, and large non-stemmed points (Moratto 1984). Sites from this period are known within the project area.

The Late Prehistoric Period

Meighan (1954) originally characterized the Late Prehistoric period in California, although this work pertained mainly to cultures from the Southern California area. The period began sometime around the B.C./A.D. transition and expanded culturally around 500 A.D. This cultural expansion was roughly coeval with the introduction of bow-and-arrow technology. The end of the period is recognized at the close of the 18th century, when the Spanish mission system had its greatest effect on the native Californian populations.

Much of what is known of the later prehistory of the San Francisco Bay Area has been gleaned from numerous excavations at the Emeryville Shellmound (Ala-309). The mound's estimated size was at least 100 meters by 300 meters, with a maximum depth of almost 10 meters (Moratto 1984). Max Uhle's excavations at the site in the early 1900s (Uhle 1907) revealed a stratified deposit with numerous cultural sequences. The lower levels contained flexed burials associated with artifacts such as pointed bone implements, chert bifaces, perforate charmstones, red ochre, and a predominance of bay oyster shells (Moratto 1984). Upper levels appeared to have cremation burials, polished stone artifacts, flaked obsidian tools, and an abundance of clam (Moratto 1984). In 1924, Schenck "rescued" materials, including approximately 700 burials, most interred in a flexed position, as the site was being prepared for construction of a paint factory (Schenck 1926).

Ethnography

The ethnographic or ethnohistoric period generally refers to the time from initial contact between the European cultures and local Native American groups to the present. Initial references to Native Americans during this period are often sketchy references found in expeditionary diaries or church baptismal records. Descriptions of Native American lifeways were later refined, frequently via informant interviews, by anthropologists, ethnographers, historians, and archaeologists (e.g., Milliken 1995). However, in most cases the decimation of Native American cultures occurred at a much faster rate than these research and recordation efforts.

Costanoan

The name Costanoan is derived from the Spanish *Costaños* or *Costeños*, or coast people (Swanton 1952). The Costanoan group designates a linguistic family consisting of eight different yet related languages (Levy 1978b). The Costanoan languages, together with Miwok, compose the Utian language family of the Penutian stock. Native Americans from the area also use the term Ohlone, which means "the Abalone people," when referring to their ancestors.

The arrival of Costanoan groups into the Bay Area appears to be temporally consistent with the appearance of the Late Period artifact assemblage in the archaeological record, as documented at sites such as the Emeryville Shellmound or the Ellis Landing mound. The cultural territory of the Costanoan groups extended along the coast from San Francisco Bay in the north to just beyond Carmel in the south.

Linguistic evidence suggests that the Costanoans' ancestors probably moved into the San Francisco and Monterey Bay areas approximately 1,500 years ago. The various groups subsisted as hunter-gatherers and relied on local terrestrial and marine flora and fauna. Their predominant plant food was the acorn, but they exploited a wide range of other foods, including various seeds, buckeye, berries, roots, land and sea mammals, waterfowl, reptiles, and insects (Levy 1978b). The Costanoans constructed watercraft from tule reeds and possessed bow and arrow technology. They fashioned blankets from sea otter pelts, fabricated basketry from twined reeds of various types, and assembled a variety of stone and bone tools in their assemblage. Costanoan villages consisted of dwelling structures, sweathouses, dance enclosures, and assembly houses constructed from thatched tule reeds and a combination of wild grasses, wild alfalfa, ferns, and carrizo. Before European contact, the Costanoans were politically organized into autonomous tribelets that had distinct cultural territories.

The first European contact with the Costanoans was probably in 1602, when Sebastian Vizcaíno's expedition moored in Monterey. The estimated Costanoan population in 1770—when the first mission was established in Costanoan territory—was approximately 10,000. By 1832, the population had declined to fewer than 2,000, mainly due to diseases introduced by the Europeans. When the Spanish mission system rapidly expanded across California, the Costanoan traditional way of life was irreversibly altered. The pre-contact hunter-gatherer subsistence economy was replaced by an agricultural economy, and the Spanish missionaries prohibited traditional social activities (Levy 1978b).

The Karkin, Chochenyo, and Ramaytush Costanoan Groups

The Karkin, Chochenyo, and Ramaytush were tribelets belonging to the larger cultural group recognized as the Costanoan Indians. The environs around Carquinez Strait were primarily tidal marsh and open water during the ethnographic period. At the time of European contact, an estimated 2000 Chochenyo ranged from Richmond to Mission San Jose, and out into the Livermore Valley. Ramaytush, also known as San Francisco Costanoan, was spoken among tribelets living in what are now San Mateo and San Francisco counties. At the time of European contact, the Ramaytush had about 1,400 speakers of their distinct language.

The cultural identity of the entire Costanoan group rapidly disappeared after the European contact. In the literature, the Karkin, Chochenyo, and Ramaytush populations are usually referred to in a larger cultural context within the Ohlone or Costanoan tradition, and except for anecdotal or extrapolated information, specific data on these small tribelet communities is sparse

in the academic literature. In 1971, descendents of the various Costanoan tribelets, including possible descendents of the Karkin, Chochenyo, and Ramaytush tribelets, formed a "corporate entity" known as the Ohlone Indian Tribe (Levy 1978b).

Coast Miwok

Potential and existing North Bay terminal sites are located in the territory of the Coast Miwok, who together with the Lake and Eastern Miwok, comprise the larger ethnic group termed *Miwok* by ethnographers. Coast Miwok territory extended from Duncan's Point north of Bodega Bay along the coast and interior of Sonoma and Marin Counties to San Pablo Bay on the south. Coast Miwok territory extended east as far as midway between the Sonoma and Napa Rivers (Kelly 1978; Figure 3.9.1).

Coast Miwok villages were in most cases located near major watercourses and, less commonly, on the coast. The villages were composed of several structure types, such as dwelling houses, a sweathouse (in larger villages), and secret society dance houses (in larger villages). Dwelling houses were built on conical frames of willow or driftwood poles, with bunches of grass, tule, or rush covering the structure.

Coast Miwok subsistence strategy focused on the coast and adjacent inland areas for much of the year, where salmon and other fish, deer, crab, kelp, seeds, mud hens, geese, eels, mussels, and clams were available. Acorns were pounded into meal, leached, and boiled with hot stones to make mush. Bread was made by mixing leached acorn meal with water and red earth and then baking it in an earth oven. Fishing was performed in a variety of ways: bay fish were caught in a seine strung between two tule balsas (rafts), and surf fish were captured with circular dip nets.

Early contact between the Coast Miwok and Europeans first occurred on the Marin County coast as early as 1579, when Sir Francis Drake spent five weeks on the coast to repair his damaged ship (Kroeber 1925). Spanish explorers made contact with the Coast Miwok in the late 1700s. By 1776, the Franciscan fathers of the San Francisco mission began forced conversions and brought Coast Miwok to mission lands, initiating a partial abandonment of native settlement. Subsequent ranching and settlement by Mexicans and Americans further displaced Coast Miwok from their homes and subjected the group to intense depredations of homicide and epidemic diseases (Cook 1976).

Eastern Miwok

Some of the potential and existing terminals are located within the territory of the Eastern Miwok, who together with the Lake and Coast Miwok, comprise the larger ethnic group termed *Miwok* by ethnographers. There were many distinct linguistic groups within the Eastern Miwok, including the Plains, Northern Sierra, Southern Sierra, Central Sierra, and Bay language areas. The project locations in this area are exclusively assigned to traditional Bay Miwok territories.

The Bay Miwok ranged from the environs near Mount Diablo into the delta of the Sacramento-San Joaquin river system. The Bay Miwok were the first tribelet of the Eastern Miwok to succumb to missionization by the Spanish. The first Bay Miwok, deriving from the Saclan tribelet, were converted at the Mission San Francisco in 1794 (Levy 1978a). The baptisms continued through 1827, with most apparently occurring between 1805 and 1812 (op cit. 401). The primary Miwok political unit was the tribelet. Each tribelet was considered an independent and sovereign nation with control over a specified territory.

The Gold Rush brought further disease to the native inhabitants. By then, nearly all of the Eastern Miwok had adapted in some way or another to economies based on cash income. Hunting and gathering activities continued to decline and were rapidly replaced with economies based on ranching and farming.

Patwin

The Montezuma Slough area is in the homeland of the Patwin. Patwin territory included the lower portion of the west side of the Sacramento Valley west of the Sacramento River from about the location of the town of Princeton in the north to Benicia in the south. In this larger territory, the Patwin have traditionally been divided into River, Hill, and Southern cultural/geographic groups, although in actuality a more complex set of linguistic and cultural differences existed than is indicated by these three divisions (Johnson 1978).

The tribelet represented the basic social and political unit. Patwin villages contained four types of permanent structures, which were earth covered, semi-subterranean, and either elliptical or circular in shape included the dwelling house, the ceremonial dance house, the sweathouse, and the menstrual hut (Johnson 1978).

Patwin subsistence consisted of hunting and gathering from a village base. Acorns were a staple food and were pulverized with a long river cobble pestle (Merriam 1967) in wooden mortars (Johnson 1978). The acorns were then leached in a sand basin and made into a bread or soup. Individuals or small groups undertook hunting and fishing. The Patwin produced numerous basketry implements that included cooking baskets, scoop trays, winnowing trays, fish baskets, baby carriers, and burial accompaniments.

The Patwin probably first encountered Europeans during Spanish domination of California. At least by 1800, Spanish missionaries from Mission Dolores (San Francisco de Asís) recruited neophytes from the Patwin villages for mission labor (Bennyhoff 1977). Under Mexican rule in California, the Patwin suffered from numerous military incursions and attacks from Mexican and American settlers who occupied Patwin territory. The Patwin also suffered from epidemic diseases, such as malaria and smallpox, which led to a decline in the Patwin population (Johnson 1978). Finally, to facilitate the development of ranching, agriculture, mining, and large settlements after the U.S. conquest of California, the U.S. government called for removal of remnant Patwin descendents to reservations.

Historic Setting

The summarized historic period represents the modern settlement California and the Bay Area from the time of the first European explorations and settlements to the present. This overview focuses on events important to San Francisco Bay and the associated historical activities that occurred in and near the shoreline environment. The following historic setting is essentially a compilation of two recent Bay Area reports completed under the aegis of URS.[1]

[1] *Underwater Cultural Resources Survey for the Proposed SFO Runway Reconfiguration Project by Ecosystems Management Associates, Inc*. (2001) for URS Corporation and *Final Cultural Resources Inventory Report for the Habitat Migration Planning Sites, San Francisco International Airport Proposed Runway Reconfiguration Project*, (2001) by Jones & Stokes for URS Corporation.

Spanish Period

Jose de Ortega located the entrance to the San Francisco Bay in 1769, but formal entry into the bay occurred a few years later with Juan Manuel de Ayala. In Contra Costa County Spanish contact was made was in 1772 by Pedro Fages while in Marin County, the first coastal exploration was in 1579 by Englishman Francis Drake. His exact anchoring continues to be debated. The first Spanish overland expedition into the San Francisco Bay region was led by Juan Bautista de Anza, who reached San Francisco in 1776 and located the sites of Mission Dolores and the Presidio. All of these expeditions were augmented with military support and the ecclesiastical presence of Franciscan priests who were responsible for establishing mission authority and converting California's Native American inhabitants to Christianity (Bean and Rawls 1983; Hoover et al. 1990; Merrit 1928.) By 1823, the Spanish network of missions, presidios, and pueblos extended from San Diego to Sonoma, enabling the Spanish to gain control of Alta California.

British, Russian, French, and American Exploration

The Spanish were extremely protective of the California territory and found outside influences difficult to control. The Spanish viewed the San Francisco Bay as a remote outpost and established the area as a buffer zone to protect the more densely inhabited areas to the south. Despite this they were unable to retain San Francisco as an isolated outpost because governments of England, France, Russia, and Prussia all became interested in California. Once the abundant natural resources were found profitable and steam power became available for ships, interest in the area dramatically increased.

Mexican Period

In 1821, Mexico achieved independence from Spain, and the following year, California was declared a territory of the Mexican republic. Apart from sending in new governors and small numbers of soldiers, Mexican intervention in California was minimal over the next several years.

The Mexican government's order for the secularization of the missions would have a major impact on the subsequent historical development of California. The 1834 secularization order downgraded the missions to the status of parish churches and divided their vast holdings into individual land grants, or ranchos. The secularization of the missions opened the door for approximately 700 private land grants and the rise of family ranchos. The ranchos raised cattle for the hide and tallow trade, sheep, horses, grain, and wine grapes. Most of these ranchos were involved in trade, specifically hides and tallow in exchange for New England goods. The advent of this trade mobilized interest of people from around the globe and increasingly more ships entered the bay. Missions and military installations in the San Francisco Bay environs included: Mission Delores (San Francisco de Asis), Presidio (Presidio de San Francisco), Mission Santa Clara (Santa Clara de Asis), Mission San Jose (San Jose de Asis), Mission San Rafael (San Rafael Arcangel), Mission Sonoma (San Francisco Solano).

American Period

Commercial activity between the United States and Mexican California increased during the Mexican period, with an influx of fur trappers and individuals in search of resources. The influx of settlers and pioneers crossing the Sierra Nevada range into Mexican California brought internal conflicts that lead to the 1846 war between Mexico and the United States. The conflict

formally ended with the signing of the Treaty of Guadalupe Hidalgo in February 1848. Alta California was ceded to the United States and was admitted as a state in 1850.

The discovery of gold led to the Gold Rush (1848–1852), which attracted a tremendous influx of prospectors and settlers. A thousand people called San Francisco home by 1848, but the news of gold hunting near Sacramento nearly emptied the growing community as mariners, hide processors and tradesmen deserted for the new gold diggings. Soon some of the prospectors found that hauling freight and gold-hunting passengers was more profitable than panning for gold. The discovery of gold at Sutter's Mill and the American control of California ended the hide trade. Within a year and a half, thousands of immigrants came to San Francisco and completely changed the lifestyle of the San Francisco community.

Maritime trade arrived through three major shipping channels approaching San Francisco. These lanes converge outside the Golden Gate to form the single channel entering San Francisco Bay. Lumber schooners came through this channel from the Mendocino coast, along with sealers, whalers, fishermen, traders, and passenger ferries. San Francisco became a major city and port almost overnight and grew at a phenomenal rate replacing Monterey as the coast's principal port. Large docks were built in order to discharge cargo directly onto the wharves instead of being ferried by rowboats to shore. From those docks, the cargo was distributed and sometimes reloaded onto smaller vessels to transport to various settlements. By July 1850, more vessels entered the bay then departed. Some 500 ships lay abandoned inside and outside the anchorage by their crews, who had deserted them in hopes of finding a better life, mostly in the gold fields. Sometimes ships, surrounded by other vessels, became landlocked. Unable to depart, they were more valuable as dock space than as a means for transport. In relation to San Francisco, development on the peninsula south of San Francisco was much different. This region remained rural with sparsely populated villages. Oakland remained a quiet suburb of busy San Francisco until 1863 when the San Francisco-Oakland railroad was built. Six years later, western Oakland became the terminus of the transcontinental railroad in 1869. This transportation role molded Oakland's future development.

Maritime Transportation

Before development of transcontinental and regional railroads, maritime transportation of agricultural products played a principal role in the economy of the San Francisco Bay Area. In the South Bay, the Port of Alviso was created to replace the Embarcadero de Santa Clara/Alviso, and is one of the oldest ports (1840s) in the western United States. In the North Bay, Mexican ranchers began using the rivers to transport hides and tallow out of the bay and into ships for export. Petaluma and the Petaluma River became a major shipping depot and agricultural center. Other development in this area included the Sausalito waterfront, which developed into an anchorage and supply point for whaling vessels and other commercial ships.

Ferry enterprises traveling to Oakland, San Pablo Bay, and San Francisco flourished during the late 19th century and the first half of the 20th century. The Bay was a transportation corridor for both local and international traffic. During the early part of the American period, the ferries united the sparsely populated rural communities and ranches with San Francisco. By the early 1870s, the railroad companies owned the ferries operating on the Bay. As communities in the area grew larger, local trade produced a demand for more frequent ferry schedules and for inter-urban lines to feed the ferry terminals. Despite all this success, the needs of the Bay Area were

rapidly changing. Most ferry service ceased in 1939 with the completion of several bridges spanning the Bay and the opening of the Bay Bridge to electric trains.

Fishing Industry

In the 1850s, commercial fishing in the San Francisco Bay began with whaling and salmon fishing. Chinese immigrants turned to shrimp fishing in the years following the Gold Rush. Throughout California's coastal waters, shrimp were harvested and sold. By 1855 over fifty Chinese shrimping vessels, mostly sampans and junks, operated on the San Francisco Bay. After 1870, shrimp fishing evolved into a major industry along the shores of San Pablo and San Francisco Bays. Approximately 26 fishing camps or villages have been recorded in this region. During the 1870s, a significant expansion of the fishing industry occurred due to the increased immigration of fisherman from Italy, Greece, China, and Portugal. By the beginning of the 20th century, the staple yields of the fishing industry were salmon, crabs, cod, and oysters (Hart 1978).

Shipbuilding

In the mid-1840s, San Francisco relied heavily upon East Coast boat builders for ship manufacturing. These builders constructed prefabricated river and delta boats and sent them around Cape Horn. It was not until after the Gold Rush that large numbers of boat builders arrived. They emigrated from New England, the British Isles, Scandinavia, the Mediterranean, and China. Due to the deep water and easy access and good storage, Hunters Point became a principal shipbuilding location, particularly during the advent of World War I. Soon after, other South Bay ports were being established as shipyards and others were enlarged for construction of steamers.

3.9.1.4 Cultural Resources Baseline Information

For this programmatic EIR, a screening level survey was conducted of archaeological and historic information to gain an understanding of resources that might be present at or near existing or proposed terminal locations. This functions as one step in the identification of potential issues and constraints as ferry transit facilities are advanced and defined. Many of the ferry sites lacked specific location information; therefore, a search was performed of the general area as opposed to specific street locations or addresses.

General Review of Ferry Terminal Locations

Many of the potential new ferry terminals are not specifically sited, and even at known ferry terminal locations, new facilities or changes to existing facilities and improvements have not been defined. An initial review of literature and record sources for the vicinity of the terminal locations was performed to generally identify types of historic and prehistoric resources, as well as the nature and type of resources present in the general area (i.e., wharves, piers, structures, listed prehistoric sites, etc.). This review was not a formal search of resource record databases, such as would be completed for a specified project and its final proposed locations, but it is intended to provide an initial identification of sites and resources that could be affected by an overall alternative.

The results of this review are listed in Appendix CUL-A. A brief overview of each site is described. In general, many of the terminal sites are located in communities having a history of maritime development and activities, where piers or wharves were located which in some cases may still be in use. A few terminal locations are in the general vicinity of potentially significant archaeological sites such as shell mounds or possible Native American occupation sites. All of these sites and resources would be evaluated as specific terminals and routes are proposed.

Marine Cultural Resources

There is a significant potential for subsurface marine cultural resources in San Francisco Bay. The sedimentation process in the San Francisco Bay Estuary has been affected by 150 years of regional anthropogenic activity. Changes in tributary runoff, alterations of the Bay shoreline wetlands and marshes, and sediment dredging and redeposition activities have all contributed to recent Bay sedimentation patterns.

Since the time of initial European contact, numerous cultural resources have been wrecked, dumped, abandoned, deposited or otherwise lost within the Bay and its environs. Likewise, prehistoric and protohistoric sites are known within the Bay environs, specifically the numerous shell mounds that have been recorded along the Bay margins (Appendix CUL-A).

3.9.1.5 Dredging and Archaeological Resources

Since 1824, the U.S. Army Corps of Engineers (USACE) has planned, built, and maintained federal navigation and flood control projects in the Bay. The U.S. Navy is also responsible for current dredging activities, including those at Mare Island and the Alameda Naval Air Station. Other dredging activities are conducted by both public and private marine operators, ports, refineries, and flood control and reclamation districts around the Bay.

In many locations, recent maintenance dredging or a continuum of dredging history could preclude the requirement for cultural resources survey. This was noted in a recent marine archaeology report that examined various nearshore and offshore sites throughout the San Francisco Bay (Ecosystems 2001), in which it was assumed that constant maintenance dredging would have obliterated any marine cultural resources in the project Area of Potential Effect.

Dredged material currently disposed within the Bay is limited to four state and federally designated sites in the Carquinez Strait, San Pablo Bay, Suisun Bay, and off Alcatraz island. Depending on volume and suitability of dredged materials, dredging projects may consider a range of reuse/disposal sites within the counties surrounding the Bay region. Options include:

- In-Bay disposal;
- Deep ocean disposal;
- Upland/wetland reuse;
- Upland landfill disposal; and
- Reuse as fill material for construction projects.

These possible locations of dredge spoils disposal could contain cultural resources.

3.9.1.6 Regulatory Setting

Regulatory requirements applicable to cultural resources are summarized in the following sections.

Federal Regulations

A number of federal regulations address the protection of cultural resources, which are summarized below. The WTA program does not have federal involvement at this time, but these requirements will likely apply at later stages when federal funding or authorizations are required.

Executive Order 11593 (1971)

Executive Order 11593 provides federal protection and enhancement of the "cultural environment," in support of the Antiquities Act, Historic Sites Act, the National Historic Preservation Act, and the National Environmental Policy Act.

Executive Order 13007 (1996)

Executive Order 13007 requires that all Executive Branch agencies that have responsibility for the management of Federal lands will, where practicable, permitted by law, and not clearly inconsistent with essential agency functions, provide access to and ceremonial use of Native American sacred sites by Native American religious practitioners. Likewise, agencies will avoid adversely affecting the integrity of such sacred sites. The order also requires that federal agencies, when possible, maintain the confidentiality of sacred sites.

Executive Order 13175 (1990)

Executive Order 11593 provides that each federal agency must have an accountable process to ensure regular and meaningful consultation and collaboration with Native American tribal governments, or their representative organizations, in the development of regulatory policies that have tribal implications.

Antiquities Act (1906)

The federal government formally recognized the importance of some cultural resources with passage of the 1906 Antiquities Act, 16 United States Code (USC) 431-433. This act, with its applicable regulation in 43 CFR 3, protects all historic and prehistoric sites on federal lands and prohibits excavation or destruction of such antiquities unless a permit (Antiquities Permit) is obtained from the secretary of the federal agency that has the jurisdiction over those lands. It also authorizes the President to declare areas of public lands as National Monuments and to reserve or accept private lands for that purpose.

Historic Sites Act (1935)

The Historic Sites Act, codified at 16 USC 461 et seq., declares a national policy to preserve historic sites, buildings, antiquities, and objects of national significance, including those located on refuges. The Historic Sites Act provides procedures for designation, acquisition, administration, and protection of such sites.

National Historic Preservation Act, as amended (1966)

The National Historic Preservation Act (NHPA) declares federal policy to protect historic sites and values in cooperation with other nations, states, and local governments. The NHPA establishes a program of grants to assist states for historic preservation activities. Subsequent amendments designated the State Historic Preservation Officer (SHPO) as the individual responsible for administering state-level programs. The act also created the President's Advisory Council on Historic Preservation (ACHP). Federal agencies are required to consider the effects of their undertakings on historic resources and to give the ACHP a reasonable opportunity to comment on those undertakings.

National Environmental Protection Act, as amended (1969)

Under the National Environmental Policy Act (NEPA), 42 USC 4321–4327, federal agencies are required to consider potential environmental impacts and appropriate mitigation measures for projects with federal involvement. If the project has federal involvement (e.g., a 404 permit), the lead federal agency will be responsible for project compliance with Section 106 of the NHPA and its implementing regulations, set forth by the Advisory Council on Historic Preservation (ACHP) at 36 CFR 800.

Archaeological and Historic Preservation Act (1974)

Under 16 USC 469-469c, the Archaeological and Historic Preservation Act (AHPA) requires Federal agencies to provide notice to the Secretary of the Interior of any dam constructions and, if archeological resources are found, for recovery or salvage of those resources. The law also applies to any agency whenever it received information that a direct or federally assisted activity could cause irreparable harm to prehistoric, historic, or archaeological data. Up to one percent of project funds could be used to pay for salvage work. The NHPA also authorized additional funding to be availed for this purpose.

American Indian Religious Freedom Act (1978)

The American Indian Religious Freedom Act, 42 USC 1996 et seq., regulated under 43 CFR 7, has been established to protect religious practices, ethnic heritage sites, and land uses of Native Americans. The act makes it a policy to protect and preserve for American Indians, Eskimos, Aleuts, and Native Hawaiians their inherent right of freedom to believe, express, and exercise their traditional religions. The act allows them access to sites, use and possession of sacred objects, and freedom to worship through ceremonial and traditional rights. It further directs various federal departments, agencies, and other instrumentalities responsible for administering relevant laws to evaluate their policies and procedures in consultation with Native American traditional religious leaders to determine changes necessary to protect and preserve Native American cultural and religious practices.

Archaeological Resources Protection Act (1979)

The Archaeological Resources Protection Act (ARPA) supplements the provisions of the Antiquities Act of 1906, and declares it illegal to excavate or remove from federal or Native American lands any archeological resources without a permit from the land manager (or federal agency with jurisdiction over those lands). Permits may be issued only to educational or

scientific institutions and only if the resulting activities will increase knowledge about archeological resources.

Native American Graves Protection and Repatriation Act (1990)

The Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC 3001 et seq., defines cultural items, sacred objects, and objects of cultural patrimony, and establishes ownership hierarchy for remains found on federal lands. It also provides for specific case review, allows excavation of human remains, and stipulates return of the remains according to ownership. NAGPRA also sets penalties for violations of the act, calls for cultural resource inventories, and has provisions for the return of specified cultural items to the appropriate Native American tribe(s) and/or Native Hawaiian organization(s). NAGPRA is initiated when the project and the finds are situated on federal lands.

State Regulations

In California, cultural resources include archaeological and historical objects, sites and districts, historic buildings and structures, cultural landscapes, and sites and resources of concern to local Native American and other ethnic groups. Compliance procedures are set forth in the California Environmental Quality Act (CEQA) Sections 15064.5 and 15126.4. The primary applicable state laws and codes pertinent to the proposed project are presented below.

California Native American Graves Protection and Repatriation Act (2001)

In the California Health and Safety Code, Division 7, Part 2, Chapter 5 (Sections 8010-8030), broad provisions are made for the protection of Native American cultural resources. The act sets the state policy to ensure that all California Native American human remains and cultural items are treated with due respect and dignity. The act also provides the mechanism for disclosure and return of human remains and cultural items held by publicly funded agencies and museums in California. Likewise, the act outlines the mechanism with which California Native American tribes not recognized by the federal government may file claims to human remains and cultural items held in agencies or museums.

California Public Resources Code Section 5020

This California Code created the California Historic Landmarks Committee in 1939 and authorizes the Department of Parks and Recreation to designate Registered Historical Landmarks and Registered Points of Historical Interest.

California Public Resources Code Section 5097.9

Procedures are detailed under California Public Resources Code (PRC) Section 5097.9 for actions taken whenever Native American remains are discovered. No public agency, and no private party using or occupying public property, or operating on public property, under a public license, permit, grant, lease, or contract made on or after July 1, 1977, shall in any manner whatsoever interfere with the free expression or exercise of Native American religion as provided in the United States Constitution and the California Constitution; nor shall any such agency or party cause severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require. The

commission, pursuant to Sections 5097.94 and 5097.97, shall enforce the provisions of this chapter.

California Public Resources Code Section 7050.5

Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined. If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

California Public Resources Code Section 7051

Every person who removes any part of any human remains from any place where it has been interred, or from any place where it is deposited while awaiting interment or cremation, with intent to sell it or to dissect it, without authority of law, or written permission of the person or persons having the right to control the remains under Section 7100, or with malice or wantonness, has committed a public offense that is punishable by imprisonment in the state prison.

14 California Code of Regulations 4308

Under this state preservation law, no person shall remove, injure, disfigure, deface, or destroy any object of archaeological, or historical interest or value.

Underwater Cultural Resources

It is important to note that federal-level mandates also cover underwater cultural heritage, such as shipwrecks and related historic maritime resources and submerged prehistoric sites. These legislative acts would be pertinent in instances where near-shore, intertidal, or offshore cultural resources are detected during project constructions or related activities. Although originally intended to address terrestrial resources, the Antiquities Act of 1906 and the ARPA of 1976 cover underwater cultural heritage to certain extents. The ARPA of 1976, which superseded the Antiquities Act of 1906, is applicable only if the underwater cultural resources are found on lands owned by the federal government.

The acts cited below, although federal-level, also apply to resources in state waters. As such, these acts are concurrently relevant for both federal and/or state-level projects.

Submerged Lands Act (1953)

This act is largely superseded by the Abandoned Shipwreck Act but has been used by states to protect abandoned historic shipwrecks by citing various state-level historic preservation laws. The Submerged Lands Act established state jurisdiction over offshore lands within 3 miles of shore (or 3 marine leagues for Texas and the Gulf coast of Florida). The Act did reaffirm the federal claim to the Outer Continental Shelf, which consists of those submerged lands seaward of

state jurisdiction. However, the act limited states' claims to the submerged lands inside the landward boundary of the Outer Continental Shelf. Several federal courts rejected state positions on historic preservation laws, for various reasons, that pertained to shipwrecks within this 3-mile zone. Judicial conclusions from cases involving the Submerged Lands Act were inconsistent and confusing, yet shipwrecks in state waters were still at risk from damage and destruction. These circumstances provided the momentum for the passage of the Abandoned Shipwreck Act.

Abandoned Shipwreck Act (1987)

The Abandoned Shipwreck Act, 43 USC 2101–2106, is a federal-level legislative act but it does protect shipwrecks found in state waters. The Abandoned Shipwreck Act also states that the laws of salvage and finds do not apply to abandoned shipwrecks protected by the Act. Under the Abandoned Shipwreck Act, the United States asserts title to abandoned shipwrecks located within state waters that are either:

- Embedded in state-submerged lands,
- Embedded in the coralline formations protected by a state on submerged lands, or
- Resting on state-submerged lands and either included in or determined eligible for the National Register of Historic Places.

The Abandoned Shipwreck Act also has a provision for the simultaneous transfer, by the federal government, of title for those abandoned shipwrecks to the state(s) in whose waters the wrecks are located.

National Marine Sanctuaries Act

National Marine Sanctuaries Act, 16 USC 1431 et seq., is also known as Title III of the Marine Protection, Research and Sanctuaries Act of 1972. The National Marine Sanctuaries Act provides for the establishment of national marine sanctuaries in waters extending to the outer limits of the 200-nautical-mile Exclusive Economic Zone of the United States. The act has provisions for civil judicial actions and administrative penalties against persons damaging, removing, or destroying natural resources within the sanctuary. This protection also extends to submerged cultural resources. The sanctuaries are protected and managed by the Sanctuaries and Reserves Division of the National Oceanographic and Atmospheric Administration. The National Marine Sanctuaries Act would apply in instances where project actions might affect resources in a designated national marine sanctuary. National marine sanctuaries near San Francisco Bay include (Figure 3.9.2):

- The Gulf of the Farallones National Marine Sanctuary, established in 1981, which covers a 1,255 square mile area (948 square nautical miles) just north of San Francisco Bay
- The Monterey Bay National Marine Sanctuary, established in 1992, which covers 400 miles (348 nautical miles) along the California coast, extends an average of 35 miles (30 nautical miles) offshore, and covers over 5,300 square miles (4,024 square nautical miles). Proposed project components are within this sanctuary.

3.9.2 Impacts and Mitigation

3.9.2.1 Significance Criteria

Conformity of Federal and State Evaluation Criteria

The criteria for eligibility for the California Register of Historic Resources (CRHR) are very similar to those that qualify a property for the National Register of Historic Places (NRHP), which is the significance assessment tool used under NHPA. The criteria of the NRHP apply when a project has federal involvement. The development and adaptation of a ferry expansion plan by the WTA is a CEQA-level project, and federal cultural resources significance criteria would apply when resources or project actions fall under the jurisdiction of a federal agency. This could apply when actions:

- Occur on the outer continental shelf (e.g., deep water dredge disposal sites);
- Require a USACE 404 permit;
- Occur on lands administered by the U.S. Navy, Coast Guard (other federal agency); or
- Require nation-to-nation consultation between a federally recognized Native American tribe or individual and the federal government.

A property that is eligible for the NRHP is also eligible to be listed on the CRHR. All potential impacts to significant resources under a federal agency must be assessed and addressed under the procedures of Section 106 of the NHPA, set forth at 36 CFR 800. All resources encountered when implementing a specific ferry expansion project, with the exception of isolate artifacts and isolate features that appear to lack integrity or data potential, will have to be evaluated for significance vis-à-vis Section 106.

Federal Significance Criteria

The four evaluation criteria to determine a resource's eligibility for the NRHP, in accordance with the Code of Federal Regulations (CFR) outlined in 36 CFR 800, are identified at 36 CFR 60.4. These evaluation criteria, listed below, are used to help determine what properties should be considered for protection from destruction or impairment as a result of project-related activities (36 CFR 60.2).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) Resources that are associated with events that have made a significant contribution to the broad patterns of our history;

(b) Resources that are associated with the lives of persons significant in our past;

(c) Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

State Significance Criteria

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "important archaeological resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility to the CRHR.

Generally under CEQA, a historical resource is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5, and defined as any historical resource that:

(a) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(b) Is associated with lives of persons important in our past;

(c) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

(d) Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under Public Resources Code (PRC) Section 5097.98.

Impacts to "unique archaeological resources" and "unique paleontological resources" are also considered under CEQA, as described under PRC Section 21083.2. A unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

(a) The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information; or

(b) The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or

(c) The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource is an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources that do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Section 15064.5, a project potentially would have significant impacts if it caused substantial adverse change in the significance of one of the following:

(a) A historical resource (i.e., a cultural resource eligible for the CRHR);

(b) An archaeological resource (defined as a unique archaeological resource that meets CRHR criteria);

(c) A unique paleontological resource or unique geologic feature (i.e., where the project would directly or indirectly destroy a site or resources); or

(d) Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological or paleontological resource is given no further consideration, other than the simple recording of its existence by the lead agency.

3.9.2.2 Impacts and Mitigation

As previously noted, the Proposed Project actions are located in onshore, Bay shoreline, and offshore environments. As detailed in Appendix CUL-A, cultural resources have been recorded or have the potential to be located in these settings.

As specific projects move forward for evaluation, detailed record searches, archival reviews, field reconnaissance, and consultation with Native American groups/individuals and local historical societies will be conducted as appropriate. These tasks, in conjunction with related research and consultations, will further establish the cultural resources data baseline and facilitate assessments of potential impacts to significant cultural resources. It will be the responsibility of the project proponent to direct these activities in a manner consistent with Section 106 and CEQA guidelines, as applicable.

Construction and Operation (Dredging)

Impact CUL-1 **Dredging of new channels or for pier retrofit or installation could impact submerged and sub-bottom cultural resources in San Francisco Bay.**

Additional dredging may be required for pier retrofits or related activities at other locations, but is likely to be minor in extent and would affect areas where previous construction has taken place. The Proposed Project includes only one terminal location, Hercules/Rodeo, which would require new construction dredging. Submerged and sub-bottom resources are known to exist within the San Francisco Bay and California coastal submarine environments. Prehistoric resources, such as submerged shellmounds, settlement sites, ceremonial artifacts, and possibly watercraft, are known to exist in these settings. Known historic resources in these environs could include maritime vessels, wharf or pier remnants, shrimp farm remnants, refuse dumps, ammunition dumps, airplane fuselages, and materials related to these or other historical activities. Previously unknown resources could also be encountered.

Summary of Impact CUL-1

- The Proposed Project involves expansion of ferry service to new terminals. This expansion would require dredging at only one location, Hercules/Rodeo. Additional dredging could be required for pier retrofits, but is likely to be minor in extent and would affect areas where previous construction has taken place. Encountering and adversely disturbing buried sites could inadvertently destroy the cultural value of the resource. Dredging and related constructions for the new terminal could have potentially significant impacts to cultural resources if they are eligible for, or listed on, either the NRHP/CRHR, or resources that qualify as a "unique archaeological resource" under CEQA. This is a potentially significant impact.

Mitigation CUL-1.1: To avoid or mitigate impacts to cultural resources, they must be evaluated against the federal and state significance criteria previously described. Prior to project construction, a focused literature search shall be conducted to identify any known resources. For sites that cannot be adequately characterized by existing literature or available site history information, marine archaeological surveys may be necessary to detect any previously unknown submerged or sub-bottom resources. Depending on the Proposed Project undertaking and the geographic or bathymetric setting, appropriate remote sensing field surveys could include deployment of a side-scan sonar, sub-bottom profiler, and magnetometer to help detect these resources. Follow-up diver survey, high-resolution side-scan sonar, sub-bottom profiler, magnetometer survey, or Remote Operated Vehicle (ROV) investigations might be required to positively identify the targets.

If resources are detected, they shall be identified and evaluated against the NRHP/CRHR significance criteria, and as a "unique archaeological resource" under CEQA. If the resources are not eligible for—or already on—the NRHP/CRHR and do not qualify as a "unique archaeological resource" under CEQA, then no further consideration of these resources is required. If the resources are eligible for—or currently on—the NRHP/CRHR or qualify as a "unique archaeological resource" under CEQA, then impacts could occur to those resources. If a resource is found to be significant, then the resource shall be avoided through alterations in project design, when feasible.

Under CEQA, preservation-in-place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place for archaeological resources may be accomplished by, but not necessarily limited to, a suite of approaches such as:

- Planning construction activities to avoid archaeological sites;
- Incorporation of sites within parks or other open spaces;
- Covering the archaeological site with a layer of chemically stable soil before building facilities on top of the site; and/or
- Deeding the site into a permanent conservation easement.

In the event that avoidance of cultural resources is not possible via project design modifications, appropriate mitigation shall be required. This could include further recordation or data recovery, in accordance with Section 106 of the NHPA. This could include a record of the resource, such as a wharf, pier, building or structure in a Historic American Building Survey/Historic American Engineering Record (HABS/HAER) at a level compatible with National Park Service standards. Adequate recordation of a built-environment resource shall include the following:

- The development of site specific history and appropriate contextual information regarding the particular resource, in addition to archival research and comparative studies;
- Accurate mapping of the noted resources, scaled to indicated size and proportion of the structures;
- Architectural descriptions of the structures;
- Photographic documentation of designated resources; and
- Recordation using measured architectural drawings.

Mitigation of impacts to a built-environment resource may also take place in the form of preservation or reuse of a wharf, pier, building, or structure. The preservation or reuse of an eligible structure would include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. If the building is considered a historic resource under CEQA, the local building inspector must grant code alternatives under the State Historic Building Code.

In some cases, HABS/HAER documentation might not provide an adequate mitigation to reduce impacts to a less than significant level, and might not be a sufficient mitigation measure for some resources. Mitigation should capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the pier/building/structure cannot physically be retained, then it is incumbent on the lead agency to pursue ways that the memory of the resource is retained and made easily available. To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. Often, it might be possible to incorporate the resource into the project as one means of resource mitigation.

The CEQA lead agency will be responsible for coordinating all necessary mitigation measures. This might include coordination with a federal lead agency, where federal permitting, land ownership, or other federal-level issues affect a specific project action.

Impact After Mitigation: The proposed mitigation may be adequate to avoid significant impacts. This condition applies to the Hercules/Rodeo location, which would require new construction dredging, and to any ancillary dredging at other locations. Further evaluations would be needed when final locations and designs are known in order to fully evaluate the significance of potential impacts. However, according to CEQA Section 15126.4(b)(1), in certain cases with built-environment resources, the mitigation steps outlined in CUL-1.1 might not reduce the impacts on a resource to a less than significant level. In some circumstances, documentation of a historical resource by way of historic narrative, photographs, or architectural drawings—as mitigation for demolition of the resource—might not mitigate the effects to a point where no significant effect on the environment would occur. In these cases, there could be potentially significant impacts to the resource after mitigation.

Impact CUL-2 Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.

Dredging would result in spoils that would require disposal. Only finer-grained materials (Bay Mud and sand) are suitable for aquatic disposal or upland reuse. Rock, coarse gravel, or materials such as concrete, steel, and other construction debris found in the submarine environment are not suitable for aquatic disposal/upland wetland reuse and must be taken to appropriate locations for disposal or recycling. Depending on the volume and suitability of dredged materials, dredging projects may consider a range of disposal options, including in-Bay disposal, ocean disposal, upland reuse, wetland restoration, upland landfill disposal, and reuse as fill material for construction projects. It is assumed that deep-ocean disposal would occur at a previously designated disposal site, that in-Bay disposal would not be allowed for new dredging projects, and that upland disposal would occur at an existing landfill. Therefore, only upland reuse or wetland restoration activities could impact terrestrial and marine cultural resources. Construction dredging would occur at only one location, Hercules/Rodeo. The estimated volume

of dredged material at this location is less than 50,000 cubic yards (cy). Disposal of this dredged material at locations that have cultural resources could have a potentially significant impact on those resources.

Summary of Impact CUL-2

- The Proposed Project involves expansion of ferry service to new terminals. This expansion would require dredging at some terminals, for both channels and ancillary project components. Construction dredging at Hercules/Rodeo would result in approximately 50,000 cy of spoils that would require disposal. Upland reuse or use for wetland restoration activities could impact terrestrial and marine cultural resources. Disposal at sites that have not previously been evaluated for cultural resources could pose a potentially significant impact to resources, should they exist.

Mitigation CUL-2.1: Same as CUL-1.1.

Mitigation CUL-2.2: Impacts could be mitigated by avoidance of the particular disposal site.

Impact After Mitigation: Impact CUL-2 would be less than significant after implementation of Mitigation CUL-2.1 or CUL-2.2.

Impact CUL-3 **Project actions such as retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources and historic built environment resources.**

On-shore project construction would involve construction of new facilities and could include expansion of existing ferry terminals. While some of the existing structures, or components thereof, are more than 50 years of age (e.g., the Ferry Building), the majority of terminals are significantly more recent (less than 25 years). Impacts at most sites are anticipated to be less than significant. However, project actions have the potential to significantly impact historic built environment structures and districts (including historic terminal structures), or prehistoric and historic (nonbuilt) archaeological sites.

Summary of Impact CUL-3

- The Proposed Project would involve construction of new terminals and expansion of ferry service. In addition, existing terminals could require renovation or expansion of facilities. While impacts at most sites are anticipated to be less than significant because the buildings at most terminal locations are less than 25 years old, these activities could potentially significantly impact historic built environment structures and districts (including historic terminal structures), or prehistoric and historic (nonbuilt) archaeological sites. These impacts could be potentially significant.

Mitigation CUL-3.1: Same as CUL-1.1.

Impact After Mitigation: Impact CUL-3 would be less than significant after implementation of Mitigation CUL-3.1.

Impact CUL-4 **Project actions such as construction and related activities could impact previously unknown resources.**

During project construction and related activities, the potential always exists to encounter previously unknown cultural resources. This would include prehistoric and historic submarine and terrestrial resources.

Summary of Impact CUL-4

- The Proposed Project would require construction in several areas. Such construction could potentially significantly impact previously unknown resources. Until final locations and designs are known, the impact on unknown cultural resources cannot be determined. Therefore, this remains a potentially significant impact.

Mitigation CUL-4.1: Same as CUL-1.1.

Impact After Mitigation: Impact CUL-4 could be potentially significant after implementation of Mitigation CUL-4.1.

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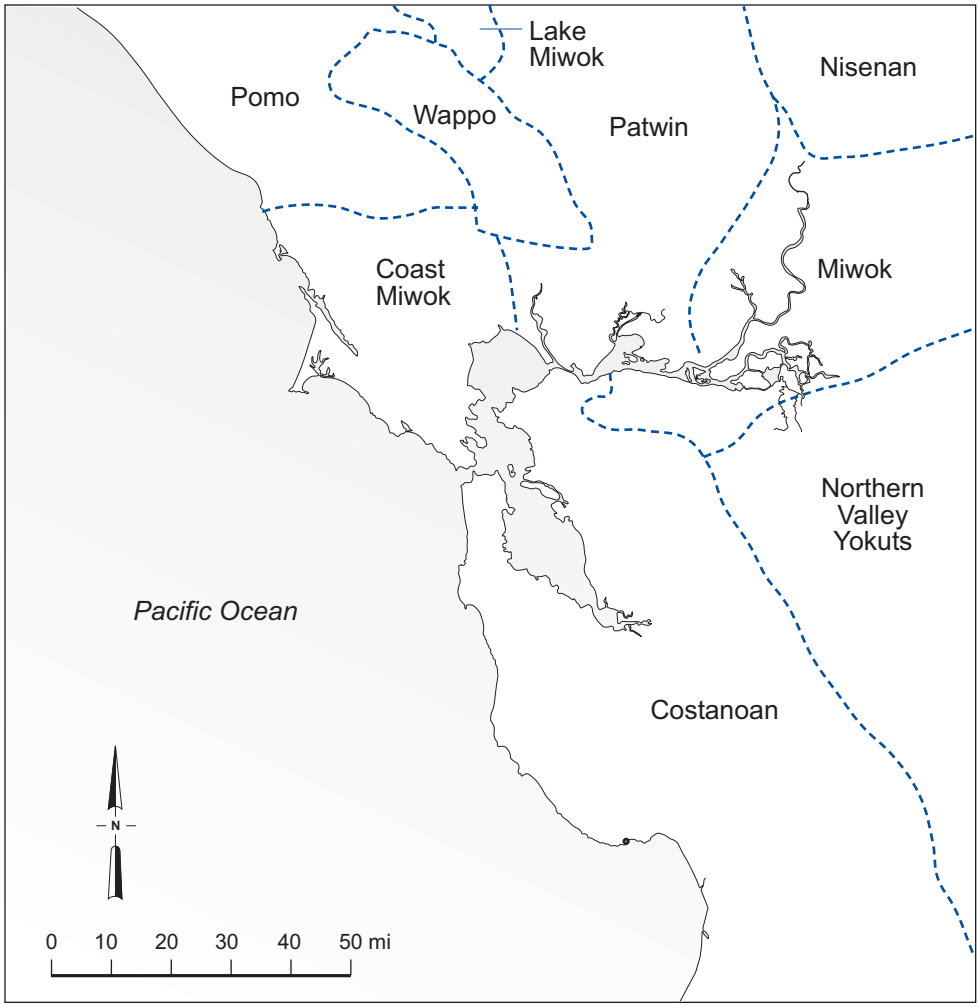
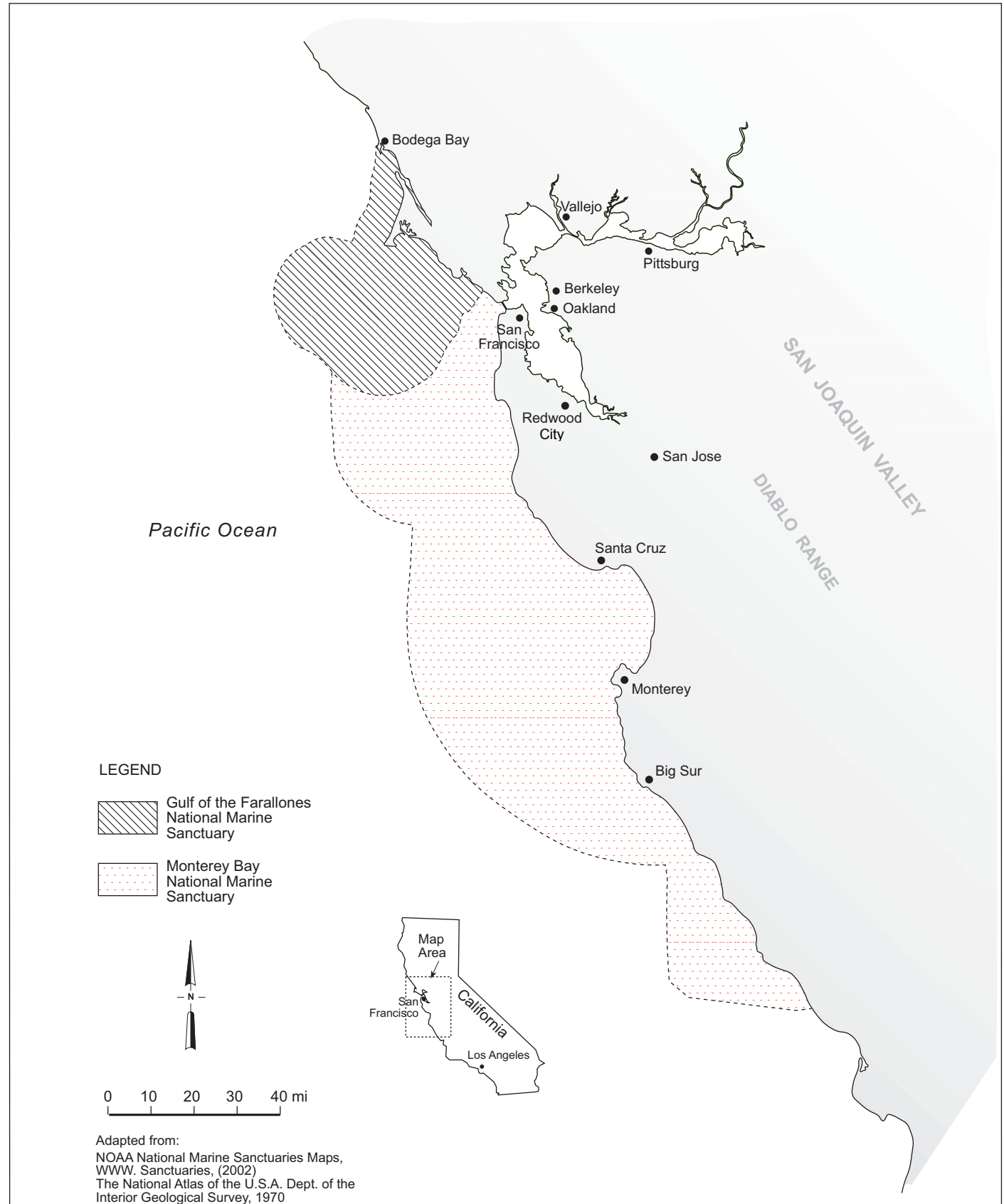


Source: Handbook of North American Indians, Vol. 8, 1978



URS	Project No.43-00066890 Water Transit Authority Program EIR	TRIBAL TERRITORIES OF THE SAN FRANCISCO BAY AREA	Figure 3.9.1



URS	Project No.43-00066890 Water Transit Authority Program EIR	NATIONAL MARINE SANCTUARIES NEAR SAN FRANCISCO BAY	Figure 3.9.2

43-00066890.19-0019A/051303/gos

3.10 GEOLOGY

This section addresses the geologic environment and the potential geologic and seismic hazard impacts related to the Proposed Project. It includes the baseline geologic, geomorphic, and seismic conditions for the San Francisco Bay Area. Potential geologic and seismic hazards are also discussed, as they might pertain to implementation of the Proposed Project.

3.10.1 Environmental Setting

3.10.1.1 Study Area

The study area for geology and seismic hazards for the Proposed Project is essentially the overall geologic and tectonic setting of the San Francisco Bay Area. The study area is a broad geographic area because of the potential for regional geologic features to affect the Proposed Project. It extends from the edge of the continental shelf, near the Farallon Islands inland to the western margin of the Sacramento-San Joaquin Valley, and from the southern end of the Santa Clara Valley northward to the northern end of the Sonoma Valley. This region incorporates all the major tectonic elements that define the structure and geologic characteristics of or affecting the San Francisco Bay Area.

3.10.1.2 Information Sources

The analyses and conclusions presented in this report were based on the review of U.S. Geological Survey (USGS) and California Division of Mines and Geology (now Geological Survey of California) maps and reports; published and peer-reviewed scientific literature; seismicity catalogs; and other available, non-proprietary geologic and seismologic data.

3.10.1.3 Regional Seismic Setting

The San Francisco Bay region is located on the boundary between the North American and Pacific tectonic plates. The Pacific plate is moving northwest relative to North America across a plate boundary oriented in a north-northwest direction that is approximately 100 kilometers (km) wide. This zone encompasses all the major faults in Northern California (Figure 3.10.1). The relative motion across this plate boundary amounts to 35 to 38 millimeters (mm) per year, with the majority of this motion occurring during large earthquakes (Working Group on California Earthquake Probabilities 1999). Geologically, this region is one of the most active in the world, highlighted by the number of large, damaging earthquakes that have occurred in the past. Major earthquakes have occurred along the margins of the Bay on the San Andreas and Hayward faults in 1836, 1838, 1868, and 1906 (Bakun 1999). Some slip also occurs as aseismic fault creep (i.e., fault movement that does not generate earthquakes) on the Hayward, Concord, and Calaveras faults (Galehouse 1992).

Historical seismicity for the Bay region is primarily associated with the strike-slip faults of the San Andreas system (Figure 3.10.1, Table 3.10.1). Fourteen earthquakes of magnitude (M) 6.0 or greater have occurred in the Bay Area in historical times. Earthquakes of this magnitude pose significant ground-shaking hazard to the study area. Of these, some of the most significant events were:

- **October 21, 1868.** This Richter Local magnitude[1] (M_L) 6.8 earthquake occurred on the southern Hayward fault. Heavy damage was sustained in towns along the Hayward fault in the eastern Bay Area, as well as in San Francisco and San Jose. Reported damage extended from Gilroy and Santa Cruz in the south to Santa Rosa in the north.

- **March 31, 1898.** The San Francisco Bay region was shaken by an earthquake that appeared to be centered near Mare Island in San Pablo Bay. This earthquake caused disturbances in the Bay that were reported as a "tidal wave."

- **April 18, 1906.** The Great San Francisco Earthquake of 1906, Moment magnitude[2] (M_w) 7.9, centered near Olema, was arguably the most destructive earthquake to have occurred in Northern California in historical times. It ruptured the San Andreas fault from San Juan Bautista to the Cape Mendocino. Damage was widespread in Northern California and injury and loss of life was particularly severe. Ground shaking and fire caused the deaths of more than 3,000 people and injured approximately 225,000. Damage from shaking was most severe in areas of saturated or loose, young soils. Liquefaction was reported throughout the Bay Area.

- **October 17, 1989.** The M_w 6.9 Loma Prieta earthquake at 5:04 p.m. local time occurred on or adjacent to the southern Santa Cruz segment of the San Andreas fault. The cities of Los Gatos, Watsonville, and Santa Cruz were hard hit with damage, as were San Francisco and Oakland. Shaking was felt throughout the Bay Area. Damage to major transportation facilities included the collapse of the I-880 Cypress structure, liquefaction and settlement damage to Port facilities in Oakland, and the runway apron at Oakland International Airport, and temporary closure of the Oakland-Bay Bridge. As in the 1906 earthquake, the worst damage from shaking occurred at structures on unconsolidated or saturated soils.

The majority of contemporary seismicity in the Bay Area is associated with the major faults, namely, the Hayward, Rodgers Creek, San Gregorio, Calaveras, and San Andreas faults (Figure 3.10.1; Table 3.10.1), or related secondary structures located within about 5 km of the major faults (Zoback et al., 1999).

3.10.1.4 Physiographic Setting

The San Francisco Bay Area has a structurally controlled topography that consists primarily of north to northwest trending mountain ranges and intervening valleys that are characteristic of the Coast Range geomorphic province (Figure 3.10.2). This fabric is subparallel to the San Andreas fault. The Coast Ranges consist of the Mendocino Range to the north of the San Francisco Bay, the Santa Cruz Mountains west of the Bay, and the Diablo Range to the east of the Bay. The Coast Ranges are composed of a thick sequence of late Mesozoic (200 to 70 million years old)

[1] Measurement of earthquake size used for relatively small, shallow earthquakes in California. Measures the maximum amplitude traced on seismogram by a seismometer located at a distance of 100 miles (62 km) from the earthquake epicenter.

[2] Measurement of earthquake size based on the energy released. The amount of energy released during an earthquake is a function of the surface area of the fault that has slipped, the amount of slip, and the rigidity of the rock through which the fault passes.

and Cenozoic (less than 70 million years old) sedimentary strata. The northern part of the Coast Range is dominated by the landslide-prone Franciscan Formation.

San Francisco Bay is a topographic trough formed by combination of warping and faulting and is underlain by a down-dropped or tilted block (the Bay Block) (Olson and Zoback 1998). This gap in the Coast Ranges to allow the San Joaquin and Sacramento Rivers to drain to the ocean. The Bay is about 90 km long and from 5 to 8 km wide. Constrictions divide the Bay into Suisun, San Pablo and the North and South San Francisco Bays. The Bay is relatively shallow with depths of less than 3 meters except in locations of drowned drainage channels. The deepest point is within the main channel through the Golden Gate, at a depth of approximately 105 meters below sea level.

To the east, the Coast Ranges are bounded by the Great Valley geomorphic province. The Great Valley comprises two elongate northwest to southeast-trending basins, the Sacramento basin to the northwest and the San Joaquin basin to the southeast located between the Coast Ranges to the west and the Sierra Nevada to the east. The province is approximately 700 km long and 70 to 90 km wide. It is characterized by a thick, relatively undeformed sequence of alluvium and volcanic deposits overlying older sediments. The western margin of the Great Valley, the Coast Ranges-Great Valley geomorphic boundary, is underlain by a system of folds and seismically active thrust faults (Wakabayashi and Smith 1994). This separates the relatively undeformed strata of the Great Valley from the highly deformed rocks of the Coast Ranges.

3.10.1.5 Regional Geology

The geology of the Bay Area is made up primarily of three different geologic provinces: the Salinian block, the Franciscan complex, and the Great Valley sequence (Figure 3.10.3). The Salinian block is located west of the San Andreas fault. It is composed primarily of granitic plutonic rocks, which are similar to those found in the Sierra Nevada and are believed to be rocks of the Sierra Nevada Batholith that have been displaced along the San Andreas fault. To the east of the San Andreas fault and bounded on the west by the Hayward fault is the Mesozoic Franciscan complex. The Franciscan rocks represent pieces of former oceanic crust that have accreted to North America by subduction and collision. These rocks are primarily deep marine sandstone and shale. However, chert and limestone are also found within the assemblage. The rocks of the Franciscan complex are prone to landslides. To the east of the Hayward fault is the Great Valley sequence. This is composed primarily of Cretaceous and Tertiary marine sedimentary rocks in the Bay Area. These rocks are also prone to landsliding.

3.10.1.6 Recent Geologic History

San Francisco Bay is California's largest estuarine environment, and its configuration and the surrounding landscape has been shaped by a combination of tectonic activity, recent sea level changes, and human activities since 1850.

Since the formation of the Sacramento-San Joaquin drainage outlet through the Bay approximately 400,000 years ago, the environment of deposition has fluctuated between estuarine (periods of high sea level resulting from a warm global climate) and alluvial (periods of low sea level during periods of cold global climate) (Sloan 1992).

The present Bay estuary formed less than 10,000 years ago as the global climate warmed and sea levels rose. Marine water re-entered the Bay approximately 10,000 years ago and by about 4,000

years ago had reached its present level. With the establishment of true estuarine conditions, sedimentation in the Bay changed from alluvial sands and silts to dark-colored estuarine clays and silts, commonly called Bay Mud. Deposition of sandier sediment was confined to channels.

Since about 1850, human activities have made enormous modifications to the Bay, causing changes in the patterns of circulation and sedimentation. Between 1856 and about 1900, hydraulic mining in the Sierra foothills deposited several feet of sediment throughout the Bay. Starting in the 1800s, the construction of levees and dykes altered the patterns of drainage and annual flooding in the Sacramento River Delta. Also, the placement of fill at numerous localities around the Bay margins has dramatically altered the shoreline profile during historic time.

3.10.1.7 Geologic and Seismic Hazards

The geologic environment of the greater San Francisco Bay Area comprises a number of potential geologic hazards. These are discussed in the following sections. The specific hazards at each potential terminal locality are summarized in Table 3.10.2.

Surface Fault Rupture

Surface fault rupture is defined as slip on a fault plane that has propagated upward to, and offsetting or disturbing, the earth's surface. Offset on a fault intersecting the ground surface can create a discrete step or fault scarp if fault slip occurs on a single fault plane or within a narrow fault zone. If fault slip is accommodated over a broader area, then the deformation may manifest as a zone of fracturing and ground cracking with minor amounts of offset on individual fractures. However, the cumulative offset across the entire zone may be significant. Surface faulting may also arise as a secondary effect from other geologic processes. Secondary surface faulting can be triggered by aquifer compaction and subsidence or by the effects of strong ground shaking triggering slip on neighboring faults. Surface fault rupture has occurred on a number of faults within the study region during the last 10,000 years (Table 3.10.1). The San Andreas, Hayward, Calaveras, and Greenville faults have all experienced surface rupture associated with large, damaging earthquakes during historical time (Figure 3.10.1).

The Alquist-Priolo (AP) Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy in California. Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that potential buildings will not be constructed across active faults. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (generally 50 feet).

Fault rupture hazard was assessed at each potential terminal locality and ranked as follows: High (located within an AP Earthquake Fault Zone), Moderate (located adjacent to an AP Zone), and Low (located away from known AP Zones). Table 3.10.2 presents a summary of surface fault rupture hazards for each potential terminal locality.

Earthquake Ground Shaking

Strong earthquake ground shaking is probably the most important seismic hazard that can be expected anywhere in the San Francisco Bay Area. The amount of earthquake shaking at a site is a function of earthquake magnitude; the type of earthquake source (i.e., type of fault); distance between the site and the earthquake source; the geology of the site; and how the earthquake

waves decrease or attenuate as they travel from their source to the site in question. The larger the earthquake and the shorter the distance between the earthquake source and the site, the greater the amount of shaking. The geologic materials through which the earthquake energy travels toward the site act to decrease, or attenuate, the amount of shaking. The San Francisco Bay Area has experienced a number of large, damaging earthquakes during historical time (see Section 3.10.1.3).

Site-specific earthquake ground motions were not calculated as part of the Program EIR. Because of the overview nature of this evaluation a ranking was developed based on proximity to major active faults, defined as Very High (located 5 km or less from an active fault), High (located 5-10 km from an active fault), and Moderate (located 10-20 km from an active fault). Ground shaking hazards are further discussed under Impacts and Mitigation (Impact G-2). Ground shaking hazards at each potential terminal locality are summarized in Table 3.10.2.

Liquefaction

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking. Liquefaction and related phenomena have been responsible for tremendous amounts of damage by historical earthquakes around the world.

Liquefaction is the transformation of a granular material from a solid state into a liquefied state as a consequence of increased pore pressure and decreased effective stress (Youd 1973). Increased pore pressures in unconsolidated sediment, especially in western California, are most typically seismically induced deformation. Observed types of ground failure resulting from liquefaction can include sand boils, lateral spreads, ground settlement, ground cracking, and ground warping (Youd and House 1978). Liquefaction occurs in saturated soils.

Lateral Spread is the lateral displacement of surficial blocks of sediment as the result of liquefaction in a subsurface. Once liquefaction transforms the subsurface layer into a fluidized mass, gravity may cause the mass to move downslope toward a cut slope or free face (such as a river channel or a canal). Lateral spreads most commonly occur on gentle slopes that range between 0.3 degrees and 3 degrees. When liquefaction occurs, the strength of the soil decreases and the ability of a soil deposit to support foundations for buildings or other structures is reduced. Liquefied soil also exerts higher pressure on retaining walls, which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface. Extensive liquefaction was triggered by the 1906 M_w 7.9 San Francisco earthquake, resulting in widespread damage in areas of soft, saturated soils. Liquefaction also resulted in major damage during the 1989 M_w 6.9 Loma Prieta earthquake.

A map of liquefaction susceptibility in seven counties of the Bay Area, prepared by Knudsen et al. (2000), was used to assess risk for the potential ferry terminal locations (Table 3.10.2). The majority of the terminal locations around the Bay Area are in areas of soft, potentially liquefiable soils (Knudsen et al. 2000). Liquefaction is likely to be triggered by strong shaking from an earthquake on one of the Bay Area's active faults.

Subsidence

Land surface subsidence can result from both natural and man-made phenomena. Natural phenomena include subsidence resulting from tectonic deformations and seismically induced settlements (see liquefaction); soil subsidence due to consolidation; subsidence due to oxidation

or dewatering of organic-rich soils: and subsidence related to subsurface cavities. Subsidence or settlement related to human activities includes subsidence caused by decreased pore pressure due to the withdrawal of subsurface fluids, including water and hydrocarbons. Ogden Beeman and Associates (1992) investigated changes in the bathymetry[3] of San Francisco Bay as a result of sedimentation and land level changes. The potential for subsidence hazard was assessed using historically recorded subsidence/uplift behavior in the Bay Area (Table 3.10.2). Ranking of subsidence hazard relates to potential for tectonic subsidence during lifetime of the project. Subsidence due to liquefaction and/or lateral spreading is not considered. Subsidence hazard rankings are as follows: High (area of known ongoing subsidence/uplift), Moderate (area of historical uplift/subsidence), and Low (area with no history of geologically recent uplift/subsidence). The northern shoreline of San Pablo Bay is experiencing contemporary subsidence, probably as a result of a combination of compaction of sediments with a high organic content and ongoing tectonic subsidence.

Expansive Soils

Expansive soils contain mixed-layer clay minerals that increase and decrease in volume upon wetting and drying, respectively. Expansive soils are common throughout California and can cause damage to foundations and slabs unless properly treated during construction. Most fine-grained deposits along the margins of San Francisco Bay contain mixed clay layer and exhibit expansive or potentially expansive behavior. However, the hazard for expansive behavior is considered a low risk for coastal locations in and around the Bay Area because these areas are permanently saturated. Expansive soils hazards at each potential terminal locality are summarized in Table 3.10.2.

Mass Wasting

Mass wasting is downward movement of soils and rock under gravity. This includes landslides, rock falls, and debris flows. Mass wasting requires source materials, a slope, and a triggering mechanism. Source materials include fractured and weathered bedrock and loose soils. Triggering mechanisms include earthquake shaking, heavy rainfall, and erosion.

Slides and earth flows are landslides that can pose serious hazard to property in the hillside terrain of the San Francisco Bay region. They tend to move slowly and thus rarely threaten life directly. When they move (in response to such changes as increased water content, earthquake shaking, addition of load, or removal of downslope support) they deform and tilt the ground surface. The result can be destruction of foundations, offset of roads, and breaking of underground pipes within and along the margins of the landslide, as well as overriding of property and structures downslope. Landslide hazards for the Bay Area have been mapped by the USGS (San Francisco Bay Landslide Mapping Team 1997) and more recently by California Geological Survey (http://gmw.consrv.ca.gov/shmp/) under the Seismic Hazard Mapping Program. Mass wasting hazards at each potential terminal locality are summarized in Table 3.10.2. Ranking of mass wasting hazard is based on the presence of suitable topography, source material (soil or weak rock), and the presence of previous slope movement. Rankings are as

[3] Bathymetry is the water depth relative to sea level. Depth values may be either negative or positive, but should all be understood to be negative.

follows: High (history of landsliding/debris flows), Moderate (area of steep slopes with landslide-prone materials), and Low (flat or relatively flat topography).

Tsunami and Seiche

A tsunami (Japanese word meaning "harbor wave") is a water wave or a series of waves generated by an impulsive displacement of the surface of the ocean or other body of water. Tsunamis can travel across oceanic basins and cause damage several thousand miles from their sources. Most tsunamis are caused by a rapid vertical movement along a break in the Earth's crust, i.e., a tectonic fault rupture on the bottom of the ocean resulting in displacement of the column of water directly above it. The majority of tsunamis are triggered by earthquake rupture along subduction zones. The 1964 Alaska earthquake generated a tsunami that caused widespread damage along the coastline of northern California. Paleoseismic investigations have also shown that tsunamis resulting from earthquakes on the subduction zone beneath Japan and the Cascadia subduction zone in the Pacific northwest have also inundated the Pacific coast states (Atwater et al. 1995).

A seiche is a periodic oscillation or "sloshing" of water in an enclosed basin such as the San Francisco Bay. The period of oscillation can range from minutes to hours. The 1898 "Mare Island" earthquake is reported to have caused a seiche in the northern part of the Bay (Toppozada et al. 1992). There are no reports of damage associated with this event.

Ritter and Dupre (1972) show that for a tsunami originating outside San Francisco Bay, the amount of inundation based on tsunami run-up decreases to 50 percent of its maximum at the Golden Gate by the time it passes the Bay Bridge to the south and the Richmond-San Rafael Bridge to the north. By the time the tsunami reaches the Carquinez Strait to the north or Alviso in the south, the run-up would only be approximately 10 percent of its maximum at the Golden Gate. Tsunami run-up results in inundation and flooding of low-lying areas, and in locations where the waves have sufficient energy cause significant erosion. The inundation model of Ritter and Dupre (1972) was used to assess hazards related to tsunamis and seiche in San Francisco Bay (Table 3.10.2). The ranking of tsunami hazard is based on the exposure of each terminal locality to the open ocean, where: High – exposed to open-ocean tsunami waves; Moderate – exposed to reduced-height tsunami waves or smaller local tsunamis; Low – sheltered from potential tsunami waves.

3.10.1.8 Regulatory Setting

Regulatory requirements potentially applicable to geology and geologic hazards are summarized below:

1998 California Building Code

The California Building Code (CBC) contains the minimum standards for design and construction in California. Local standards other than the CBC may be adopted if those standards are stricter. Some design considerations associated with seismic hazards will have to address the appropriate building codes for each ferry expansion facility location. The CBC involves the standards associated with seismic engineering detailed in the Uniform Building Code of 1997.

California Public Resources Code Section 25523(a); 20 CCR 1752(b) and (c); 1972 Alquist-Priolo Earthquake Fault Zoning Act (amended 1994)

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The Alquist-Priolo Earthquake Fault Zoning Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults.

Before a project can be permitted, cities and counties must require a geologic investigation to demonstrate that potential buildings will not be constructed across active faults. An evaluation and written report of a specific site must be prepared by a licensed geologist. If an active fault is found, a structure for human occupancy cannot be placed over the trace of the fault and must be set back from the fault (generally 50 feet).

California Public Resources Code Chapter 7.8, 1990 Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 allows the lead agency to withhold permits until geologic investigations are conducted and mitigation measures are incorporated into plans. The Seismic Hazards Mapping Act addresses not only seismically induced hazards but also expansive soils, settlement, and slope stability. The Seismic Hazards Mapping Act will be relevant to soil conditions at some future facility sites.

3.10.2 Impacts and Mitigations

3.10.2.1 Significance Criteria

Impacts would be considered significant if they would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving surface fault rupture, earthquake ground shaking, liquefaction, subsidence, uplift, expansive soils, mass wasting, erosion, and tsunami or seiche;
- Expose people or structures to on-site or off-site landslides, lateral spreading, ground subsidence, liquefaction, or collapse because terminals were situated on unstable geologic units or soil, or soil that could become unstable as a result of the project;
- Prevent future access to geologic features and resources of economic or scientific value.

The following section discusses potential impacts to and from the geologic environment for the Proposed Project. Geologic hazards considered include surface fault rupture, earthquake ground shaking, liquefaction and lateral spreading, uplift and subsidence, expansive soils, mass wasting, erosion, and tsunamis. Major active faults in the Bay Area are summarized in Table 3.10.1. The potential exposure of transit terminals to geologic hazards is summarized in Table 3.10.2. Mitigation measures to overcome the various geologic hazards are also presented. The potential impacts of the program on the geologic environment are discussed.

3.10.2.2 Impacts

Impact G-1 **Potential new terminals and facilities could be exposed to surface faulting. There is a potential for substantial damage and risk of injury or loss of life at facilities located on or near active faults.**

The State of California delineates zones around active faults under the Alquist-Priolo (AP) Earthquake Fault Zone Act (Hart 1994). Any development within an AP Zone requires detailed geologic investigation to accurately delineate active fault strands such that they can be avoided. Fault rupture beneath engineered structures can, if the fault displacement is large enough, lead to damage and in extreme conditions catastrophic collapse. Even minor fault displacements can cause significant structural damage.

None of the ferry terminal locations for the Proposed Project are within an AP Zone. Therefore, the potential for exposure and damage from surface fault displacement is low (Table 3.10.2).

Summary of Impact G-1

- The Proposed Project does not include new terminal locations within AP Zones. Therefore, the potential for impacts from surface faulting is low and is considered less than significant.

Impact G-2 **Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.**

The Bay Area is seismically active and all sites have a reasonably high potential of experiencing significant strong earthquake shaking in the future (Working Group on California Earthquake Probabilities 1999). This is true for most transportation facilities and public buildings in and around the Bay Area.

A number of attenuation relationships have been developed based on recordings of earthquake shaking. These relate earthquake size, distance from the earthquake source, and geologic conditions to the amount of shaking that can be expected at a site. The amount of shaking is expressed in terms of "Peak Horizontal Acceleration" measured in percent of acceleration of gravity (g) (approximately 9.8 m/s^2). However, because no specific projects are proposed at this time, no site-specific ground motions were calculated for any sites during this study. Rather, relative levels of earthquake shaking were estimated based on the proximity of each terminal site to known active faults (Table 3.10.2). Sites located less than 5 km from an active fault could experience "very high" shaking. Sites located 5 to 10 km from an active fault could experience "high" levels of shaking. Sites located 10 to 20 km from active faults could experience "moderate" shaking. In cases where ground conditions are likely to amplify the effects of earthquake shaking (deep, soft sediment), there is an increase in the likely shaking hazard ranking (i.e., a site on soft Bay Mud located 7 km from an active fault would likely experience "very high" levels of earthquake shaking). As shown on Table 3.10.2, all of the proposed terminal sites for the Proposed Project could experience "high" to "very high" earthquake shaking.

The levels of earthquake shaking expected from a large earthquake on any of the Bay Area faults would likely result in structural damage and possible injury or loss of life at poorly constructed

structures. Areas where foundation conditions have not been sufficiently engineered could experience a loss of bearing capacity, leading to significant structural damage and even collapse.

Summary of Impact G-2

- The Proposed Project includes new terminals. If the new structures and facilities are not properly designed or constructed for site-specific conditions, they could suffer substantial damage from seismic activity and pose potential risk of injury or loss of life to occupants. This impact is potentially significant.

Mitigation G-2.1: Terminal facilities shall be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 4. Additionally, to satisfy the provisions of the 1998 California Building Code, these facilities shall be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedence in 50 years). For design purposes, site-specific ground motions shall be calculated for all project sites.

Impact After Mitigation: Impact G-2 would be less than significant with implementation of Mitigation G-2.1.

Impact G-3 Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.

A map of liquefaction susceptibility in the seven-county Bay Area, prepared by Knudsen et al. (2000), was used to assess risk for the potential ferry terminal locations (Table 3.10.2). The majority of the terminal locations around the Bay Area are in areas of soft, potentially liquefiable soils (Knudsen et al. 2000). Liquefaction is likely to be triggered by strong shaking from an earthquake on one of the Bay Area's active faults. When liquefaction occurs, the strength of the soil decreases, and the ability of soil to support building foundations is reduced. Liquefied soil also exerts higher pressures on retaining walls, which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface. Increased water pressure can also trigger landslides. Liquefaction can be minimized or even prevented by adopting appropriate ground improvement techniques, such as soil densification and dewatering, or by designing foundations that will accommodate differential ground movement during liquefaction.

Summary of Impact G-3

- The Proposed Project includes new terminals located within areas ranked as having high to very high susceptibility to liquefaction. This is a potentially significant impact only if soil improvement techniques are not implemented or building foundations are not designed correctly for potentially liquefiable conditions.

Mitigation G-3.1: A program of site-specific exploratory borings and accompanying laboratory testing will be required to delineate any potentially liquefiable materials underneath potential terminal sites. These geotechnical investigations will also be required for consideration prior to foundation design. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction potential.

This has been performed with success within areas of liquefaction risk in the Bay Area. For example, densified fill material in areas of Foster City and Redwood Shores survived the 1989 M_w 6.9 Loma Prieta earthquake without liquefying (Benuska 1990). The commercial and residential developments situated on these areas of engineered fill suffered no major structural damage during the earthquake.

Impact After Mitigation: Impact G-3 would be reduced to less than significant levels with implementation of Mitigation G-3.1 for potential new terminals.

Impact G-4 Subsidence is ongoing in portions of the Bay Area. Damage from subsidence is a potential geohazard.

Although subsidence is ongoing in areas of the Bay (Ogden Beeman and Associates 1992), it does not appear to pose a significant hazard during the lifetime of the project. Significant land level changes generally occur on geologic time scales (more than a thousand years). The geohazard presented by subsidence to potential new terminals is low (Table 3.10.2). Therefore, the hazard from subsidence is likely negligible at potential transit terminal localities and the potential for impacts is considered less than significant.

Summary of Impact G-4

The Proposed Project includes new terminals located in areas of low potential for subsidence. Therefore, the hazard from subsidence is likely negligible at potential transit terminal localities and the potential for impacts is considered less than significant. No mitigation is required.

Impact G-5 Expansive soil behavior is associated with wetting and drying of soils containing mixed-layer clays. Expansive soils can lead to structural damage.

The high groundwater table along the margins of the Bay indicates that soils at these localities are permanently saturated; therefore, there is a very low risk of expansive soil behavior and this impact is considered less than significant.

Summary of Impact G-5

- The Proposed Project includes new terminals located along the shore, where soils are permanently saturated. The hazard of expansive soils is considered less than significant, and no mitigation is required.

Impact G-6 Slope movements have the potential to cause a range of impacts from minor structural damage (building impacts from rock fall) to major damage and injury/loss of life from building collapse.

Project sites located adjacent to any areas of steep topography are potentially prone to slope instability, depending on source materials, when subject to a triggering mechanism such as heavy rainfall or seismic shaking. Slope instability ranging from rock falls to block sliding is possible on any steep slope around the Bay Area. Particularly prone areas are underlain by rocks of the Great Valley Group or the Franciscan Complex. However, for the Proposed Project, all localities

of proposed new terminals are on relatively flat topography. Therefore the potential hazard from mass wasting is considered less than significant.

Summary of Impact G-6

- All localities of proposed new terminals are in relatively flat topography. Therefore the potential hazard from mass wasting is considered less than significant.

Impact G-7 Erosion due to wind and water action could lead to the deterioration of terminal structures.

Wind and water are the primary agents of erosion, leading to the weathering and subsequent transportation of rock and soils. In coastal and shoreline environments, both agents work in conjunction, often augmented by tidal and current action, to cause removal and/or redeposition of sediments and soft, easily erodable rock. In addition, erosion of soils and soft rock along the margins of river channels can be significant due to high velocity flows.

Comparison of pre-1900 and post-1900/pre-fill topographic maps of San Francisco Bay indicates that the greatest amount of erosion has occurred along the East Bay shoreline in the area south of the Bay Bridge (NOAA no date). This erosion is the result of wave action, driven by the prevailing winds that cross the Bay from the west. The western shoreline, in the lee of the Peninsula Hills and San Bruno Mountain, has remained essentially unchanged during this period.

Other areas that may be subject to erosion are located along the banks of rivers, where relatively high velocity flows can occur during flood stage.

Erosion can result in undermining of seawalls, foundations, and other constructed facilities located adjacent to the coast or river channel.

As shown in Table 3.10.2, Vallejo, Pittsburg/Antioch, and Martinez have moderate potential for erosion. All other proposed terminals have low potential. However, the majority of landside portions of terminals would either be on piles or set back from the shoreline. Erosion would not be an issue for ferry floats. While it is unlikely that erosion would lead to significant impacts, until site-specific conditions are known, this remains a potentially significant impact.

Summary of Impact G-7

- The Proposed Project includes new terminals (Pittsburg/Antioch and Martinez) along narrow portions of the North Bay, where relatively high velocity flows can occur during flood stage. These terminals could be subjected to erosion. While it is unlikely that erosion would lead to significant impacts, until site-specific conditions are known, this remains a potentially significant impact.

Mitigation G-7.1: The erosion potential of each site will have to be determined on a site-specific basis. Once this has been determined, appropriate mitigation measures, if necessary, could be adopted.

If erosion is determined to be a significant threat at a terminal location, the specific location of the terminal could be changed and/or terminal design could be changed to minimize the potential for impacts from erosion. As a last resort, the shoreline could be armored with rip-rap or

concrete seawalls. Defensive measures such as groins that modify or deflect flow and circulation patterns are not desirable as they can merely transfer erosion problems elsewhere.

Impact After Mitigation: Impact G-7 would be less than significant after implementation of Mitigation G-7.1.

Impact G-8 Tsunami- and seiche-generated waves have the potential to inundate shoreline sites and damage terminal facilities.

Ritter and Dupre (1972) show that for a tsunami originating outside San Francisco Bay, the amount of inundation, based on tsunami run-up, decreases to 50 percent of its maximum at the Golden Gate by the time it passes the Bay Bridge to the south and the Richmond-San Rafael Bridge to the north. By the time the tsunami reaches the Carquinez Strait to the north or Alviso in the south, the run-up would only be approximately 10 percent of its maximum at the Golden Gate. This model was used to assess hazards related to tsunamis and seiche in San Francisco Bay.

Tsunami-generated waves have the potential to inundate low-lying coastal areas and cause extensive erosion and/or deposition of sediment. Poorly constructed facilities can also be damaged by both the incoming waves and outgoing return flow. By the time a tsunami enters the Bay, its impacts will be dramatically reduced compared to those on the open coast. Therefore, the impact of a tsunami to facilities along the Bay shoreline would be minimal, possibly involving a meter or so of potential inundation. The Proposed Project does not include any oceanside terminals and the potential for impacts from tsunamis to facilities along the Bay shoreline is minimal. Therefore, the impact is less than significant.

Summary of Impact G-8

- The Proposed Project does not include any oceanside terminals and the potential for impacts from tsunamis to facilities along the Bay shoreline is minimal. Therefore, the impact is less than significant.

Impact G-9 The ferry expansion program could potentially impact the geologic environment, including energy or mineral resources.

Hydrocarbon Resources. No known hydrocarbon (oil and gas) resources are within the immediate area of the project with the exception of a gas field located near Antioch (DOGG 2001). However, the Proposed Project is not expected to have an impact on this resource.

Geothermal Resources. No known geothermal resources are within the immediate area of the program expansion (DOGG 2001). The Proposed Project would have no impact on geothermal resources.

Crushed Rock Aggregate Resources. The majority of the terminal locations are classified by California Division of Mines and Geology (now California Geological Survey) as being Mineral Resource Zone (MRZ)-1 or MRZ-4 areas (Stinson et al. 1987). MRZ-1 describes "areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence." MRZ-4 describes "areas where available

information is inadequate for assignment to any other MRZ zone." Based on this information, the majority of potential terminal locations would have no impact on economic mineral resources. However, Rodeo was classified as MRZ-3 areas containing crushed aggregate resources. MRZ-3 describes "areas containing mineral deposits, the significance of which cannot be evaluated from available data". Therefore, there is a possibility that the Hercules/Rodeo site could locally affect future use of these crushed aggregate resources.

Activities involved in the ferry terminal construction would likely require crushed rock aggregate for the manufacture of concrete elements (e.g., piles, retaining wall structures, and surface facilities). Considerations of transportation cost mean that this material would have to come from local sources. This would result in increased production of crushed rock aggregate at local source sites, but this has not been a major constraint for other Bay Area projects.

Sand and Gravel Resources. Antioch is classified as an MRZ-3 area containing sand and gravel resources. This indicates that the siting of shore facilities at these locations could restrict future development of these sand and gravel resources. However, the terminal would be located in the Rivertown district, which does not permit the types of uses involved in extracting or processing sand and gravel resources (Albro 2002). In addition, the Bay Area has other available sources for these materials. Therefore, the Proposed Project would not have a significant impact on these resources.

Unique or Outstanding Geologic and Geomorphic Features. The area of San Francisco Bay surrounding potential terminal sites does not contain any unique geological formations, geological features, or geomorphological features that would be adversely impacted by the Proposed Project.

Summary of Impact G-9

- The Proposed Project does not appear to have a significant potential to impact energy or geologic resources. Therefore, impacts are anticipated to be less than significant.

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Table 3.10.1
Major Active Faults in the San Francisco Bay Area

Fault Name	Maximum Length (km)	Maximum Magnitude (M_w)	Dip (°)	Approximate Age of Most Recent Rupture Event	Slip Rate (mm/yr)
San Gregorio	175	7.7	90	Holocene	7 ± 3
San Andreas	474	7.9	90	1906	24 ± 5
Rodgers Creek	63	7.1	90	Holocene	9 ± 2
Hayward	87	7.1	90	1868 (Currently creeping)	9 ± 2
Calaveras	123	7.5	90	Holocene (Part in 1851)	15 ± 3
Concord	20	6.6	90	Holocene (Currently creeping)	4 ± 2
Green Valley	36	7.0	90	Holocene (Currently creeping)	5 ± 3
Coast Range-Sierra Block	41	6.6	15 WSW	Holocene	1.5 ± 0.5
Greenville	73	7.2	90	Holocene (Part in 1980)	2.0 ± 1.0
Ortigalita	92	7.2	90	Holocene	1.0 ± 0.5
West Napa	33	6.8	90	Holocene	1.0 ± 0.5
Mount Diablo	25	6.7	20 NE	Holocene	3.0 ± 1.0

Sources: Working Group on California Earthquake Probabilities (1999); Working Group on Northern California Earthquake Potential (1996)

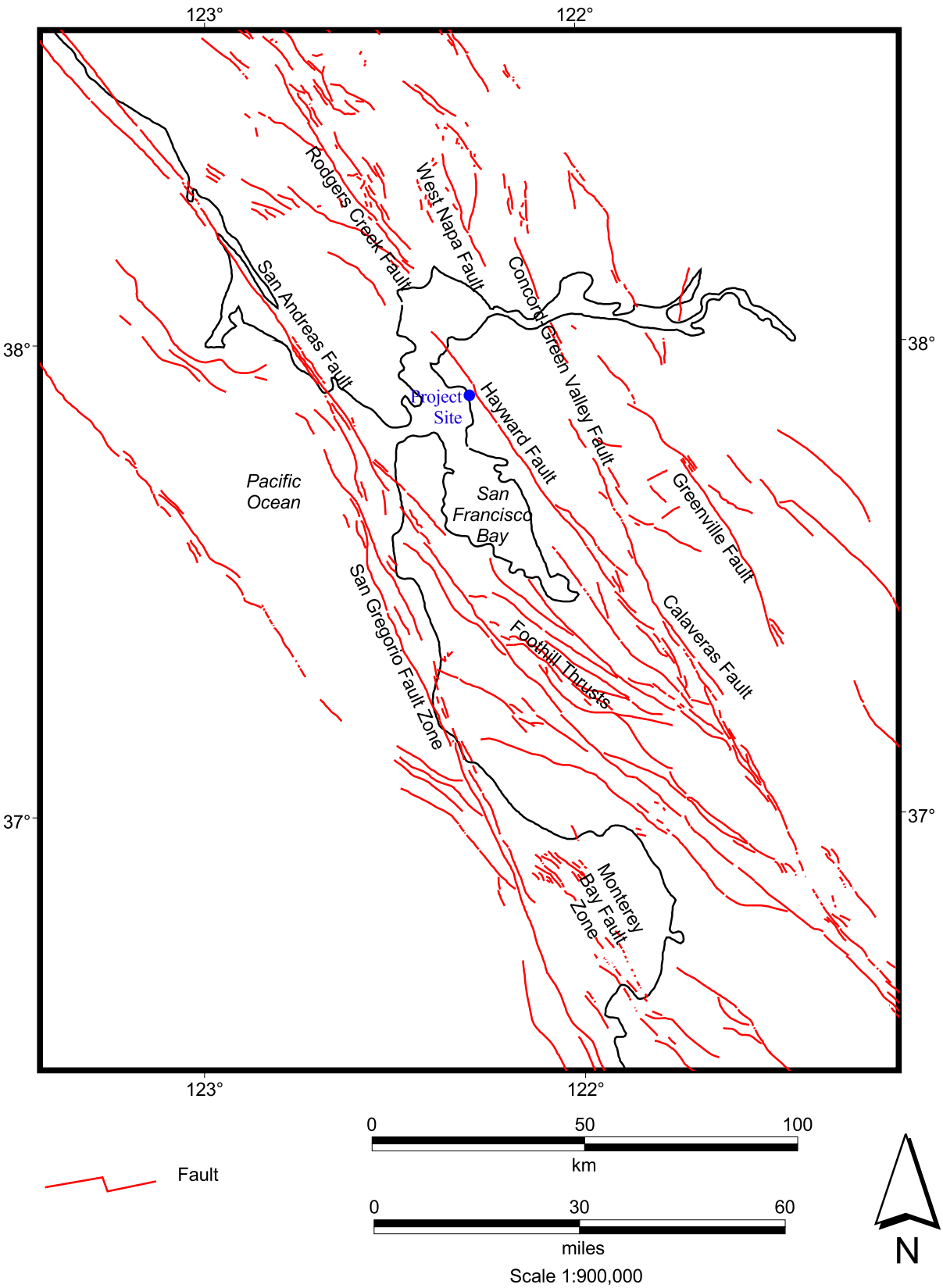
Table 3.10.2
Geohazard Exposure for Potential Terminal Sites

	Terminal Site	Potential Geohazards							
		Earthquake Shaking[1]	Fault Rupture[2]	Liquefaction[3]	Subsidence / Uplift[4]	Landsliding[5]	Erosion[6]	Expansive Soils[7]	Seiche / Tsunami[8]
Existing Terminals	Vallejo	Very High	Low	High to V. High	Low	Low	Moderate	Low	Low
	Larkspur	High	Low	Very High	Low	Low	Low	Low	Low
	Tiburon	High	Low	Very High	Low	Low	Low	Low	Low
	Sausalito	High	Low	Very High	Low	Moderate	Low	Low	Low
	SF Ferry Building	High	Low	Very High	Low	Low	Low	Low	Low to Moderate
	Jack London Square	High	Low	Very High	Low	Low	Low	Low	Low
	Alameda	High	Low	Very High	Low	Low	Low	Low	Low
	Harbor Bay Isle	High	Low	Very High	Low	Low	Low	Low	Low
Proposed Terminals	Pittsburg/Antioch	High	Low	Moderate to V. High*	Low	Low	Moderate	Low	Low
	Martinez	High	Low	Very High	Low	Low	Moderate	Low	Low
	Richmond	High or V. High*	Low	V. Low or V. High*	Low	Low	Low	Low	Low
	Berkeley / Albany	Very High	Low	Very High	Low	Low	Low	Low	Low
	Treasure Island	High	Low	Very High	Low	Low	Low	Low	Low to Moderate
	Redwood City	High	Low	High	Low	Low	Low	Low	Low
	Oyster Point (SSF)	Very High	Low	Very High	Low	Low	Low	Low	Low
	Hercules/Rodeo	High	Low	High	Low	Low	Low	Low	Moderate

Notes:

1) Earthquake Shaking: Site-specific earthquake ground motions were not calculated. Ranking is based on proximity to major active faults. Very High = 5 km or less from active fault; High = 5-10 km from active fault; Moderate = 10-20 km from an active fault.
2) Fault Rupture: High = within an Alquist-Priolo (AP) Earthquake Fault Zone; Moderate = adjacent to an AP Zone; Low = away from known AP Zones.
3) Liquefaction: Hazards designations based on ranking of Knudsen et al. (2000).
4) Subsidence/Uplift: Ranking relates to potential for tectonic uplift/subsidence during lifetime of the project. Subsidence due to liquefaction and/or lateral spreading is not considered. High – Area of known ongoing subsidence/uplift; Moderate – Area of historical uplift/subsidence; Low – Area with no history of geologically recent uplift/subsidence.
5) Landsliding: High – History of landsliding/debris flows; Moderate – Area of steep slopes with landslide-prone materials; Low – Flat or relatively flat topography.
6) Erosion: High – Area of significant active erosion; Moderate – Site located adjacent to river channel, open ocean, or coastline exposed to wind/wave fetch; Low – Site sheltered from agents of erosion.
7) Expansive Soils: The expansive soil hazard at all localities is considered low as the coastal location of these sites ensures that the soils will almost always be saturated and, therefore, not subject to shrink/swell wetting and drying.
8) Seiche/Tsunami: High – exposed to open ocean tsunami waves; Moderate – exposed to reduced-height tsunami waves or smaller local tsunamis; Low – sheltered from potential tsunami waves.

* Actual hazard ranking is dependent on the exact location of the shore-based facility.



URS	Water Transit Authority Program EIR Project No. 43-00066890	MAJOR ACTIVE FAULTS	Figure 3.10.1

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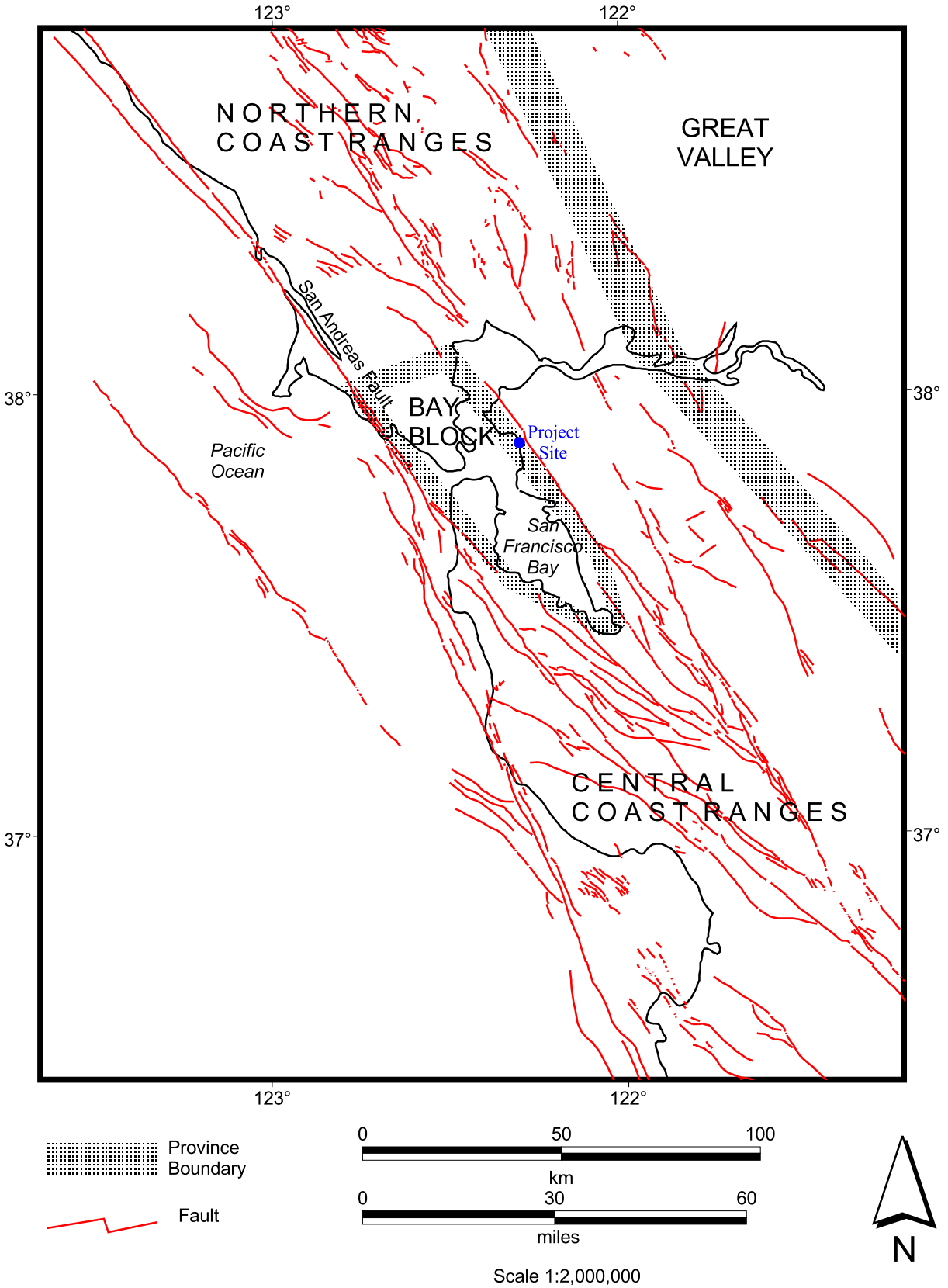
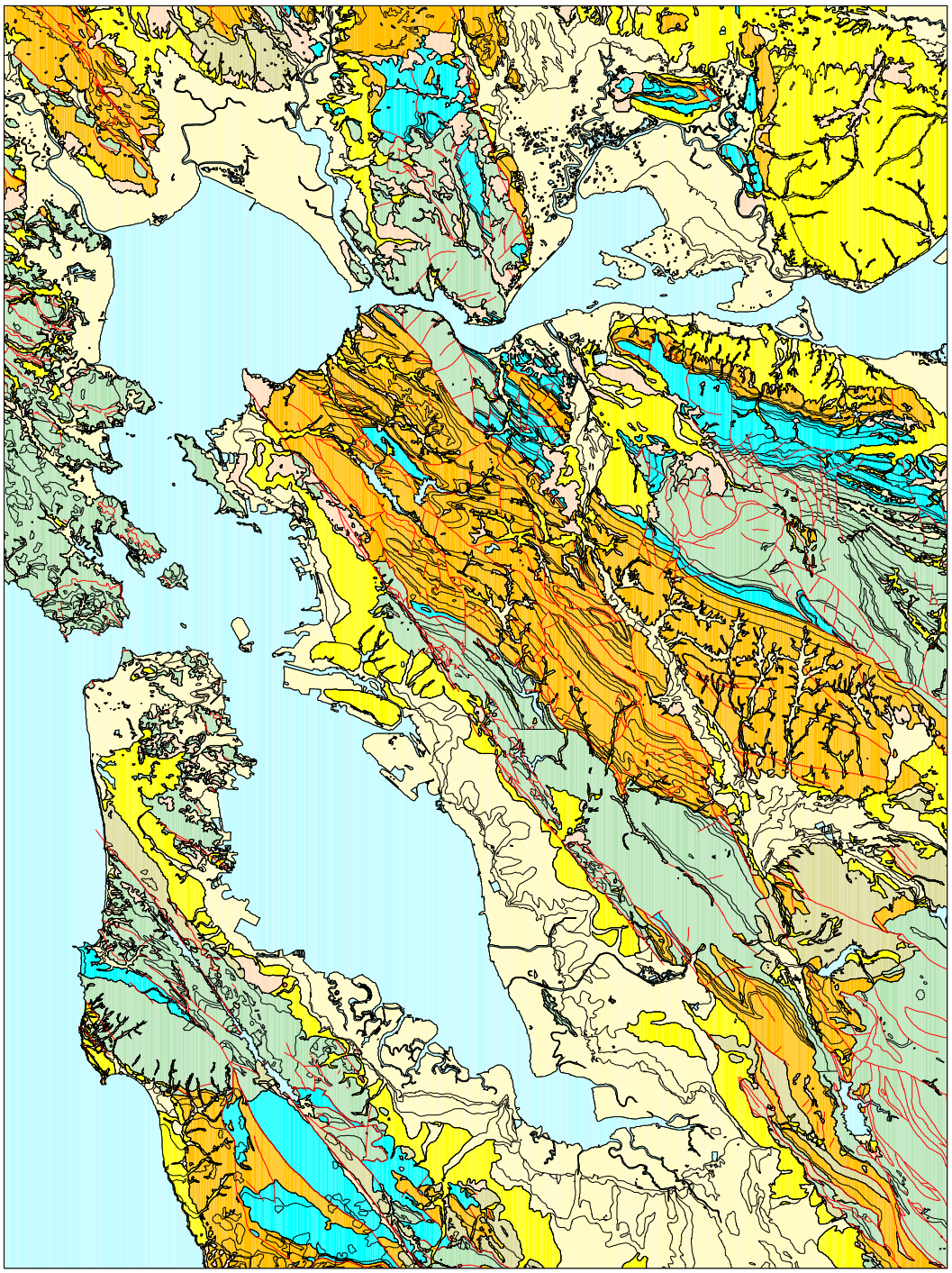


URS	Water Transit Authority Program EIR Project No. 43-00066890	PHYSIOGRAPHIC PROVINCES	Figure 3.10.2



Legend

- Holocene
- Pleistocene
- Quaternary Undivided
- Pliocene and/or Quaternary
- Upper Tertiary
- Lower Tertiary
- Mesozoic
- Water
- Geologic Contact
- Fault

N

5 0 5 10 15 Kilometers

Scale 1:600,000

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

REGIONAL GEOLOGY

Figure
3.10.3

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3.11 NOISE

Noise is defined as unwanted sound. The perception of sound requires three components – a sound source, a pathway for the sound to travel, and a receiver. A sound source generates minute vibrations (pressure waves) that affect the medium surrounding it. The medium and the course of the vibrations traveling through the medium describe the sound pathway. The receiver is a person or animal hearing and perceiving the sound.

The perception of a sound or noise depends on two physical characteristics – amplitude and frequency – both of which can be measured. Amplitude is the measure of the acoustic energy of sound vibrations. Although amplitude can be expressed in terms of linear sound pressure (in units called Pascals (Pa)), the range of audible sound pressures is very large and is difficult to comprehend on a linear (Pa) scale. Therefore, sound amplitude is measured on a logarithmic scale in units called decibels (dB). When expressed in decibels, sound pressure is referred to as sound pressure level (SPL). SPL in air is referenced to 20 microPascals (μPa). SPL in water is referenced to 1 μPa. Because they have unique reference pressures, SPLs in air and water cannot be readily compared.

Frequency, also referred to as pitch or tone, is the rate at which the medium (e.g., air or water) vibrates or oscillates and is expressed in terms of cycles per second, or Hertz (Hz). The distribution of frequency content of any sound or noise is known as its spectrum.

Two relevant characteristics of sound (or noise) behavior are propagation and attenuation. Propagation refers to the manner in which sound energy travels outward from its source. The pattern of propagation is related to the type of sound source.

There are many mechanisms for attenuation of sound. Typical mechanisms include absorption, geometrical divergence[1], terrain, wind, and topography. For example, absorption is the reduction of acoustic energy as a result of conversion of acoustic energy to heat as sound propagates through a medium. Geometrical divergence is the term associated with the reduction of acoustic energy with increasing distance from the sound source. The emitted energy is assumed to spread uniformly away from the source.

The perception of noise depends heavily on the medium involved. Because ferries generate sound in air and under water, the propagation of sound and its descriptors (or metrics) in both media are presented.

3.11.1 Environmental Setting

3.11.1.1 Noise Metrics

The common measure for environmental sound in air is the "A"-weighted sound level (dBA) relative to 20 μPa. The "A" scale weighting is an adjustment to measured sound that takes into account how the human ear responds to sound.

[1] Also called "spreading loss" or "distance attenuation."

The "ambient" noise level is the steady noise level that exists in the absence of all identifiable, sporadic, individual noise events, such as automobile pass-bys, aircraft over-flights, intermittent dog barking, etc. The ambient noise level comprises the sum of all noise sources, both near and far. It includes indistinguishable noise from roads, machinery, aircraft, and other sources. The ambient level varies slowly during the day, as these sources increase or diminish.

Because noise by its nature varies with time, it is beneficial to define certain measurement terms, also called "metrics," used to characterize this fluctuation. The study of environmental noise has led to many noise metrics. The energy-average level over a specific time period is defined as the Equivalent Sound Level (L_{eq}). For a given time interval, L_{eq} is a constant sound level whose acoustic energy is the same as the acoustic energy of the (actual) time-varying sound level. Thus, L_{eq} provides a measure of the true energy-average sound level in an area, and includes the sound from all constant, sporadic or transient events. L_{eq} is usually measured in hourly intervals over long periods in order to develop 24-hour energy-average noise levels. L_{eq} is generally used to describe levels of noise affecting sensitive receptors where the noise source itself is not of special concern during evening and nighttime hours, or where the noise is only generated during daytime hours such as with construction activities.

Other descriptors of noise are commonly used to predict noise/land use compatibility, as well as community reaction to daytime and nighttime environmental noise. These descriptors include the Day-Night Average Sound Level (abbreviated L_{dn} or DNL), and California's Community Noise Equivalent Level (CNEL). Each of these descriptors has units of dBA. Both L_{dn} and CNEL represent 24-hour periods, and both apply a penalty to noise events that occur during evening or nighttime hours, when relaxation and sleep disturbance is usually of more concern. In the case of CNEL, noise occurring during the daytime hours, between 7:00 a.m. and 7:00 p.m., receives no penalty. Noise occurring between 7:00 p.m. and 10:00 p.m. (denoted "evening") is penalized by adding 5 dB to the measured noise level, while noise occurring from 10:00 p.m. to 7:00 a.m. (nighttime) is penalized by adding 10 dB to the measured level. L_{dn} differs from CNEL by not adding a penalty in the evening period. Both CNEL and L_{dn} are the predominant metrics used by local governments to describe noise environments within their jurisdictions and for land use compatibility planning purposes. The U.S. Environmental Protection Agency (USEPA) recommends their use.

Other metrics presented in this report include Maximum A-weighted Sound Level (L_{max}), Sound Exposure Level (SEL), and statistical sound levels such as L_{10}, L_{50} and L_{90} (L_x) in dBA. L_{max} is the A-weighted maximum instantaneous sound level measured during a specified time interval or for an individual noise event. SEL is a composite metric that represents the amplitude of a sound and its duration. SEL is a logarithmic measure of the total acoustic energy transmitted to the listener during an event. L_x is the (measured) level that is exceeded "x" percent of the time during a given interval.

3.11.1.2 Airborne Noise Propagation

Environmental noise sources are typically characterized as one of two source types – point source or line source. Examples of a point source would be a horn or a single piece of machinery or construction equipment relatively close to a receptor (or a single ferryboat) or an entire construction site that is relatively far away from a receptor. Examples of a line source would be a very busy (nearly continuous stream and densely populated) highway or a long railroad train.

In general, for a point source, the rate of distance attenuation is 6 dB for every doubling of distance (DD) relative to the source's level at a reference distance (usually 50 feet). This attenuation rate is appropriate for intermittent ferryboat traffic. For an infinite line source, the rate of distance attenuation is 3 dB per DD. An in-between condition exists called a quasi-line-source (e.g., automobiles spaced apart on a road) that attenuates with distance at the approximate rate of 4.5 dB per DD.

Besides distance, other factors cause changes in sound levels. Sound waves can be "carried" by the wind if the wind is blowing away from the sound source. Conversely, sound waves can be bent up and away from receptors by the wind if the wind is blowing toward the sound source.

Other sound attenuators include intervening terrain or barriers between the source and the receptor that block the direct line-of-sight, and for distances greater than 1,000 feet, the atmosphere itself. Grassy ground or plowed earth is usually referred to as "soft ground" whereas asphalt/concrete or water surfaces such as San Francisco Bay are usually referred to as "hard ground." Soft ground attenuates sound more than hard ground. Attenuation, especially that due to terrain, is dependent on the spectrum, i.e., the frequency content, of the source. At 1,000 feet from the source, the difference between hard ground and soft ground attenuation could be on the order of 3 to 4 dBA. The difference would increase with distance. Atmospheric attenuation (also called "air absorption") is dependent on the source spectrum, the relative humidity and temperature of the air through which the sound is travelling. Air absorption increases linearly with distance.

Figure 3.11.1 shows an example of overall sound attenuation for a line source and for a point source demonstrating the effect of different ground types (soft and hard ground). The magnitudes of attenuation in the figure account for spreading loss, air absorption and ground/water attenuation. The spectrum chosen for this figure is low-frequency dominant, like that of a diesel-engine ferry.

3.11.1.3 Underwater Noise Propagation

Sound levels in air are not comparable to underwater sound levels because a different reference level is used to calculate the decibel level. The reference level for underwater acoustics is 1 μPa.

Propagation of sound in air is very different than propagation in water. Although the speed of sound in water is greater than the speed of sound in air, the former is dependent on water temperature, pressure, salinity and bubble population. For the temperature range of interest to this project, the speed of sound increases with increased temperature. The speed of sound in water also increases with increased salinity. However, bubbles found in breaking waves ("white caps") tend to decrease the speed of sound in water.

In air, sound pressure amplitude from a point source is proportional to the inverse of the distance from the source. For comparison with underwater sound, at long distances from the source, the geometrical divergence or spreading can be characterized as a line source radiating as a cylinder of constant depth whose surface area increases with distance. In this case, the sound pressure amplitude is proportional to the inverse of the square root of the distance from the source. This is one reason why sound propagates farther in water than in air. Figure 3.11.2 shows the difference in spreading loss for sound propagation in air and in water.

The attenuation losses due to absorption in water are much less than those in air. This is another reason why sound in water travels greater distances than sound in air. The rate of absorption increases with frequency.

Sound is also reflected from the surface and the bottom. The composition of the bottom material affects the reflection loss. Multilayered bottoms consisting of sand, mud and rock would give multiple reflections. The bottom roughness also affects the reflection losses.

Figure 3.11.3 shows typical underwater noise sources and their frequency range and levels. The ambient noise in shallow water environments such as San Francisco Bay is highly variable in space and time. Sources would include existing boat traffic (industrial, commercial and pleasure craft), rain noise, breaking waves induced by the wind or shore breaks, and biological noise. Boat noise can be of very high levels, especially below 1 kHz. As the wind speed increases, the wave height increases and so do the number of breaking waves. The frequency range of wind-induced wave noise is between about 500 to 20,000 Hz.

3.11.1.4 Noise Perception and Effects

This section is divided into two subsections, human and wildlife.

Human

Human response to noise varies among individuals and is dependent upon the ambient environment in which the noise is perceived. The same noise that would be highly intrusive to a sleeping person or someone in a quiet park might be barely perceptible at an athletic event or in the middle of the freeway at rush hour. Therefore, planning for an acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for each particular set of land use. Some general guidelines for noise levels are sleep disturbance, speech interference, and workplace hearing loss. Sleep disturbance begins to occur when the indoor Sound Exposure Level rises above 35 dBA (FICAN 1997). Interference with human speech begins to occur when the L_{eq} rises above 60 dBA (USEPA 1974). Hearing loss can result from prolonged exposure (in the workplace, for example) to a time-averaged noise level of 90 dBA for 8 hours or more (OSHA).

Some representative sources and their sound levels are shown in Figure 3.11.4. An evaluation of differences between the existing and total predicted future noise environments usually assesses potential responses of persons to changes in the noise environment. The following relationships of perception and response to quantifiable noise increases are used as a basis for assessing potential effects of changes in environmental noise level:

- Except in a carefully controlled laboratory condition, a change of 1 dBA is very difficult to perceive.
- In the outside environment, a 3 dBA change is considered just perceptible.
- An increase of 5 dBA is considered readily perceptible and would generally result in a change in community response.
- A 10 dBA increase is perceived as a doubling in loudness and would likely result in a widespread community response.

Because of their logarithmic scale, sound levels must be logarithmically added and subtracted and cannot be arithmetically added or subtracted. For example, two sources each producing 60 dB would yield 63 dB (not 120 dB) when added. Note that the result (63 dB) is only 3 dB greater than the sound level of each of the sources (60 dB). This provides insight into the degree of perception when a noise source is doubled. For example, a doubling of boat traffic represents a doubling of sound energy yielding a 3 dB increase. Thus, for an environment dominated by boat noise, the number of boats must double for a noise level increase to be just perceived.[2]

Wildlife

Anthropogenic (i.e., human-generated) noise impacts wildlife in a variety of ways and under certain circumstances can be damaging. In general, noise has the potential to impact wildlife via three methods: masking of acoustic signals, affecting behavior, and affecting the animal's physiology (auditory or non-auditory). Each method is described below.

Masking

Animals use sound for a variety of purposes, including communication, detection of predators/prey, and navigation. Masking occurs when noise interferes with the perception of the sound of interest. The specific animal's physics, behavior, anatomy, and physiology determines whether masking will occur as a result of noise due to the proposed project. Animals may compensate for masking through behavioral adaptation, by avoiding the noise, or shift frequency and/or level of the signal.

Behavioral Effects

Noise has the potential to disrupt animal behavior. Extensive research has been conducted on observed behavioral changes due to anthropogenic sounds (aircraft, ships, boats, construction, etc.) with a variety of animals. Observed reactions include a cessation of feeding, resting, socializing, and an onset of alertness or avoidance. The disturbance may not be biologically significant if it causes a temporary change in behavior or habitat use. In contrast, the disturbance may be biologically significant if it causes animals to avoid critical habitat for an extended time period, or hinders foraging or mating.

Excessive noise may cause an animal to frequent a hazardous area (as a result of humans or other predators) due to motivation to find food. For example, pelicans and sea lions are known to be attracted to fishing vessels and bait barges due to the presence of an "easy meal." Animals may also exhibit "habituation" to noise, which can also have positive and negative impacts. For example, animals that habituate to traffic noise are vulnerable to oncoming vehicles, but also may have the choice of better habitat if it can adapt to the louder noise environment. Habituation to noise is affected by the frequency of the noise event (how many times it occurs), the motivation of the animal to habituate (i.e., easy meal), and many other factors.

Physiological Effects

Any type of noise above some level has the capability to damage hearing. The resulting damage determines whether the resulting threshold shift is temporary (temporary threshold shift [TTS])

[2] This example assumes all other factors (e.g., boat type, engine type, etc.) remain constant.

or permanent threshold shift (PTS). Repeated exposure to TTS in marine animals is thought to cause a PTS, but no long-term studies offer empirical proof. Hearing loss affects the animal's ability to navigate, communicate, and detect predators and prey. The extent to which a noise may damage an animal's hearing ability depends on the animal's auditory sensitivity.

3.11.1.5 Ferry Noise Sources

The major source of airborne noise from existing ferries operating at full power is their engine exhaust. Other sources of airborne noise, especially for fast ferries, include the main propulsion engines and water (or wake) noise. Fluid dynamic noise in fast-moving slender catamaran hulls is often a major contributor of shipboard noise. Other shipboard noise sources include gearbox(es), ventilation fans and cabin heating, and ventilation and air conditioning (HVAC) systems. Most fast ferries are driven by waterjets, which are normally not a major source of airborne noise. In terminal areas, diesel generators and horns replace the idling main engines as the primary airborne noise generators (J. & A. Enterprises 2002). As the engines and exhaust of fast ferries are the primary airborne noise components, the low-frequency regime (up to approximately 125 Hz) dominates their spectra (Danish EPA 2002). Low-frequency noise generated by older diesel engines was the greatest concern in European studies (BAC 1998).

Most of the existing fast ferry data is anecdotal and is focused on shipboard noise. One such data point is on the deck of a 40 knot (kt) experimental catamaran with two Caterpillar 3516 diesel engines with waterjet propulsion – 96 dBA (Noise Control Engineering Inc. 2002). Another data point is from an existing high-speed catamaran ferry in the San Francisco Bay Area. The operator recorded sound levels between 71 and 73 dBA in the passenger lounge, 84 to 86 dBA on the main deck and levels up to 110 dBA on the exterior main aft deck (Courtois 2002). Note that these shipboard levels may not be representative of all vessels in the existing ferry fleet. Future methods of propulsion via fuel cells (diesel-electric or hydrogen fuel, for example) or those running on natural gas or solar and wind energies may prove quieter (TR News 2000; Solar Sailor Holdings 2001).

Underwater noise data of existing ferries throughout the world is virtually nonexistent, especially for the types of fast ferries proposed for this project. Therefore, the expected range of underwater noise levels is unknown. However, a range of underwater source sound levels of vessels while underway is provided in Richardson et al. (1995) and was used to estimate underwater sound levels that may be generated by the ferry. Sound levels range from 152 dB (*re* 1 μPa at 1 meter) at 6,300 Hz for a 5-meter inflatable Zodiac to 177 (*re* 1 μPa at 1 meter) at 125 Hz. Although the acoustic characteristics of ferries and tankers vary, the source level of ferries would most likely be less than that of the tanker. Therefore, an estimate of 177 dB (re 1 μPa at 1 meter) would be considered a worst-case condition.

3.11.1.6 Regional Setting

Exterior noise measurements of fast ferries operating on San Francisco Bay were made in April 2003 with the purpose of obtaining maximum sound pressure levels (L_{max}) at a common distance from the vessels (Stumbo, 2003). Measurements were taken from an observation boat positioned 100 to 200 meters from ferries operating at service speed under normal full power. Sound levels (dBA) were measured with a calibrated sound level meter interfaced to a laptop computer

running data acquisition software. The distance to vessels was measured with a laser rangefinder accurate to ±1 meter.

The results of the noise measurements are shown in the table below. The measured values were converted to L_{eq} at a closest point of approach (CPA) distance of 100 meters, and L_{max} at the same distance. Because engine and exhaust noise is the largest contributor to exterior vessel noise, the sound levels are usually highest directly behind a vessel. Hence, the maximum noise levels do not occur at the CPA, but rather, after the vessel has passed. The measured data show this effect for all vessels except the Intintoli, which calls the Intintoli data into question. The Mare Island (sister ship of the Intintoli) and Del Norte data shows the expected pattern and multiple measurements of the Del Norte show very consistent results. Hence the Mare Island and Del Norte results are considered representative of exterior noise levels for 325-passenger vessels using existing technology.

The table below shows L_{max} at various distances including 2/3 mile and 1,500 meters. Background (ambient) noise levels on the Bay were measured to range between 58 and 63 dBA (average 60 dBA) which means that at a distance of 2/3 mile, exterior vessel noise is at ambient (except for the Peralta). At a distance of 1,500 m (the distance from the shoreline recommended to minimize wake impacts), the maximum vessel noise is below ambient and not detectable.

Exterior Vessel Noise Measurements, April 2003

VESSEL	L_{EQ} @ CPA	L_{max} @ 100 m (328 ft)	L_{max} @ 1000 ft	L_{max} @ 2/3 mi. (3520 ft)	L_{max} @ 1500 m (4922 ft)
INTINTOLI	72.1	72.1	62.4	51.5	48.6
MARE ISLAND	72.3	79.5	69.8	58.8	56
DEL NORTE*	66.8 - 69.1	79.0 - 80.5	69.3 – 70.8	58.4 - 59.9	55.5 - 57.0
PERALTA	63.6	87	77.3	66.4	63.5

Note: * multiple measurements

The existing noise on-land environment in the study area ranges from quiet and serene rural to a noisy urban center. Generalized characterizations of ambient sound level are shown on Figure 3.11.5. The figure shows the ranges of L_{dn} for seven environments. A rural setting could be 40 dBA L_{dn} or lower. The L_{dn} for a downtown metropolis ranges from approximately 72 dBA to 80 dBA. Table 3.11.1 provides Federal Transit Administration (FTA) guidance on estimating existing noise exposure. Existing noise exposure is estimated by first looking at a site's proximity to major roads and railroad lines. If the site's noise environment is not thought to be dominated by the closest major roads or railroad lines, then population density determines the level. If the noise environment could be a combination of roads, railroads and/or general community noise, the highest level of the combination would be used (FTA 1995).

Population density for Congressional District 8 (primarily the City of San Francisco) is approximately 18,000 people per square mile (U.S. Census Bureau 2000). Table 3.11.1 yields an L_{dn} of 60 dBA as an estimate of the District's ambient noise level. This level is consistent with the 60 dBA average of background noise measured on the Bay as described above.

3.11.1.7 Regulatory Setting

Federal, state and local settings are discussed in the following subsections.

Federal

The Noise Control Act of 1972

The Noise Control Act (42 United States Code [USC] Chapter 4901 et seq.) directs the EPA to develop noise level guidelines, which would protect the population from the adverse effects of environmental noise. The EPA published a guideline (USEPA 1974) containing recommendations for acceptable noise level limits affecting residential land use of 55 dBA L_{dn} for outdoors and 45 dBA L_{dn} for indoors. The agency is careful to stress that these recommendations contain a factor of safety and do not consider technical or economic feasibility issues, and therefore should not be construed as standards or regulations.

Noise Emission Standards for Transportation Equipment

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 Code of Federal Regulations (CFR) Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters (approximately 50 feet) from the vehicle pathway centerline (Crocker 1997). Vehicle noise limits are implemented through regulatory controls on vehicle manufacturers.

The federal regulations for railroad noise are contained in 40 CFR, Part 201, and 49 CFR, Part 210. Noise limits for locomotives manufactured during or after 1980 are as follows: stationary (idle throttle setting)—70 dBA at 15 meters from the track pathway centerline; stationary (all other throttle settings)—87 dBA at 15 meters; and moving—90 dBA at 15 meters (Crocker 1997). These noise limits are implemented through regulatory controls on vehicle manufacturers.

Department of Housing and Urban Development (HUD) Standards

Department of Housing and Urban Development standards define L_{dn} below 65 dBA as acceptable for residential use. Levels up to 75 dBA L_{dn} can be made acceptable through the use of insulation in buildings.

FTA Guidelines

The FTA has no specific guidelines for ferries. However, it has published a guidance manual for assessment of rail and bus mass transit projects. As ferries are another mode of mass transit, and in lieu of any specific guidance, it would be expected that the FTA would apply its "transit project" impact criteria described below.

Table 3.11.2 describes the three "sensitive" land use categories used by the FTA to evaluate the compatibility of predicted noise levels. Category 1 includes land where quiet is an essential element such as outdoor amphitheaters; Category 2 includes residences where people sleep; and Category 3 includes institutional buildings where quiet is important such as schools, libraries and churches. Note that Categories 1 and 3 utilize the Hourly Equivalent Sound Level ($L_{eq}(h)$) whereas Category 2 utilizes L_{dn}. Such criteria recognize the heightened community annoyance caused by late-night or early-morning train operations, and to respond to the varying sensitivities

of communities to projects under different ambient noise conditions. The noise criteria is to be applied *outside of building locations* for residential land use and at the *property line* for parks and other significant outdoor use (FTA 1995).

The FTA noise impact criteria for a transit project are shown in Figure 3.11.6. It considers the existing (ambient) noise, the noise from the proposed project, the change in overall noise level due to the project and the type of land use receiving the noise. Use of the figure results in three determinations of impact to human annoyance: No Impact, Impact, and Severe Impact to Land Use Categories 1 through 3. "Impact" is associated with the minimum measurable change in community reaction whereas "Severe Impact" is associated with the change in community reaction from an acceptable to an unacceptable noise environment (FTA 1995).

U.S. Fish and Wildlife Service

Regarding impacts to birds, the U.S. Fish and Wildlife Service (USFWS) has determined a significance criterion of 60 dBA CNEL at the line of habitat as an impact.

Marine Mammal Protection Act

See Section 3.5 (Biological Resources) for a brief description. With regard to noise, the National Marine Fisheries Service (NMFS) currently considers, as a guideline, received underwater sound pressure levels at or above 160 dB (re 1 μPa) as constituting harassment of marine mammals. NMFS has suggested that underwater sound pressure levels above 180 dB (re 1 μPa) could cause TTS in marine mammals.

Shipboard Noise

The regulation of shipboard noise is not very clear. The United States Coast Guard (USCG) regulates all affairs regarding licensed commercial vessels. The applicable USCG document is Navigation & Vessel Inspection Circular (NVIC) No. 12-82, dated June 2, 1982. However, the NVIC 12-82 only provides guidelines and recommendations for vessel noise, not shipboard noise. Away from seaways, OSHA actively regulate noise in industrial environments under the Department of Labor (Bahtiarian 2002).

The OSHA regulations are similar to the USCG requirements. The governing regulations for "Occupational Noise Exposure" are found in 29 CFR 1910.15. The California Department of Industrial Relations, Division of Occupational Safety and Health (Cal OSHA) (8 California Code of Regulations [CCR], General Industry Safety Orders, Article 105, Control of Noise Exposure, Section 5095) requires that the time-averaged noise level of any work environment during an 8-hour period be limited to 90 dBA.

In many cases, shipboard and exterior noise limits for all types of ships including ferries are specified prior to ship construction. For example, Table 3.11.3 contains the noise limits imposed by Alaska for their Fast Vehicle Ferry (FVF). For this vessel, shipboard levels are limited to 55 dBA due to HVAC noise up to 120 dBA in the engine room. FVF exterior noise is limited to 60 dBA at 1,000 feet with engines developing their maximum fast ferry power rating (The Glosten Associates 2002).

State

Noise Insulation Standards

Relevant state regulations are contained in the California Code of Regulations. Part 2 of Title 24 establishes the limit for interior community noise level for multifamily dwellings, hotels, motels, dormitories and long-term care facilities of 45 dBA L_{dn}. The state's regulation may be extended by local legislative action to include single-family dwellings.

California Governor's Office of Planning and Research (OPR) Guidelines

Section 65302(f) of the CCR establishes the requirement that local land use planning jurisdictions prepare a General Plan. In 1998, the OPR published its most recent edition of their *General Plan Guidelines* (GPG). The GPG advise local jurisdictions in preparing their comprehensive long-term general plans. The Noise Element is a mandatory component of the General Plan and includes general community noise guidelines and specific planning guidelines for noise/land use compatibility developed by the local jurisdiction.

The OPR guidelines are presented in Figure 3.11.7. Selected relevant levels are:

- CNEL below 60 dBA—acceptable for low-density residential use.
- CNEL below 65 dBA—normally acceptable for high-density residential use.
- CNEL of 60 to 70 dBA—conditionally acceptable for churches, educational and medical facilities.
- CNEL below 70 dBA—normally acceptable for playgrounds and neighborhood parks.

See Figure 3.11.7 for definitions of the word "acceptable."

Other

The State of California also establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the state pass-by noise standard is consistent with the federal limit of 80 dBA. The state pass-by noise standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle weight rating) is also 80 dBA at 15 meters from the centerline (California Vehicle Code Sections 23130, 23130.5, 27150 et seq., 27204, and 27206). Vehicle noise limits are implemented through regulatory controls on vehicle manufacturers and by legal sanction of vehicle operators enforced by state and local peace officers. Other state standards exist, such as Caltrans and FHWA's criteria for noise assessment and abatement, but these are focused on situations unique to their authority, such as control of freeway noise, and are not necessarily applicable to WTA's actions.

Local

Regulatory noise standards employed by local jurisdictions generally fall into two categories: noise control ordinances and noise/land use compatibility guidelines. Noise produced by sources not related to transportation is usually regulated using ordinances that limit the amount of noise such sources may produce, as measured at the nearest sensitive receptor or at property lines. Standards in local noise ordinances may be in the form of quantitative noise performance levels, or they may simply be in the form of a qualitative prohibition against creating a nuisance. Many ordinances employ both approaches.

Because local jurisdictions are preempted from regulating noise emissions from transportation noise sources such as cars, trucks, trains, airplanes and ferries, such jurisdictions also typically implement noise controls through adoption and implementation of noise/land use compatibility guidelines. Noise/land use compatibility guidelines identify the range of noise levels with which various land uses are deemed compatible. This permits local jurisdictions to achieve noise/land use compatibility for the land uses exposed to noise, even if the noise sources themselves cannot be regulated.

Jurisdictions in the study area (along the shorelines) have published Noise Elements of their General Plan. Some of the Noise Elements contain specific guidelines for noise and land use planning. Some of the jurisdictions default to the HUD guidelines.

Tables 3.11.4 and 3.11.5 identify exterior operational noise standards according to noise ordinances of two of the cities affected by the project – San Francisco (San Francisco Municipal Code [SFMC], Title 8, Chapter 8.32.030) and Oakland (Oakland Municipal Code [OMC], Title 17, Chapter 17.120.050). As evidenced by these two tables, ordinances in the region typically specify daytime and nighttime limits of statistical noise levels for various land use or zoning. Nighttime limits are usually lower than daytime limits accounting for the lower ambient noise levels at night and people's increased sensitivity to or annoyance about nighttime noise events.

3.11.2 Impacts and Mitigation

3.11.2.1 Significance Criteria

The CEQA Guidelines environmental checklist includes the following criteria for determining potentially significant noise impacts:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinances, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; and/or
- Exposure of people residing or working in the project area to excessive noise levels for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, or for a project within the vicinity of a private airstrip.

Based on these guidelines and relevant local, state, and federal standards, this EIR applies the following thresholds of significance. A noise impact is considered significant if it would:

- Expose ferry passengers and crew to noise levels greater than Occupational Safety and Health Administration (OSHA) standards;

- Expose residents and noise-sensitive land use to "impacts" as defined by the Federal Transit Administration (FTA) (FTA 1995);
- Expose terrestrial wildlife to 60 A-weighted dB (dBA) Community Noise Equivalent Level (CNEL) (or greater) per the U.S. Fish and Wildlife Service (USFWS); and/or
- Expose aquatic wildlife to underwater sound pressure levels at or above 160 dB (re: 1 uPa) per the National Marine Fisheries Service (NMFS).

3.11.2.2 Impacts and Mitigation

Four impact topics have been identified and are discussed in this section.

Impact NOI-1 **Passengers and crew would be exposed to shipboard noise from proposed enroute ferry operations.**

Because of the relatively short time that passengers spend onboard ferries (e.g., 20 to 40 minutes per trip), they are unlikely to suffer hearing loss or damage. However, the noise levels on ferries could damage crew hearing if not controlled. Compliance with Cal/OSHA regulations would ensure that ferry crews are adequately protected from potential noise hazards. A time-averaged noise exposure level less than or equal to 90 dBA over an 8-hour work shift protects hearing of workers. Areas above a time-averaged noise level of 85 dBA would be posted as high-noise level areas, and hearing protection would be required. The ferry operators would have to implement a hearing conservation program for applicable employees as outlined in Cal/OSHA regulations.

Summary of Impact NOI-1

- Implementation of the Proposed Project would result in ferry passenger and crew exposure to engine noise. Shipboard noise is expected to be at acceptable levels for passengers due to limited exposure time. Existing and proposed ferries are required to incorporate necessary noise and vibration controls to comply with USCG guidelines and Cal/OSHA limits to avoid adverse noise effects to crew members. Because compliance with existing guidelines already mandates noise exposure controls for crew members, no further mitigation is required. Impacts to passengers are expected to be less than significant.

Impact NOI-2 **Noise-sensitive human receptors could be exposed to significant noise from proposed enroute ferry operations.**

Noise impacts would be considered significant if the project resulted in a determination of an "impact" per the FTA guidelines (Figure 3.11.6). The FTA guidelines consider noise levels at the outside of buildings or property boundaries for 3 categories of noise-sensitive land use. The guidelines are described in Section 3.11.1.4. The use of the FTA's "sliding scale" is appropriate because it responds to the varying sensitivity of communities to projects under different ambient noise conditions. For example, for an ambient sound level of 45 dBA Day-Night Average Sound Level (DNL), a project generating 52 dBA DNL or more would cause impact (e.g., annoyance or activity interference). In contrast, for an ambient noise level of 65 dBA DNL, a project generating 61 dBA DNL or more would result in a noise impact.

The determination of noise impacts depends on many factors. The primary factor is the noise level generated by a single pass-by of a proposed ferry, often expressed as the Sound Exposure Level (SEL). Other important factors include the number of trips per day, the category of land use that would experience the ferry pass-bys, existing ambient noise levels, and the time of day in which those trips occur. In California, noise assessments divide the day into: daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.).

Measurements of exterior noise from fast ferries operating at full service speed recorded an L_{max} (or SEL) of 70 dBA at a distance of 1,000 feet. This level is representative of the existing class of 350-passenger high-speed vessels operating at between 34 and 36 knots. The measurements also indicate that the ferry L_{max} noise levels would drop to the measured ambient level of 60 dBA at a distance of 2/3 mile. Therefore, ferry operations on routes greater than 2/3 of a mile from the shoreline would not be heard under typical ambient conditions.

The numbers of weekday pass-bys estimated by the WTA are listed in Table 3.11.6, which includes pass-bys for Peak period, Off-Peak, and Total. The distribution of trips over a one-day period assumes that 85 percent of the total trips would be during the daytime, 10 percent during the evening, and 5 percent during the nighttime for all routes.

At the regional level, this programmatic noise impact assessment assumes that the most noise-sensitive land use potentially affected would be FTA Category 2 receptors (e.g., residential, places where people sleep). Furthermore, it was assumed that the existing ambient sound level at all potentially affected FTA Category 2 receptors is 55 dBA DNL or CNEL. With an ambient sound level of 55 dBA DNL, an FTA impact would result if the sound level from proposed ferry operations would be 55 dBA DNL or CNEL.

Using these criteria and assumptions, a ferry-to-shoreline distance was determined beyond which no adverse noise impact would occur. For existing fast ferries with an SEL of 70 dBA at 1,000 feet, there would be no adverse noise impact from ferry operations or routes at a distance of 130 feet or more from noise-sensitive land uses along the shoreline. Because of terminal approach and departure safety procedures, no service-speed operations occur within 130 feet of a terminal site. Existing and proposed ferry routes are located at least 5,000 feet (1.5 km) from the shoreline except in areas with narrower passages and no service-speed operations along routes occurs within 130 of the shoreline due to safety and other considerations (such as wake wash). The 130-foot estimate applies to the most frequently traveled segment and assumes:

- FTA Category 2 residential receptors are located on the shoreline; and
- Sound attenuates as it propagates over the Bay's surface at a rate of 3 dB per doubling of distance.

Summary of Impact NOI-2

- It is unlikely that the Proposed Project would cause significant noise impacts to noise-sensitive land use. Measured fast ferry pass-by noise levels indicate that a maximum stand-off distance of 130 feet for a fast ferry at service power and speed avoids the FTA's "impact" designation at residential-type land use on the shoreline. Service-speed operations will not occur within 130 feet of the shoreline for safety, wake wash and other considerations. Because the WTA has adopted new vessels specifications with noise level limits that are more severe than those on existing high-speed vessels, new vessels could have an L_{max} (at

1,000 feet) up to 10 dBA quieter than existing vessels. This impact is considered less than significant.

Impact NOI-3 Noise-sensitive human receptors could be exposed to significant increases in ambient noise from proposed ferry terminal operations.

Ferry terminals, like other mass transit terminals, can bustle with activity, including arriving and departing ferries, automobiles, and bus and truck traffic. Some existing ferry terminals in the Bay Area have Park-and-Ride lots for auto and bus commuters. Proposed ferry terminals may include rail (Amtrak and/or BART) links.

Ferry whistles or horns used in proximity to terminals for safety create impulsive and directional sound. A small sample of measured maximum A-weighted sound levels at a distance of 1,000 feet in front of, abeam, and behind a typical ferry horn yielded approximate sound levels of 90 dBA, 83 dBA, and 77 dBA, respectively (BKL Consultants 2002). Horn use usually consists of one or two blows, lasting 2 to 5 seconds per event.

A study of noise from ferry terminals in the State of Washington yielded anecdotal daytime hourly equivalent sound level (L_{eq}) values of 55 to 60 dBA at residential locations varying from approximately 500 feet to 2,500 feet from terminal operations. These noise levels occurred during normal scheduled ferry service. Nighttime levels, when ferries were not operating, yielded hourly L_{eq} near 45 dBA except at a site that was 2,500 feet away (approximately 35 dBA hourly L_{eq}). The range of DNL derived from these 24-hour measurements resulted in levels from 51 dBA at the farther site to 63 dBA at the closer sites (Magnoni 2002).

Summary of Impact NOI-3

- Implementation of the Proposed Project would involve new and existing terminals that could create impacts to noise-sensitive land uses, such as adjacent residential areas. This impact is potentially significant if the exposure and noise levels exceed applicable noise thresholds.

Mitigation NOI-3.1: Siting and planning of new ferry terminals shall include planning to locate terminal areas away from noise-sensitive land uses. Compliance with existing zoning ordinances should be sufficient to mitigate any potential impacts of ferry terminal operations.

Impact After Mitigation: After implementation of Mitigation NOI-3.1, the impact would be less than significant.

Impact NOI-4 Wildlife could be exposed to noise from proposed ferry operations.

The proposed project would generate noise both in air and underwater. Therefore, there is a potential impact to wildlife in both media. Potential in-air and underwater environmental impacts to wildlife are addressed separately in the following section.

Mammals. Mammalian hearing varies, although abilities are fairly consistent within families (Fay 1988). In general, mammals can hear in the bandwidth from below 10 Hz to over 150 kHz. Small terrestrial mammals, small odontocetes (toothed whales), and bats hear best at high frequencies; mysticetes (baleen whales) hear best at low frequencies; and most other mammals

have similar hearing to humans (20 Hz to 20 kHz). Noise-induced hearing loss usually results from inner ear hair-cell loss, which is typically permanent in mammals.

Airborne sounds as a result of the proposed project would contribute to the ambient noise exposure for small terrestrial mammals and marine mammals (when at the surface or when hauled out). However, little data are available on the overall sound level from specific sources. The small terrestrial mammals of particular interest to this project are the endangered salt marsh harvest mouse and the salt marsh wandering shrew (see Section 3.5, Biological Resources). These mammals would be exposed to noise from the ferries as they pass salt marsh habitat. The auditory sensitivity of these small mammals is at higher frequencies (Fay 1988) and the noise from ferries is in the low to mid-frequency range. Therefore, masking of biologically significant sounds is highly unlikely. Due to the transient nature of noise from passing ferries, the proposed project would likely instigate increased alertness, but not habitat avoidance or hearing loss. Furthermore, small mammals inhabiting the area are already exposed to airborne ship noise within San Francisco Bay and are presumably habituated to such noise. These small mammals would not be impacted by underwater noise generated as a result of the Proposed Project.

The marine mammals of particular interest to this project are the gray whale, Pacific harbor seal, California sea lion, and sea otter. No research has been conducted on the effects of airborne noise on the behavior of gray whales. The response of gray whales to underwater vessel noise depends on several factors, including location of the vessel, behavior of the vessel, and behavior of the whale (i.e., whether the whale is in breeding/calving grounds, migration route, or summering grounds). Gray whales are frequently attracted to vessels in the breeding/calving lagoons of Baja California (Dahlheim et al. 1981; Wisdom 2000), but often change course or stay underwater longer in the presence of vessels while migrating (Schulberg et al. 1991). Because gray whales rarely use the Bay, no impacts are expected as a result of the Proposed Project.

Harbor seals use haul-out sites throughout the Bay (BAC 1998). Small boats that approach haul-out sites often displace seals; less severe disturbances can cause alert reactions without departure (Stewart et al. 1988; Allen 1991). In places with many boats, harbor seals may become habituated to the noise (Johnson et al. 1989). The National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters (this distance, however, does not take vessel speed or wake wash into account). Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Given the site-specific information available for San Francisco Bay (Castro Rocks), it is recommended that ferry routes should be at least 300 meters from haul-out sites to reduce disturbance to the animals. Figure 3.5.14 in the Biology Section presents seal and sea lion haul-out sites in relation to the ferry routes in the Proposed Project. As shown on the figure, the only haul-outs within 300 meters of a proposed route are on the eastern side of Treasure Island and near Redwood City. Detailed studies regarding the specific location of this haul-out site in relation to specific ferry routes will need to be completed to determine the significance of impacts.

California sea lions also use the Bay, but the only known haul-out site is Pier 39. In the water, sea lions tolerate close and frequent approaches by vessels and often congregate around fishing vessels. Sea lions hauled out on land (or piers) are more responsive, but rarely react unless a

boat approaches very closely (Bowles and Stewart 1980). The sea lions that use Pier 39 are habituated to human presence and, therefore, should not be affected by the Proposed Project.

Little data are available on reactions of sea otters to vessels. However, since they rarely use habitat within the Bay, no significant impact as a result of the Proposed Project is expected.

As stated in Section 3.11.1.4, NMFS currently considers, as a guideline, received underwater sound pressure levels at or above 160 dB (re 1 μPa) as constituting harassment of marine mammals. NMFS has suggested that underwater sound pressure levels above 180 dB (re 1 μPa) could cause temporary hearing impairment in marine mammals. As discussed in Section 3.11.1.2, no underwater noise level data for ferries are available. However, based on the worst-case estimate of 177 dB re 1 μPa at 1 meter for a tanker ship pass-by, marine mammals would experience sound levels of 160 dB at a distance of approximately 7 meters and would not experience sound levels greater than 180 dB. Seals and sea lions show high levels of tolerance to vessel traffic and would more than likely remain beyond 7 meters of the ferry due to the high speed of the vessel; therefore, they would not be exposed to underwater noise levels greater than 160 dB.

Birds. Birds have more uniform hearing abilities than mammals and hear best from 100 Hz to 10 kHz. Hearing loss in birds is difficult to characterize because they appear to regenerate inner ear hair cells even after substantial loss (Corwin and Cotanche 1988). Domestic fowl sometimes experience declines in productivity after continuous exposure to noise at high levels, but laying rates did not change in wild waterfowl after exposure to continuous noise received at the nest from a compressor station (reviewed in Bowles 1994). Persistent human disturbance or harassment by predators causes declines in productivity of colonies of birds (Anderson and Keith 1980). Birds exhibit behavioral responses to noise similar to those of mammals. At the lowest level, they become alert to the noise; at the highest level, they abandon the area. In the long term, nesting birds become more habituated and less responsive in the presence of human disturbance if they are not deliberately harassed (Burger and Gochfeld 1981). After habituation, loss rates are too low to be detected.

The USFWS has determined a significance criterion of 60 dBA CNEL at the edge of habitat as an impact. Birds in San Francisco Bay use a variety of habitats, including wetlands, shoreline, sandbars, and the Bay itself; hence it is difficult to determine the sound level received at all bird habitat. Therefore, the distance of the 60 dBA CNEL contour from the ferry operations or routes was calculated using the criteria and assumptions discussed in Impact NOI-2. For an average fast ferry with a pass-by noise rating (or level) of 70 dBA at 1,000 feet, there would be no adverse noise impact from ferry operations or routes at a distance of 34 feet or more from the edge of the noise-sensitive habitat. Mitigation would likely mean moving ferry routes so that the sound level received at the edge of habitat does not exceed 60 dBA CNEL by ensuring that routes are at least 35 feet from sensitive habitat.

Fish. Fish use sound to obtain information about their environment and for communication (Tavolga et al. 1981). Every species of fish has a different auditory system and therefore different hearing sensitivity. Generally, fish hear sounds at frequencies between 50 Hz and 2,000 Hz. Loud sounds may cause damage to auditory systems of fish, ranging from morphological damage to stunning and even death (Hastings 1991). Intense sound pressure levels may also cause morphological damage to other parts of the body, such as the air bladder, that play an important role in acoustic detection and production in some fish.

A review of scientific literature and experiments concluded that several species of fish exposed to underwater sound levels of 180 dB re 1 µPa or higher for 2 hours or less were adversely affected (Finneran et al. 1995). Aversive responses were detected in some fish at levels as low as 161 dB (Hawkins 1973).

As noted in Section 3.11.1.2, underwater noise data for ferries is not available. However, based on the worst-case estimate of 177 dB re 1 µPa at 1 meter for a tanker ship pass-by, fish would experience sound levels of 160 dB at a distance of approximately 7 meters and would not experience sound levels greater than 180 dB. Fish may avoid the area while a ferry is in transit, but it is unlikely that it would cause fish to completely abandon the area.

The worst-case estimate of 177 dB re 1 µPa at 1 meter for a tanker ship pass-by is considered to be very conservative. Whereas tanker propulsion is provided by large propellers, most high-speed vessels use water jet propulsion systems. While non-classified data comparing water jet and propeller noise could not be identified, water jets are considered to produce less underwater noise than propellers. Anecdotal evidence is provided in military citations of the use of water jets in "stealth" vessels to reduce underwater noise (see http://www.memagazine.org/backissues/jan01/features/stealth/stealth.html "They also equipped the Smyge with a quiet propulsion system consisting of two water jets made by KaMeWa Group of Kristinehamn, Sweden. KaMeWa's jets are used on fast ferries, catamarans, and other high-speed marine craft.").

Summary of Impact NOI-4

- **Terrestrial Mammals.** Implementation of the Proposed Project would be unlikely to impact small mammals, such as the salt marsh harvest mouse.
- **Marine Mammals.** No noise impacts to gray whales are expected. No impact is expected for sea lions and sea otters from ferry operations. There is a potential for impacts to seals at the haul-out site on the eastern side of Treasure Island.
- **Birds.** Noise impacts to birds are difficult to determine because of the variety of habitats birds use within San Francisco Bay. There is a potential for impacts if noise levels exceed 60 dBA CNEL at the edge of sensitive habitat.
- **Fish.** Although it is unlikely that fish would completely abandon ferry transit areas, available data preclude determination of impact. Therefore, impacts to fish could be potentially significant for some routes.

Mitigation NOI-4.1: The exact routes from San Francisco to Treasure Island and to Redwood City shall be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-outs or to other wildlife (birds and fish), could be significant.

Impacts After Mitigation: It is anticipated that impacts would be less than significant with implementation of Mitigation NOI-4.1, except for the seal haul-outs at Treasure Island and Redwood City. The impact could be potentially significant regarding the seal haul-outs.

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Table 3.11.1
Estimating Existing Noise Exposure

Distance from Major Noise Source [1] (feet)				Noise Exposure Estimates (dBA)			
Interstate Highways [2]	Other Roadways[3]	Railroad Lines [4]	Population Density (people per sq. mile)	L_{eq} (day)	L_{eq} (evening)	L_{eq} (night)	L_{dn}
10 - 49				75	70	65	75
50 - 99				70	65	60	70
100 - 199				65	60	55	65
200 - 399				60	55	50	60
400 - 799				55	50	45	55
800 and up				50	45	40	50
	10 - 49			70	65	60	70
	50 - 99			65	60	55	65
	100 - 199			60	55	50	60
	200 - 399			55	50	45	55
	400 and up			50	45	40	50
		10 - 29					75
		30 - 59					70
		60 - 119					65
		120 - 239					60
		240 - 499					55
		500 - 799					50
		800 and up					45
			1 - 99	35	30	25	35
			100 - 299	40	35	30	40
			300 - 999	45	40	35	45
			1,000 - 2,999	50	45	40	50
			3,000 - 9,999	55	50	45	55
			10,000 - 29,999	60	55	50	60
			30,000 and up	65	60	55	65

Notes:

1. Distances do not include shielding from intervening rows of buildings. General rule for estimating shielding attenuation in populated areas: Assume 1 row of buildings every 100 ft; -4.5 dB for the first row, -1.5 dB for every subsequent row up to a maximum of -10 dB attenuation.
2. Roadways with 4 or more lanes that permit trucks, with traffic at 60 mph.
3. Parkways with traffic at 55 mph, but without trucks, and city streets with the equivalent of 75 or more heavy trucks per hour and 300 or more medium trucks per hour at 30 mph.
4. Main line railroad corridors typically carrying 5 to 10 trains per day at speeds of 30 to 40 mph.

Source: FTA, 1995 (Table 5-7)

Table 3.11.2
Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA) *	Description of Land Use Category
1	Outdoor $L_{eq}(h)$ **	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$ **	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks and recreational facilities are also included.

* Onset-rate adjusted sound levels (L_{eq}, L_{dn}) are to be used where applicable.
** L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.
Source: FTA, 1995 (Table 3-2)

Table 3.11.3
Owner-Imposed Noise Level Limits

Areas of Measurement	Noise Levels Not to Exceed	Applicable Notes
Interior Noise		
Passenger & Crew Spaces	75 dBA	Notes 1, 2, 4, 5
HVAC Noise	55 dBA	Notes 1, 2, 4, 7
Offices	70 dBA	Notes 1, 2, 5
Food Services	75 dBA	Notes 1, 2, 5
Solarium	82 dBA	Notes 1, 2, 5
Wheelhouse	65 dBA	Notes 1, 2, 5
Bridge Wings	65 dBA	Notes 1, 2, 5
Boat Embarkation Station	75 dBA	Notes 1, 2, 6
Line Handling Station	75 dBA	Notes 1, 2, 6
Engine room	120 dBA	Notes 1, 2, 5
Vehicle Deck	75 dBA	Notes 1, 2, 3
Exterior Noise	60 dBA at 1,000 ft distance from the FVF and at elevations of sea level and 100 ft above sea level	
In Harbor	Notes 1, 2, 6	
At Sea	Notes 1, 2, 5	

Source: The Glosten Associates, 2002

Notes:

1. dBA ref: 20 microPascals
2. Criteria do not apply to operation of portable appliances, but do apply to operation of machinery that is operated intermittently or automatically cycles on and off, such as elevators and compressors. The criteria apply with the windlasses, capstans and boat davits secured.
2. Measured at 5 feet above the vehicle deck with fans running at 20 air changes per hour with either loading door open, and all engines running at an rpm and loading reflective of temporary tie-up. (Main engines will not be shut down and shore power will not be connected.)
3. Applies to all passenger spaces, crew spaces and normal work areas throughout the vessel, except the vehicle space and stairwells leading from the vehicle space to these areas.
4. Applies to main propulsion engines operating at maximum fast ferry rating, and all ship systems in normal operation.
5. Measured with the main propulsion engines operating at the maximum harbor maneuvering power without causing waterjet cavitation, and the vehicle deck ventilation system operating at 20 air changes/hour.
7. Applies to all passenger and crew spaces with HVAC equipment operating at the maximum capacities required to achieve the heating or cooling requirements, the auxiliary diesel gensets operating as required to supply the electrical load, and the main engines shut down.

Table 3.11.4
City of San Francisco Operational Noise Standards at Receiving Property Line, dBA[a]

Receiving Zoning/Land Use[a]	Cumulative Number of Minutes in a 1-Hour Period[b]	Maximum Allowable Noise Level (dBA)		
		Daytime 7 a.m.-10 p.m.	Nighttime 10 p.m.-7 a.m.	Notes
Residential (R-E, R-1 and R-2 zones) or single-family or duplex in a specific plan district	30 (L_{50})	60	50	c
	15 (L_{25})	65	55	d
	5 ($L_{8.3}$)	70	60	d
	1 ($L_{1.7}$)	75	65	f
	0 (L_{max})	80	70	g
Residential (R-3 and D-C zones) or multi-family or mixed residential/commercial in any specific plan district	30 (L_{50})	60	55	c
	15 (L_{25})	65	60	d
	5 ($L_{8.3}$)	70	65	e
	1 ($L_{1.7}$)	75	70	f
	0 (L_{max})	80	75	g
C-1, P-C zoning and Gateway and Oyster Point Marina districts or any commercial use in any specific plan district	30 (L_{50})	65	60	c
	15 (L_{25})	70	65	d
	5 ($L_{8.3}$)	75	70	e
	1 ($L_{1.7}$)	80	75	f
	0 (L_{max})	85	80	g
		Anytime		
M-1and P-1 zones	30 (L_{50})	70		c
	15 (L_{25})	75		d
	5 ($L_{8.3}$)	80		e
	1 ($L_{1.7}$)	85		f
	0 (L_{max})	90		g

Source: City of San Francisco — San Francisco Code Section 8.32.030.

Notes:

a: Apply lowest of two zones plus 5 dB if on boundary

b: L_x is the noise level exceeded x percent of a given period. L_{max} is the maximum instantaneous noise level.

c: Apply ambient if it is higher

d: Apply 5 dB above ambient if ambient is higher than L_{50} standard

e: Apply 10 dB above ambient if ambient is higher than L_{50} standard

f: Apply 15 dB above ambient if ambient is higher than L_{50} standard

g: Apply 20 dB above ambient if ambient is higher than L_{50} standard

Table 3.11.5
City of Oakland Operational Noise Standards at Receiving Property Line

Receiving Land Use	Cumulative Number of Minutes in a 1-Hour Period[a]	Maximum Allowable Noise Level (dBA)[b]	
		Daytime 7 a.m.-10 p.m.	Nighttime 10 p.m.-7 a.m.
Residential and Civic[c]	20 (L_{33})	60	45
	10 ($L_{16.7}$)	65	50
	5 ($L_{8.3}$)	70	55
	1 ($L_{1.7}$)	75	60
	0 (L_{max})	80	65
		Anytime	
Commercial	20 (L_{33})	65	
	10 ($L_{16.7}$)	70	
	5 ($L_{8.3}$)	75	
	1 ($L_{1.7}$)	80	
	0 (L_{max})	85	
Manufacturing, Mining, and Quarrying	20 (L_{33})	70	
	10 ($L_{16.7}$)	75	
	5 ($L_{8.3}$)	80	
	1 ($L_{1.7}$)	85	
	0 (L_{max})	90	

Source: City of Oakland 1996b—Oakland Planning Code Section 17.120.050.

Notes:

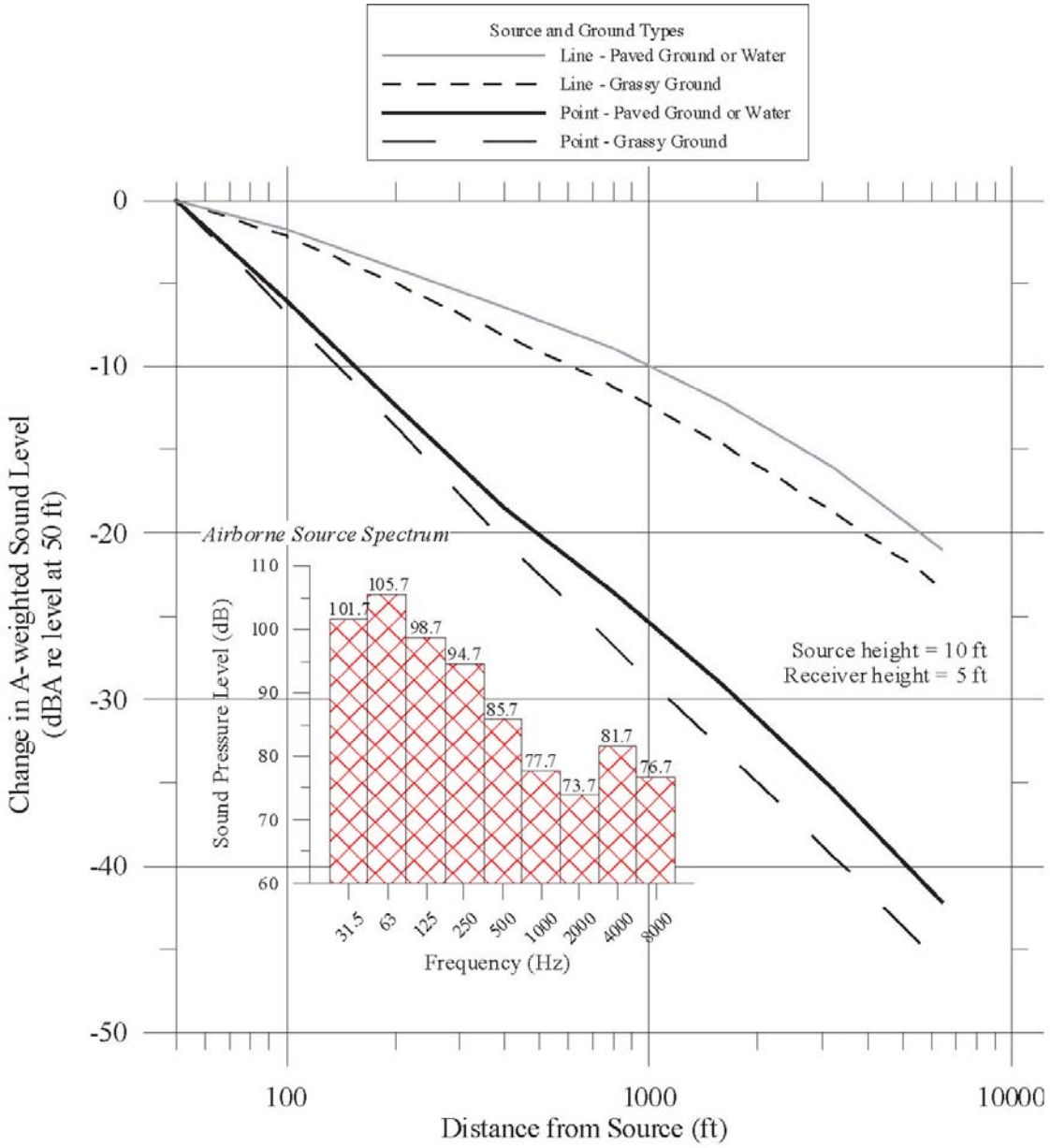
a: Lx is the noise level exceeded x percent of a given period. Lmax is the maximum instantaneous noise level.

b: These standards are reduced 5 dBA for simple tone noise, noise consisting primarily of speech or music, or recurring impact noise. If the ambient level exceeds these standards, the standard shall be adjusted to equal the ambient noise level.

c: Legal residences, schools, childcare facilities, health care facilities, public open space, or similarly sensitive land uses.

Table 3.11.6
Weekday Ferry Pass-bys by Route

Route	Total Weekday Pass-bys		
	Peak	Off-Peak	Total
Existing Routes			
Alameda/Harbor Bay Isle - Ferry Bldg.	12	0	12
Jack London Sq.& Alameda Main St.- Ferry Bldg.	24	18	42
Sausalito - Ferry Bldg.	24	18	42
Tiburon - Ferry Bldg.	24	18	42
Larkspur - Ferry Bldg.	36	18	54
Vallejo - Ferry Bldg.	24	18	42
New Routes			
Berkeley/Albany - Ferry Bldg.	24	18	42
Mission Bay – Ferry Bldg.	24	18	42
Redwood City - Ferry Bldg.	12	18	30
Richmond - Ferry Bldg.	24	18	42
Oyster Point (SSF) - Ferry Bldg.	24	18	42
Treasure Island - Ferry Bldg.	24	36	60
Hercules/Rodeo - Ferry Bldg.	12	4.5	16.5
Pittsburg/Antioch & Martinez - Ferry Bldg.	12	5.4	17.4



SOURCE: ISO 9613 3 (1996)

URS	Water Transit Authority Program EIR Project No. 28066519	EXAMPLE OF OVERALL AIRBORNE SOUND ATTENUATION	Figure 3.11.1

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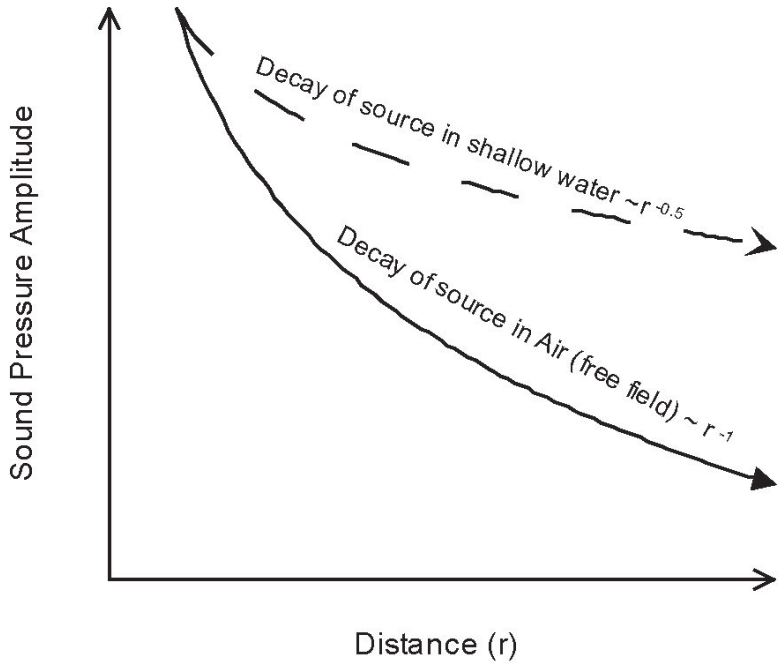

URS	Water Transit Authority Program EIR Project No. 28066519	DIFFERENCE IN SPREADING LOSS FOR SOUND PROPAGATING IN AIR AND IN WATER	Figure 3.11.2

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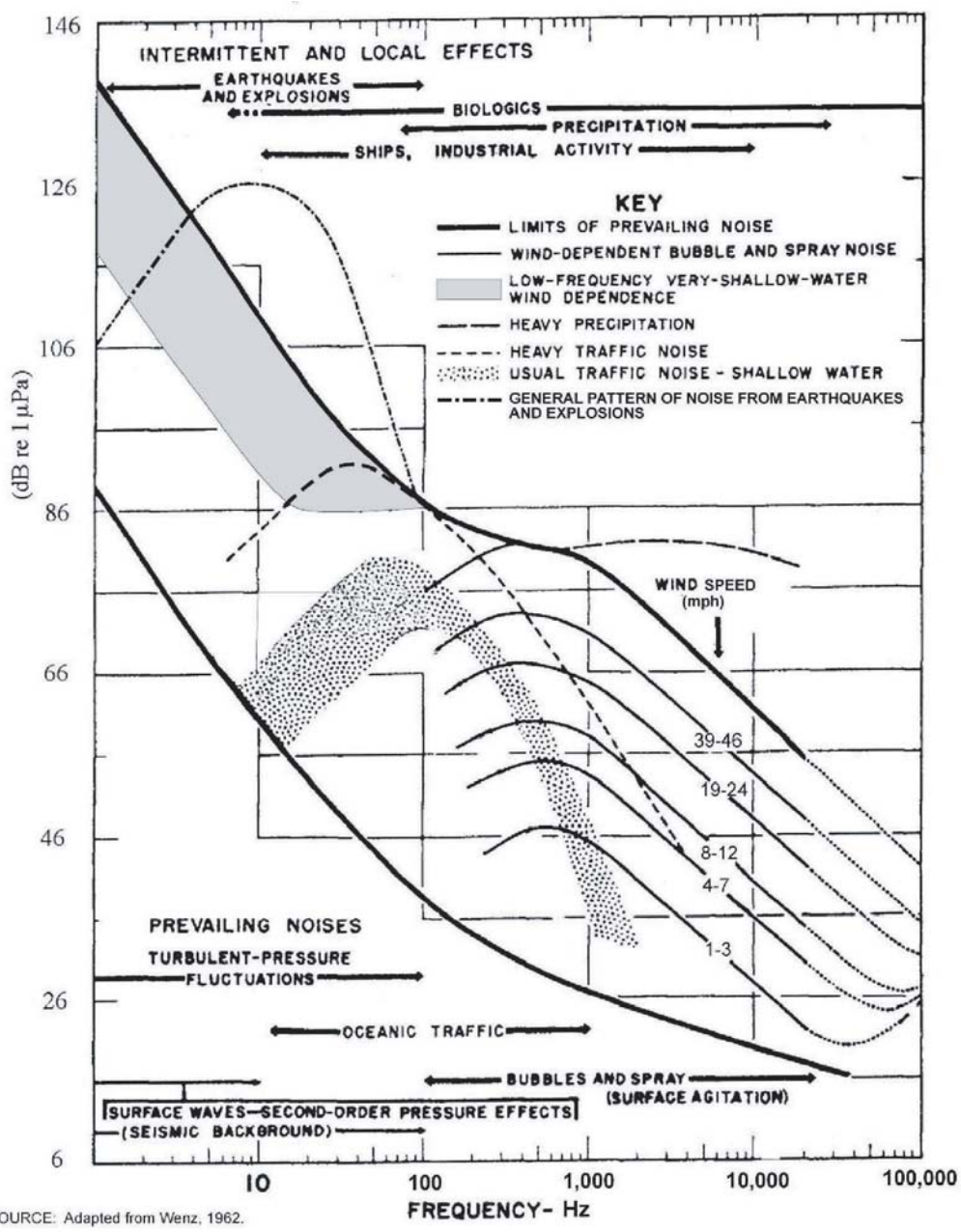

SOURCE: Adapted from Wenz, 1962.

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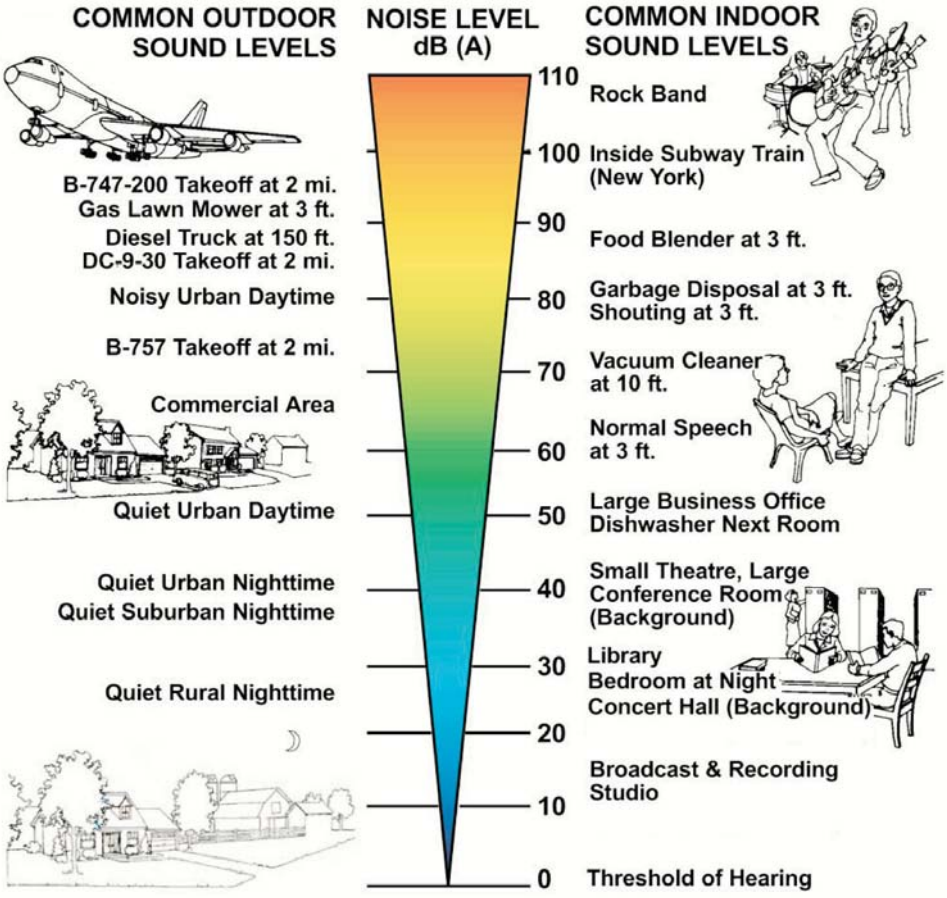
URS	Water Transit Authority Program EIR Project No. 28066519	SUMMARY OF UNDERWATER AMBIENT NOISE	Figure 3.11.3

NOISE SCALE:
COMMON SOUND LEVELS



Source: Draft EIS/EIR LAX Proposed Master Plan Improvements, Los Angeles, CA
U.S. Dept. of Transportation, FAA
January 2001

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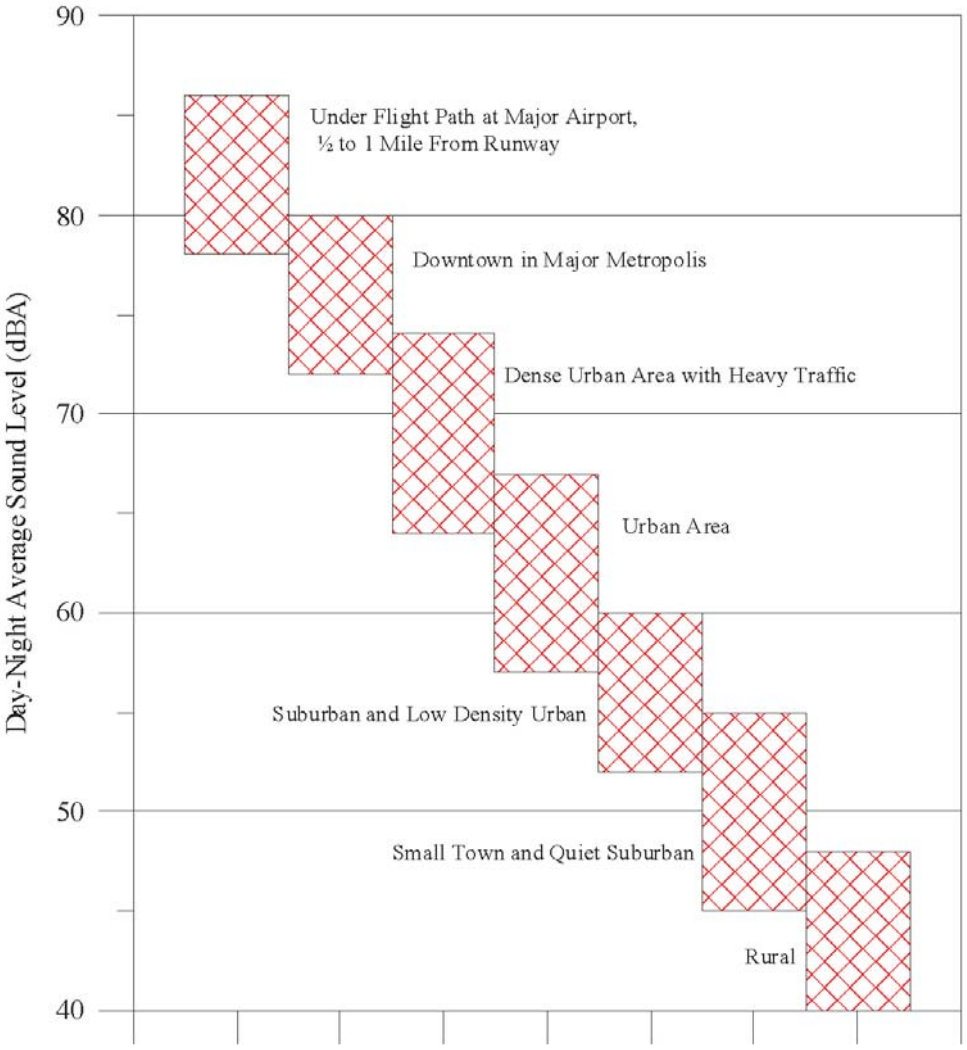
URS	Water Transit Authority Program EIR Project No. 28066519	COMMON INDOOR AND OUTDOOR SOUND LEVELS	Figure 3.11.4



SOURCE: Carver, 1978

URS	Water Transit Authority Program EIR Project No. 28066519	TYPICAL RANGE OF OUTDOOR COMMUNITY DAY-NIGHT AVERAGE SOUND LEVELS	Figure 3.11.5

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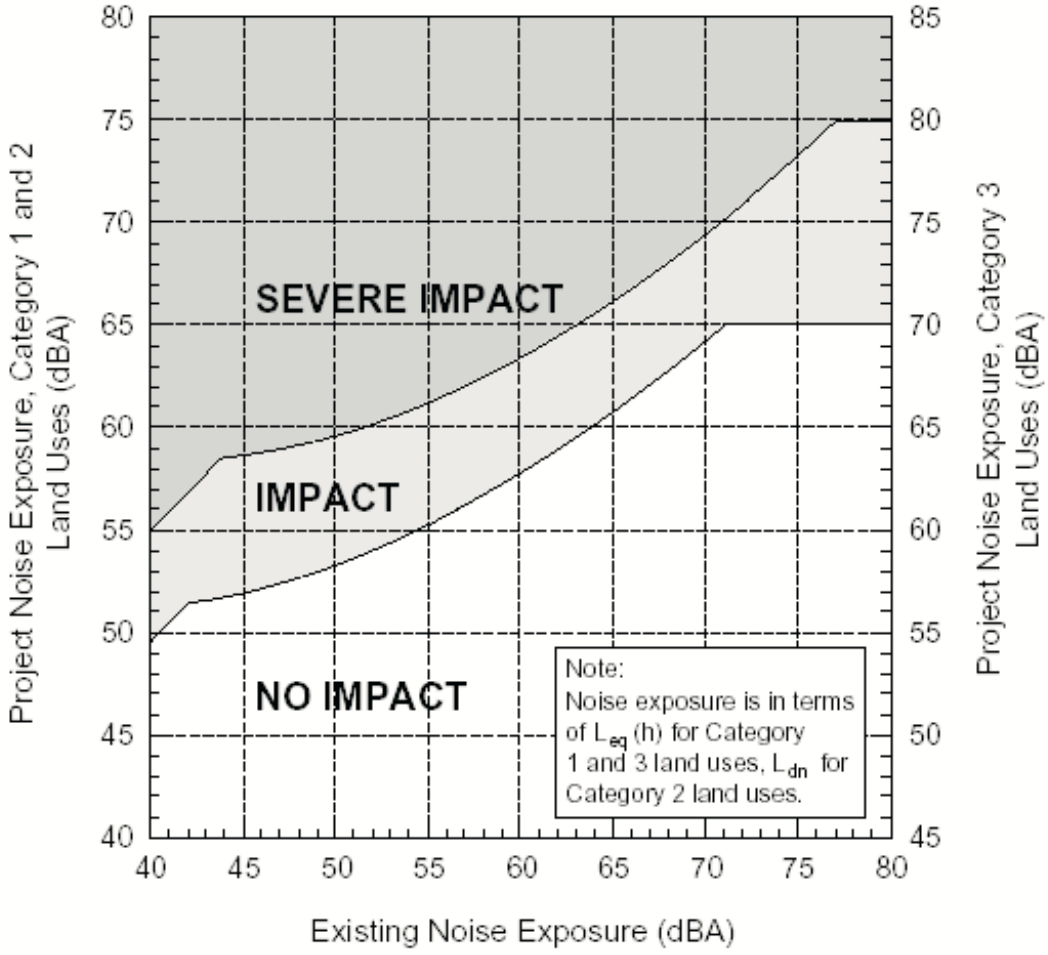

SOURCE: Federal Transit Administration, 1995 (Figure 3-1)

URS	Water Transit Authority Program EIR Project No. 28066519	NOISE IMPACT CRITERIA FOR TRANSIT PROJECTS	Figure 3.11.6

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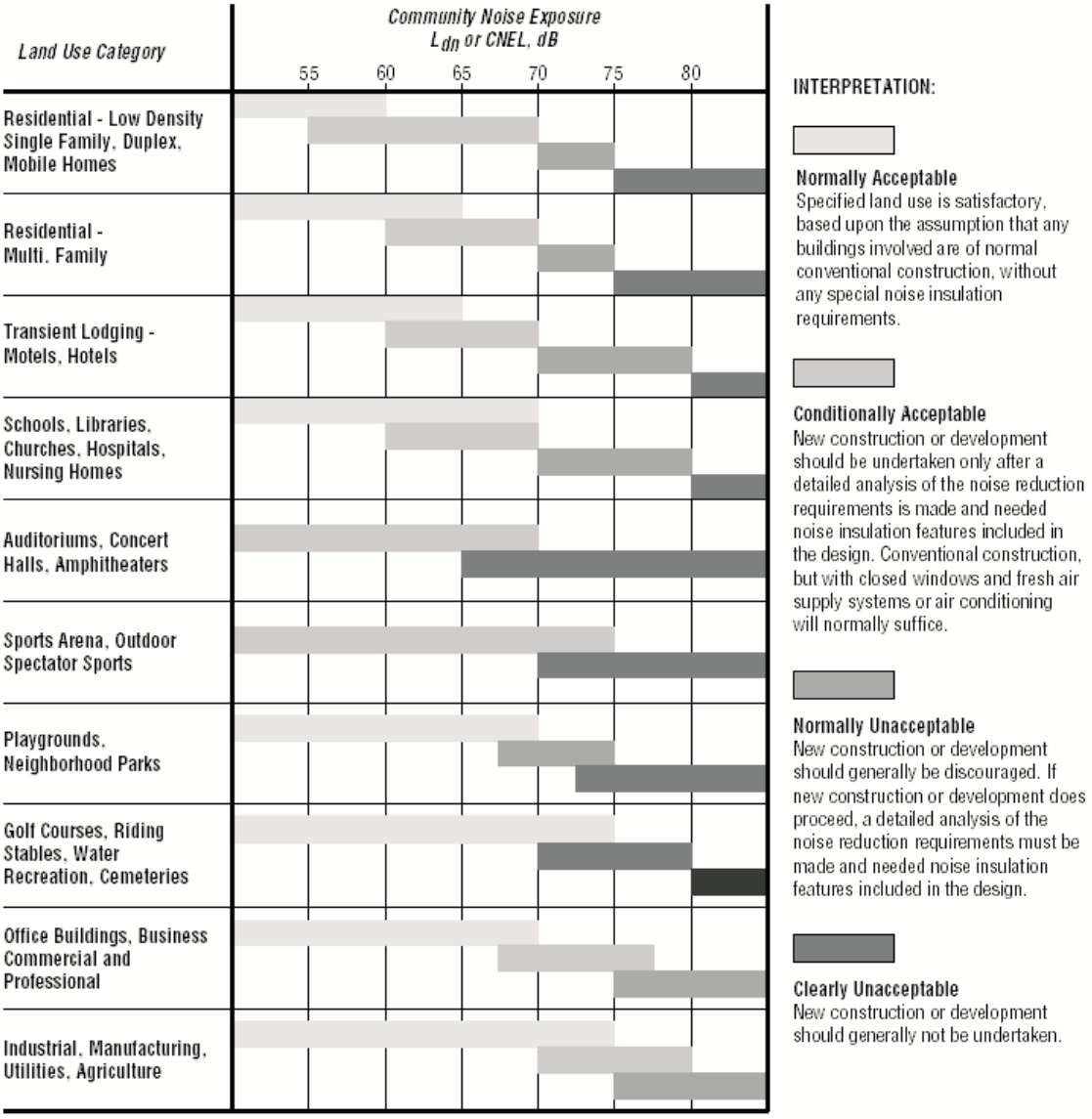

SOURCE: State of California, 1998

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URS	Water Transit Authority Program EIR Project No. 28066519	GUIDELINES FOR NOISE COMPATIBLE LAND USE	Figure 3.11.7

3.12 TRANSPORTATION

This section provides an overview of transportation in the Bay Area and its importance from environmental and regional planning perspectives. Existing transportation modes and primary routes and corridors crossing and accessing key Bay Area destinations are described. Current and future challenges for regional transportation are also discussed.

Bay Area traffic conditions will change over time. Both the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) develop and share projections and planning information for forecasted growth and transportation conditions in the region. For this report, existing traffic refers to conditions at the present time. "Projected traffic" is the anticipated traffic conditions which is projected to exist at the time of project buildout (2025) without the WTA ferry expansion program (i.e., the 2025 No Project Alternative). These conditions are described to provide the basis for comparison to changes with the ferry expansion alternatives, discussed in Section 3.12.2.

3.12.1 Environmental Setting

3.12.1.1 Transportation Within the San Francisco Bay Area

Transportation is vital to the nine-county Bay Area and its economy. Work commutes, shipping and distribution, and routine daily tasks rely on a dependable and safe transportation system. The region is also a global gateway for international trade. The Port of Oakland, one of the busiest on the West Coast, and the three international airports in the area serve as hubs for commerce and transportation. The Bay Area also includes dense urban cores with suburban and rural peripheries. It is connected to the rest of the region through a system of federal and state highways, while a network of local major and arterial roads provide internal circulation. In addition to surface roads and freeways, the region is served by an extensive transit network including rail and ferry systems. Bay Area residents make about 21 million person trips per day. Bay Area-wide, 82.2 percent of those trips are completed by car, 6.2 percent by public transit, 1.3 percent by bike, and 10.3 percent on foot (MTC 2001).

Road System

Bay Area residents depend on automobiles for the majority of their local and regional transportation needs. The Bay Area has 19,600 miles of local streets and roads. The region is served by numerous interstate and U.S. freeways. On the west side of San Francisco Bay, I-280 and U.S. 101 run north-south. U.S. 101 continues north of San Francisco into Marin County. I-880 and I-680 run north-south on the east side of the Bay. I-80 starts in San Francisco, crosses the Bay Bridge, and runs northeast toward Sacramento. SR 92 and SR 84, both highways that allow at-grade crossings, in certain parts of the region become freeways that run east-west and cross the Bay. I-580 starts in San Rafael, crosses the Richmond-San Rafael Bridge, joins with I-80, runs through Oakland, and then runs eastward toward Livermore.

The California Department of Transportation (Caltrans) is responsible for the design, construction, and maintenance of the California State Highway System, in addition to the portion of interstate highways within California's boundaries. The U.S. Department of Transportation Federal Highway Administration (FHWA) provides oversight of projects involving federal

highways or projects that are funded through the Department of Transportation. The MTC is the nine-county transportation planning and coordinating agency for the region. Local government, (such as county or city public works departments) and regional transportation planning agencies are responsible for the design, construction, and maintenance of county and local roads.

Mass Transit

Public transportation is managed by private, public, and quasi-governmental agencies at the local, county, or regional level. Bay Area transit system components include buses, rail systems (including light rail, rapid rail, and commuter rail), and ferries. Historically, the Bay Area's transit systems have developed independently of one another, which has resulted in geographic gaps in service and limited direct connections between different transit modes.

MTC encourages the integration of expansion of existing systems in the Bay Area Regional Transportation Plan (RTP). Figure 3.12.1 shows the different transit systems in the region. Table 3.12.1 lists transit systems by county. Appendix Tran-A describes those systems. Ferries are part of this Bay Area transit system. Existing ferry service is summarized in Table 3.12.2.

The existing and forecast future transit supply of each transit component is presented in Table 3.12.3. Transit supply can be expressed in terms of passenger-seat miles per hour. Based on that measure, the ferries currently carry the least number of passengers when compared to other transit modes. The 2025 forecast increases in transit supply take into account planned expansions in bus, BART, light rail and train service. While increases in ferry patronage are expected, they will likely be outpaced by supply increases in other transit, and the proportion of ferry supply from the total transit supply will drop without enhancements in ferry service.

Transportation Challenges in the Bay Area

Almost 7 million people live in the Bay Area's nine counties and 101 cities. According to ABAG, this number is projected to grow to 8 million by 2020. Imbalances in area employment and available affordable housing have resulted in mounting traffic congestion. Reliance on the automobile is illustrated by the vehicle ownership statistics. In the 1940s growth in vehicle ownership began to outpace the growth in the number of households. According to ABAG's figures, in 1980 there were approximately 1.5 vehicles per household. By 2010, the ratio is projected to reach approximately 2 cars per household, with almost 6 million vehicles in the nine-county region (Figure 3.12.2). The number of people driving alone to work every day grew by 35 percent, from 1.6 million to 2.1 million, between 1980 and 1990. With the growth in the number of cars, there has been a growth in highway congestion.

Current Highway Bottlenecks

Traffic performance of the freeway system within the nine counties of the San Francisco Bay Area has been the subject of study by the Caltrans District 4 Office of Highway Operations. The Highway Congestion Monitoring Program (HICOMP) was established to compile data on locations and magnitude of recurrent traffic congestion. With the exception of 1985 and 1997, HICOMP reports were issued by Caltrans from 1981 until 2001, when funding was discontinued.

Congestion is measured as Level of Service (LOS), which reflects the ease with which one can drive on a roadway. There are six LOS gradations, from A to F. LOS A represents free flow, unimpeded travel (at maximum posted speed). LOS F represents bumper-to-bumper or very

congested conditions. Congestion becomes a problem when it affects the capacity for movement. Congestion on Bay Area freeways has been increasing steadily. The 1988 HICOMP reported 58,600 vehicle-hours of delay (the combined amount of time cars and trucks spend idling on freeways), costing commuters an estimated $548,000 daily in lost productivity. By 1998 Bay Area commuters were spending an estimated 112,000 vehicle-hours in congestion, costing approximately $1,249,000 per day. All counties in the region experienced an increase in congestion, with the greatest increases occurring in Alameda and Santa Clara Counties. The 1998 HICOMP reported congestion regularly occurring at 145 different freeway locations each day, affecting 327 directional miles of freeway (a one-mile length of freeway has two directional miles, irrespective of the number of lanes.)

One of the more apparent effects of increased congestion is the expanded duration of commute periods. In many locations, peak commute periods now last up to 5 hours. Commutes have stretched both in time and distance as people move farther from their workplaces. In Alameda County, for example, the average commute time has increased from 17 minutes in 1993 to 35 minutes in 2000. During that same period, according to the Alameda County Congestion Management Agency (ACCMA), the average one-way commute length increased from 15.3 to 17.1 miles (ACCMA 2001). Congestion occurs at distinct locations in the freeway system, depending on commute patterns and the ability of the system to accommodate traffic flow. Table 3.12.4 shows the main Bay Area bottlenecks, by county, recorded by the 1998 HICOMP. Noted on Table 3.12.4 are those congested areas associated with Bay Area bridges. Figure 3.12.3 illustrates congested and heavily congested highway locations.

Bay Area Crossings

Some of the Bay Area's most congested corridors are associated with the three principal transbay crossings: Oakland-San Francisco, San Mateo-Hayward, and the Dumbarton Bridge corridor. Of these three corridors, only the Oakland-San Francisco crossing is currently served by ferries. These corridors are currently filled to capacity much of the time and, according to MTC projections, transbay travel is expected to increase 40 percent by 2025. To address the situation, MTC launched the San Francisco Bay Crossings Study in 2000 to update a 1991 study (http://www.mtc.ca.gov/projects/bay_crossing/bay_crossing.htm). The Crossings Study is attempting to answer questions regarding more efficient use of existing corridors, as well as the need for construction of new transbay bridge or tunnel crossings. One of the study's first activities consisted of the preparation of a forecast of travel patterns, traffic volumes, and trip times for the year 2025 if no major improvements are made in the three principal transbay corridors. This forecast is known as the 2025 baseline. The first phase of the study included identification of the possible range of improvements in each transbay corridor, including:

- Carpool facilities and other operational improvements on existing highway bridges;
- New highway, BART, commuter rail, or multimodal crossings;
- Express bus services;
- BART services; and
- Water-based transportation services.

While the Bay Crossings Study is not focusing on expanded ferry service, the San Francisco Bay Area Water Transit Authority (WTA) is studying several alternatives, which are the subject of this program EIR, to improve mobility for transbay travelers.

Screenlines

A useful tool to consider traffic conditions in the Bay Area is a "screenline" analysis. Screenlines are representative geographic lines that provide a measurement point of people making trips either by public transit or private car. Cambridge Systematics analyzed daily person trips made across screenlines that correspond to important bottlenecks in the Bay Area, as shown in Table 3.12.5.

The Cambridge Systematics screenline analysis indicates that public transit accounted for 215,458 person trips across Bay Area screenlines in 1998 (i.e., 13.5 percent of the baseline year total). Ferry trips accounted for 5.5 percent of person trips by transit and 0.7 percent of the total person trips across the screenlines considered. By the year 2025, without any expansion or enhancement of the ferry service, the number of public transit person trips across screenlines would almost double, according to the modeling, reaching 402,905 or 20 percent of that year's total. Ferry transit is also expected to increase and will make up 5.7 percent of transit person trips and 1.1 percent of the total person trips in 2025 across the screenlines.

Bay Area Vehicle Trips

Although most instances of congestion are related to work commutes, fewer than one in three automobile trips made by Bay Area residents are to work. The vast majority of daily trips are less than 5 miles. According to ABAG, "they are trips to the grocery store, gym, daycare center, or a child's soccer practice" (ABAG 2002). Table 3.12.6 shows the number of Bay Area trips by purpose. Commuter trips, approximately 3.7 million in 1998, were outnumbered by trips in the other categories. Table 3.12.6 also indicates that 98 percent of the private vehicle trips in the Bay Area are made by automobile and the remaining 2 percent by truck. The total number of trips made during the 1998 baseline year was 12.6 million. While the number of trips is expected to increase by 33 percent in 2025, the proportion of trips made by car and truck will remain the same.

Table 3.12.7 shows the number of vehicle miles traveled (VMT) by vehicle type in the nine-county area during the 1998 baseline year. Santa Clara and Alameda are the two counties with the greatest traffic volumes.

3.12.2 Impacts and Mitigation

3.12.2.1 Significance Criteria

According to CEQA guidelines, a project would have a significant impact if it would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. This assessment was performed at a regional level and impacts are identified in terms of their potential to substantially change traffic volumes; hence a specific numerical criterion was not applied.

3.12.2.2 Impacts and Mitigation

The proposed enhancement of the ferry system would expand transportation options for Bay Area commuters. In general, this may result in lower use of the automobile and non-ferry transit as commuters shift to ferries. Table 3.12.8 shows VMT for year 2025, without any expansion of ferry service (No Project Alternative) and for the Proposed Project and compares them to the 1998 data. As shown in Table 3.12.8, the total regional VMT for the No Project Alternative will increase by 33.7 percent over the baseline, while the total regional VMT for the Proposed Project would increase by 33.6%. All nine counties will experience traffic increases, with the highest relative percent changes in the North Bay counties. Notably, Solano County will experience a 75 percent increase over baseline conditions. The largest reductions in VMT occur in counties where ferries are competing with congested highway facilities, such as San Francisco, San Mateo, and Marin. However, an increase in drivers accessing transit is expected due to increases in VMT in the vicinity of terminals to ferry ridership at new terminals (as discussed in Impact T-1). The Proposed Project would have a total regional VMT of 0.07% less than the No Project Alternative. While the overall percentage reduction may seem small, it may reduce peak hour volumes on the Bay Bridge by almost a lane's worth of traffic.

Table 3.12.9 shows the effect of the Proposed Project on vehicle trips by purpose and vehicle type. As expected, only auto trips would be affected because they are the transportation mode most affected by commute improvements. Truck trips would remain constant for 2025. Among the auto trips, the addition of ferry routes and vessels would mostly affect trips to work and recreation, where ferry travel presents a real option for Bay Area residents. However, as Table 3.12.9 indicates, the percentage change in total vehicle trips from the Proposed Project to the No Project Alternative is minimal.

Table 3.12.10 shows total ridership in non-ferry transit for the No Project Alternative and the Proposed Project. As shown, the modeling for the Proposed Project predicts small decreases in ridership for busses (0.6%), light rail (0.3%), and BART (0.5%), and 2.0% increase in ridership for commuter rail. It is important to note, however, that this modeling result is similar to the modeling results from other transit expansion. For example, the WTA's ridership model showed that expansion of express buses or BART also forecast shifts from one mode to another. It is important to note that the MTC regional model does not use capacity constraints for transit systems. This likely causes an overestimation of shifts from BART to ferries. In addition, it is unclear whether the capacity constraints are in BART terminal access or in the trains themselves. BART has indicated that capacity of the trains could be expanded by eliminating seats and shifting to 3-door cars. It is also not clear how increased crowding would affect BART ridership. Based on these uncertainties, it is expected that there would be little effect on BART revenues from ferry expansion.

The Proposed Project would result in a reduction in automobile trips across the Bay Area bridge screenlines, as shown in Table 3.12.11. The Bay Area screenlines would experience a 0.7 percent reduction in automobiles. The Bay Bridge and Golden Gate Bridge corridors would experience more than 1 percent reductions in automobile trips.

Impact T-1 **At the regional level, expansion of the ferry service would result in a decrease of the total automobile VMT. At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals.**

As shown in Table 3.12.8, the Proposed Project would result in a 0.07 percent reduction in automobile VMT for the nine-county Bay Area. Reductions in automobile VMT would occur in all counties.

Due to the increase in ferry riders of 13,736 under the Proposed Project, the expanded ferry service would facilitate an increase in access to terminals by riders. As shown in Table 3.12.12, of the 36,974 daily riders under the Proposed Project, 65 percent would access the terminals by car, 15 percent by bus or rail, and 20 percent on foot. With a 65 percent total access to terminals by car and a 13,736 increase in total daily riders, 8,928 new riders could be accessing ferry terminals in automobiles. There could also be an increase in bus access to ferry terminals. The increase in riders accessing the ferry terminals in cars could alter traffic circulation patterns in localized areas near the ferry terminals. In locations where terminals would only exist under the Proposed Project, traffic could be expected to increase. Localized traffic could likely increase and decrease, depending on the location, between the Proposed Project and the No Project Alternative at existing terminal locations due to shifts in local traffic movements related to the implementation of the Proposed Project.

Therefore, there is a potential that traffic impacts could be significant on a site specific level, where access and circulation are not adequate to accommodate riders attracted to the terminal and system

Summary of Impact T-1

- The Proposed Project would result in an overall decrease in regional auto VMT. At a more localized level, the Proposed Project could result in increased car and bus traffic to and from existing ferry terminals, depending on local access and traffic conditions. This impact could be potentially significant on a site specific level.

Mitigation T-1.1: Once terminal locations are narrowed down, site specific traffic analyses shall be conducted to compare predicted traffic with applicable local LOS standards. Traffic mitigation measures would depend on site specific conditions, including design of vehicular access to terminals, major access routes, parking availability, and traffic patterns. For example, impacts that were predicted to occur at intersections could be mitigated by addition of turning lanes. For some cases, where access is problematic or presents serious community concerns, the viability of the terminal location would need to be further evaluated.

Impact After Mitigation: Impacts after mitigation must be determined on a case-by-case basis after mitigation measures are considered. Impact T-1 could be potentially significant.

Impact T-2 **Additional automobiles accessing existing and new ferry terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.**

Ridership increases would result from new and expanded ferry service. It is expected that more commuters would drive their cars to access ferry terminals. As discussed in Impact T-1, up to 65 percent of the ferry riders, under the Proposed Project, are expected to drive to the terminals. While some of the additional cars may be accommodated in terminal parking structures, it is the intention of WTA to limit parking in an effort to encourage transit use to access existing and new terminals. The demand for parking as a percentage of available parking is listed in Table 3.12.13. Approximately 40 percent of the ferry terminals under the Proposed Project could have parking demands exceeding parking availability. In some locations, due to lack of sufficient space or desire to avoid paying parking fees, commuters would choose to park offsite, along local streets in the vicinity of the ferry terminals. This can lead to enforcement of restrictions on local street parking, which can inconvenience local residents and businesses. It is important to note, however, that the potential parking at each site was estimated based on limited knowledge of the potential sites. Actual parking would be based on the demand and site specific constraints. Actual parking would likely vary from the estimates of available parking included in Table 3.12.13.

Summary of Impact T-2

- Implementation of the Proposed Project would result in increased car traffic to and from new ferry terminals and lead to an increased demand for parking. Parking demand would exceed parking availability at some locations. The project proponent(s) should seek to encourage and increase transit access to terminals. The impact would be localized and site specific. Its significance cannot be determined at the program level. Therefore this is a potentially significant impact.

Mitigation T-2.1: The project proponent(s) and ferry terminal authorities, in conjunction with local and regional transit agencies, shall study and develop terminal-specific plans to ensure that potential driving ferry patrons can be adequately served by transit in locations with limited parking and currently insufficient transit access.

Mitigation T-2.2: Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

Impact After Mitigation: Traffic access and parking impacts can often be mitigated through design or operational improvements. Mitigation improvements would be defined with each proposed new terminal or terminal improvement. This is a potentially significant impact.

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Table 3.12.1
Bay Area Regional and County Transit Systems

	Local Service	Connecting Service
Regional	Alameda/Oakland Ferry Service BART Blue & Gold Fleet Caltrain Dumbarton Express Golden Gate Ferry Harbor Bay Ferry Red and White Fleet Vallejo Baylink Ferry	
Alameda	AC Transit Air-BART BART Broadway Shuttle CSUH Hill Hopper Emery Go-Round UC Berkeley Campus Shuttle Union City Transit WHEELS (LAVTA) West Berkeley Shuttle	Alameda/Oakland Ferry Service Altamont Commuter Express County Connection Dumbarton Express Harbor Bay Ferry Modesto MAX SamTrans San Joaquin Regional Transit (SMART) Santa Clara VTA
Contra Costa	AC Transit BART Brentwood Dimes-A-Ride County Connection Tri Delta Transit WestCAT	Benicia Transit Fairfield-Suisun Transit Golden Gate Transit
Marin	Angel Island - Tiburon Ferry Golden Gate Transit	Blue & Gold Fleet Golden Gate Ferry
Napa	American Canyon Transit Calistoga Handy Van Napa Downtown Trolley Napa Valley Commute Club St. Helena VINE VINE VINE Go Yountville Shuttle	Lake Transit
San Francisco	BART Caltrain San Francisco Muni	AC Transit Alameda/Oakland Ferry Service Blue & Gold Fleet Golden Gate Ferry Golden Gate Transit Harbor Bay Ferry Napa Valley Commute Club SamTrans Vallejo Baylink Ferry
San Mateo	BART BART Employer Shuttles Burlingame Free Bee Shuttle Caltrain Caltrain Shuttles Foster City Sunshine Shuttle Menlo Park Midday Shuttle SamTrans	Dumbarton Express San Francisco Muni Santa Clara VTA

Table 3.12.1 - Continued
Bay Area Regional and County Transit Systems

Santa Clara	Caltrain Caltrain Shuttles Palo Alto Shuttle Santa Clara BEE Santa Clara VTA Stanford Marguerite Shuttle VTA Light Rail Shuttles	AC Transit Altamont Commuter Express Menlo Park Midday Shuttle SamTrans San Benito County Transit San Joaquin Regional Transit (SMART)
Solano	Benicia Transit Fairfield-Suisun Transit Rio Vista Transit Vacaville City Coach Vallejo Transit	Vallejo Baylink Ferry
Sonoma	Cloverdale Transit Healdsburg In-City Transit Petaluma Transit Santa Rosa CityBus Sonoma County Transit	Golden Gate Transit Mendocino Transit
Outside the Bay Area	Altamont Commuter Express Amtrak California / Capitol Corridor Greyhound Lake Transit Mendocino Transit Modesto MAX Monterey/Salinas Transit Sacramento Regional Transit (RT) San Benito County Transit San Joaquin Regional Transit (SMART) Santa Cruz Metro Unitrans (Davis) Yolobus	

Source: www.transitinfo.org/county.html

Table 3.12.2
Existing Ferry Service

Corridor	Route	Operator	Number of Vessels	Annual Patronage
Transbay	Vallejo –S.F. Ferry Bldg.	Blue and Gold	2	736,000
	Oakland-Alameda-S.F. Ferry Bldg.	Blue and Gold	2	496,000
	Harbor Bay- S.F. Ferry Bldg.	Harbor Bay Maritime	1	114,000
Golden Gate	Sausalito - San Francisco	GGBH&TD*	1	454,000
	Tiburon - San Francisco	Blue and Gold	1	125,000
	Larkspur – San Francisco	GGBH&TD	4	1,400,000
Sub-Total Commuter Ferry				3,325,000
GGNRA Service	Alcatraz	Blue and Gold	1	2,720,000
TOTAL			12	6,045,000

(*) Golden Gate Bridge Highway and Transportation Department
Source: WTA

Table 3.12.3
Transit Supply for 1998 and 2025 During Morning Peak Hours

Mode	1998 passenger-seat miles per hour	Percentage of 1998 total	2025 passenger-seat miles per hour[a]	Percentage of 2025 total	Percentage increase between 1998 and 2025
Bus	1,365,270	43.53	1,470,102	36.95	7.68
Light rail	143,011	4.56	268,134	6.74	87.49
BART	1,058,138	33.74	1,452,045	36.50	37.23
Train	473,046	15.08	672,602	16.90	42.19
Ferry	96,720	3.08	115,860	2.91	19.79
Total	3,136,185	100.00	3,978,743	100.00	26.87

Source: MTC 2001
[a] 2025 data is the forecasted data under the No Project Alternative, i.e. the forecasted 2025 passenger seat miles per hour data if the project were to not occur.

Table 3.12.4
Highway Congestion Locations in the Bay Area

County	Congestion Location
Alameda	• Southbound Route 680 over the Sunol Grade • Westbound Route 92 over the San Mateo Bridge * • Route 84 over the Dumbarton Bridge * • Westbound Route 80 approaching the Bay Bridge Toll Plaza (morning)* • Eastbound Route 80 (afternoon) • Northbound Route 880 approaching the Bay Bridge toll plaza.*
Contra Costa	• Route 4 in Pittsburg (morning and afternoon commutes) • Route 680 in Concord/Walnut Creek (morning)
Marin	• Southbound Route 101 from Novato to central San Rafael (morning peak) • Westbound Route 580 approaching Route 101 (evening)
Napa	• There is no significant freeway congestion in this county.
San Francisco	• Route 101 in the vicinity of Hospital Curve (at the Cesar Chavez Street interchange) in both directions (morning)* • Bay Bridge approach (afternoon commute)*
San Mateo	• Eastbound on the San Mateo-Hayward Bridge (evening)* • Southbound Route 101 between San Bruno and Burlingame (morning) • Southbound Route 280 from Daly City to Route 380 (morning)
Santa Clara	• Southbound Route 101 between Great America Parkway and Tully Road (evening) • Northbound Route 101 from Route 237 to University Avenue (evening) • Several locations on Route 87 and Route 680 (evening peak) • Southbound Route 280 from Page Mill Road to Magdalena (evening)
Solano	• Northbound Route 680 near the 80/680 interchange (evening peak period) • Approaches to the toll plazas at the Carquinez and Benicia-Martinez Bridges (evening).*
Sonoma	• Route 101 north of the Route 101/12 interchange in Santa Rosa (evening) • Northbound Route 101 north of Route 12/101 interchange (morning) • Southbound Route 101 south of Route 12/101 interchange (morning) • Southbound Route 101 near Lakeville Highway in Petaluma (morning)

(*) indicates congested area associated with bridge approaches and crossings.
Source: Caltrans District 4, HICOMP 1998

Table 3.12.5
Daily Person Trips Across Bay Area Screenlines

	Screenline	Daily Person Trips 1998	Daily Person Trips 2025[a]
Bay Bridge	BART	143,958	262,671
	AC Transit	2,089	3,812
	Ferry Transit	1,801	3,058
	Highway	408,851	451,521
	Bay Bridge Total	***556,699***	***721,062***
Golden Gate	Golden Gate Transit	9,298	14,055
	Ferry Transit	8,118	14,247
	Highway	151,926	168,637
	Golden Gate Total	***169,342***	***196,939***
SF/San Mateo County Line	Caltrain, BART and Samtrans	48,204	99,129
	Highway	318,955	380,252
	SF/SM County line Total	***367,159***	***479,381***
San Mateo Bridge	Highway	***145,258***	***161,611***
Dumbarton Bridge	Highway	***129,638***	***161,796***
Richmond-San Rafael Bridge	Highway	***78,058***	***90,986***
Carquinez/Benicia Bridges	Ferry Transit	1,990	5,933
	Highway	157,224	176,634
	Carquinez/Benicia Bridges Total	***159,214***	***182,567***
TOTAL		**1,605,368**	**1,994,342**

Source: Cambridge Systematics, 2002

[a] 2025 data is the forecasted data under the No Build alternative, i.e. the forecasted 2025 daily person trips data if the project were to not occur.

Table 3.12.6
Daily Number of Trips in the Bay Area by Vehicle Type

Purpose	1998 trips	2025 trips[a]	Percentage Change
Car			
Home-Based Work	3,707,297	5,103,132	38
Home-Based Shop	3,277,781	4,030,835	23
Home-Based Social/Rec.	1,302,011	1,607,989	24
Non-Home Based	3,610,424	4,738,388	31
Internal- External	458,523	913,203	99
Total cars	12,356,037	16,393,547	33
Trucks			
Small Truck	192,446	264,732	38
Medium Truck	18,633	25,580	37
Large Truck	40,851	56,647	39
Total trucks	251,930	346,959	38
TOTAL	**12,607,967**	**16,740,507**	**33**

Source: Cambridge Systematics (2002)

[a] 2025 data is the forecasted data under the No Build alternative, i.e. the forecasted 2025 trips if the project were to not occur.

Table 3.12.7
Daily Vehicle Miles Traveled (VMT) by County and Vehicle Type in 1998

County	Auto	Small Truck	Medium Truck	Large Truck	TOTAL
San Francisco	7,755,334	183,804	14,900	63,721	8,017,759
San Mateo	17,850,190	402,968	29,657	175,474	18,458,290
Santa Clara	32,754,307	651,396	53,770	211,556	33,671,029
Alameda	29,345,683	809,450	61,280	317,724	30,534,137
Contra Costa	16,701,084	376,108	27,912	144,147	17,249,251
Solano	9,057,951	181,832	12,131	68,505	9,320,419
Napa	2,978,750	73,024	4,656	28,699	3,085,129
Sonoma	7,509,204	187,843	13,405	75,265	7,785,717
Marin	7,084,922	164,598	11,112	74,768	7,335,401
INTRAZONAL VMT	1,347,897	-	-	-	1,347,897
TRANSIT DRIVE ACCESS VMT	984,344	-	-	-	984,344
TOTAL BAY AREA	**133,369,665**	**3,031,024**	**228,824**	**1,159,859**	**137,789,372**

Source: Cambridge Systematics (2002)

Table 3.12.8
Vehicle Miles Traveled for the Proposed Project for Automobiles, Trucks, and Buses

		2025 No Project Alternative		2025 Proposed Project		
County	**1998 Vehicle Miles Traveled**	**Vehicle Miles Traveled**	**% Change from 1998 Baseline**	**Vehicle Miles Traveled**	**% Change from 1998 Baseline**	**% Change from No Project**
San Francisco	8,017,759	9,075,385	13.19	9,035,662	12.70	-0.4
San Mateo	18,458,290	20,838,110	12.89	20,743,861	12.38	-0.5
Santa Clara	33,671,029	45,696,564	35.71	45,688,423	35.69	-0.02
Alameda	30,534,137	40,021,231	31.07	40,007,689	31.03	-0.03
Contra Costa	17,249,251	23,702,339	37.41	23,693,094	37.36	-0.04
Solano	9,320,419	16,317,037	75.07	16,331,542	75.22	0.09
Napa	3,085,129	5,038,273	63.31	5,044,401	63.51	0.1
Sonoma	7,785,717	11,045,667	41.87	11,041,454	41.82	-0.04
Marin	7,335,401	8,539,503	16.41	8,505,155	15.95	-0.4
Intrazonal VMT	1,347,897	2,112,613	56.73	2,112,563	56.73	-0.002
Transit Drive Access VMT	984,344	1,892,977	92.31	1,933,395	96.41	2.1
Bus VMT	268,239	323,225	20.50	333,167	24.21	3.1
TOTAL BAY AREA	**138,057,611**	**184,602,925**	**33.71**	**184,470,407**	**33.62**	**-0.07**

Source: Cambridge Systematics (2002)

Table 3.12.9
Vehicle Trips by Purpose and Vehicle Type for the Proposed Project

Purpose/Vehicle Type	1998 Vehicle Trips	2025 No Project Vehicle Trips	2025 Proposed Project Vehicle trips	Percent Change from No Project
Car				
Home-Based Work	3,707,297	5,103,132	5,096,452	-0.131%
Home-Based Shop	3,277,781	4,030,835	4,030,347	-0.012%
Home-Based Social/Recreation	1,302,011	1,607,989	1,605,594	-0.149%
Non-Home-Based	3,610,424	4,738,388	4,737,488	0.019%
Internal-External	458,523	913,203	913,203	0%
Truck				
Small Truck	192,446	264,732	264,732	0%
Medium Trucks	18,633	25,580	25,580	0%
Large Trucks	40,851	56,647	56,647	0%
TOTAL	**12,607,967**	**16,740,507**	**16,730,045**	**-0.062%**

Source: Cambridge Systematics (2002)

Table 3.12.10
Total Ridership in Non-Ferry Transit under the Proposed Project

Transit Mode	2025 No Project Riders	2025 Proposed Project Riders	Percent Change from No Project
Bus	1,728,641	1,719,018	-0.6%
Light Rail (Muni, SCVTA)	240,818	240,041	-0.3%
BART	890,084	885,524	-0.5%
Commuter Rail (Caltrain, ACE, Amtrak)	133,896	136,613	2.0%

Source: Cambridge Systematics (2002)

Table 3.12.11
2025 Daily Vehicle Trips (Auto Modes Only) Across a Screenline

Screenline	2025 No Project	2025 Proposed Project	Difference from No Project	Percent Change from Total
Bay Bridge	383,245	379,009	-4,236	-1.1
Golden Gate	143,510	141,493	-2,017	-1.4
SF/SM County line	327,759	325,264	-2,496	-0.8
San Mateo Bridge	137,838	137,547	-291	-0.2
Dumbarton Bridge	133,989	133,971	-18	0.0
Richmond-San Rafael Bridge	79,000	79,000	0	0.0
Carquinez/Benecia Bridges	157,000	157,000	0	0.0
TOTAL	**1,362,348**	**1,353,290**	**-9,058**	**-0.7%**

Source: Cambridge Systematics (2002)

Table 3.12.12
Daily Ridership According To Access Mode to Terminals by Ferry Corridor for the Proposed Project

Corridor	Ferry Route	Walk Access	Drive Access	Transit Access
Solano	Vallejo - San Francisco	257	3,805	349
Contra Costa	Pittsburg/Antioch – Martinez - San Francisco	24	1,995	19
Contra Costa	Hercules/Rodeo - San Francisco	172	619	142
Contra Costa	Richmond - San Francisco	219	1,435	126
Alameda	Berkeley – San Francisco - Mission Bay	24	1,789	544
Alameda	Oakland – San Francisco	107	1,695	525
Alameda	Harbor Bay - San Francisco	314	345	20
Alameda	Alameda – San Francisco	410	746	549
Marin	Sausalito - San Francisco	2,520	2,201	397
Marin	Tiburon - San Francisco	1,288	988	373
Marin	Larkspur - San Francisco	693	4,888	995
San Mateo	Oyster Point (South San Francisco) - San Francisco	128	2,159	209
San Mateo	Redwood City - San Francisco	76	1,286	58
Treasure Island	San Francisco - Treasure Island	1,074	0	1,411
TOTAL		**7,306**	**23,951**	**5,717**

Source: Cambridge Systematics (2002)

Table 3.12.13
Potential Parking Availability and Parking Demand for the Proposed Project

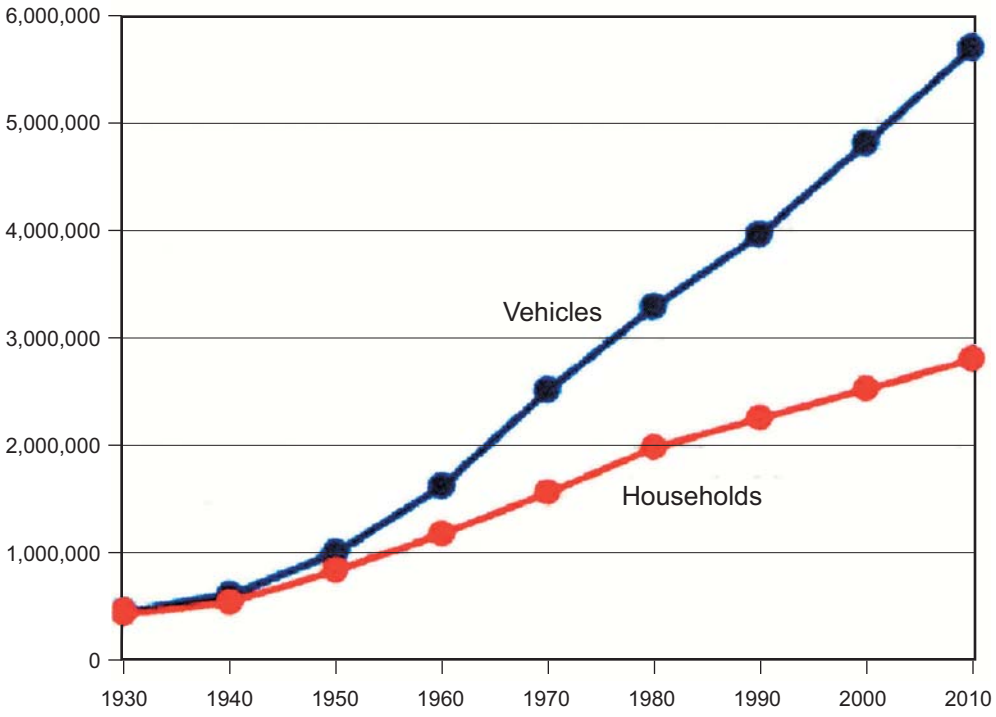
Corridor	Route	Potential Available Parking	Proposed Project Parking Demand
Transbay	Vallejo - San Francisco	1,600	1,084
	Pittsburg /Antioch – Martinez - San Francisco	300	568
	Hercules/Rodeo - San Francisco	500	176
	Berkeley – San Francisco – Mission Bay	1,000	510
	Alameda - San Francisco	1,000	263
	Richmond - San Francisco	1,000	409
	Jack London Square (Oakland) - San Francisco	500	509
	Harbor Bay - San Francisco	400	122
	Subtotal Transbay Corridor	***6,300***	***3,641***
Golden Gate	Sausalito - San Francisco	100	259
	Tiburon - San Francisco	100	143
	Larkspur - San Francisco	2,000	1,438
	Subtotal Golden Gate Corridor	***2,200***	***1,840***
Peninsula	Oyster Point (South San Francisco) - San Francisco	600	615
	Redwood City - San Francisco	500	366
	Subtotal Peninsula Corridor	***1,100***	***981***

Source: Cambridge Systematics (2002)



URS	Water Transity Authority Program EIR Project No. 28066519	REGIONAL TRANSIT SYSTEMS	Figure 3.12.1

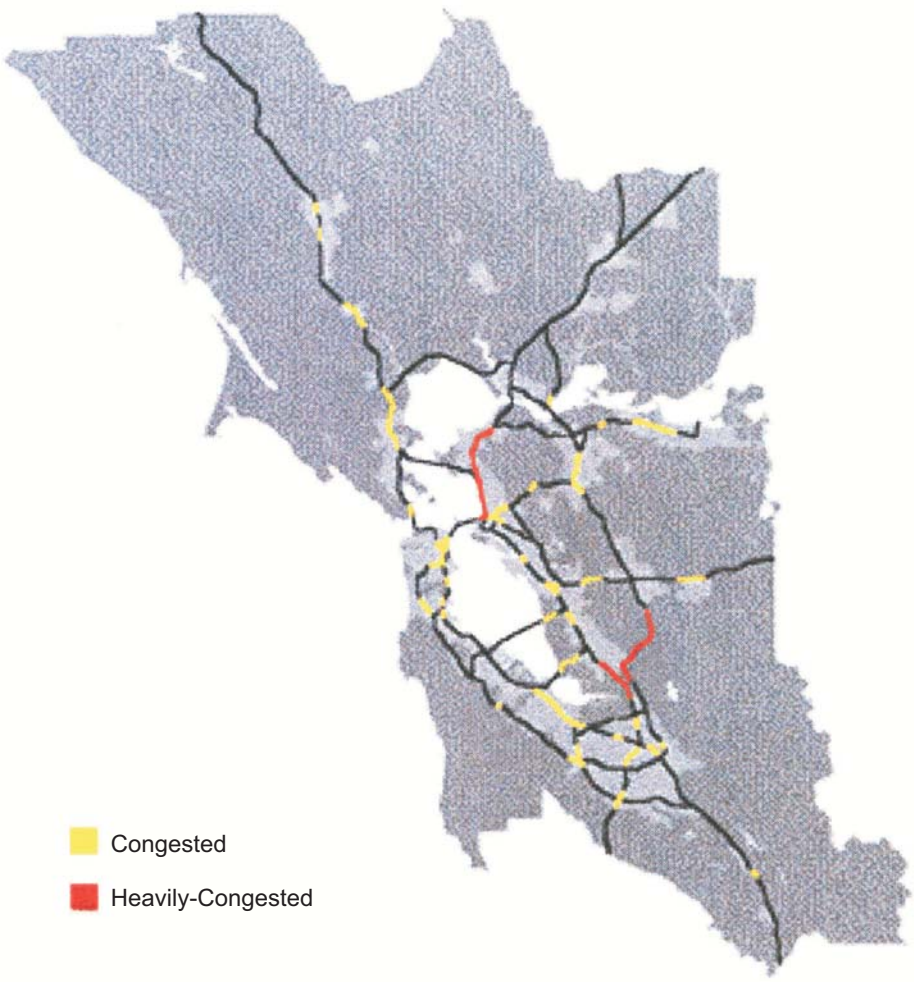
28066519.00200/051503/gos



Source: www.abag.ca.gov

URS	Water Transity Authority Program EIR Project No. 28066519	SAN FRANCISCO BAY AREA VEHICLE OWNERSHIP 1930-2010	Figure 3.12.2

28066519.00200/051503/gos



Source: www.abag.ca.gov

URS	Water Transity Authority Program EIR Project No. 28066519	LOCATIONS OF FREEWAY CONGESTION	Figure 3.12.3

28066519.00200/051503/gos

3.13 ENERGY

This section discusses energy consumption and addresses the issue of potential for wasteful, inefficient, or unnecessary use of energy from implementation of the Proposed Project.

3.13.1 Environmental Setting

3.13.1.1 National Setting

In the year 2000, transportation activity accounted for 27 percent of the total energy consumed in the US. Between 1990 and 2000, energy use for transportation increased 1.7 percent annually. Petroleum was the source of 96.4 percent of the energy for transportation in 2000. This accounts for the majority of petroleum used in the United States (USDE 2001). In 1999, automobiles accounted for 9,126 trillion British thermal units (Btu)[1], personal trucks accounted for 4,702 trillion Btu, buses 207 trillion Btu, aviation passenger transportation 2,176 trillion Btu, and rail passenger transportation 78 trillion Btu (ORNL 2001). For public transit in 1999, diesel buses accounted for 72.2 percent, diesel commuter rail 8.52 percent, and ferries 3.35 percent of the total fossil fuel (petroleum, gas, and coal) consumed by this transit sector (APTA 2002).

3.13.1.2 California and Bay Area Setting

In California, the vast majority of energy consumed originates from fossil fuel sources. Approximately 60 percent of the state's energy is derived from petroleum, while 27 percent is from natural gas; 10 percent from hydroelectric, geothermal, nuclear, and other sources; and 3 percent from coal. Consumption of petroleum for transportation is the primary use of fossil fuel energy in the state. Of all energy consumed, 48 percent is used for transportation, 31 percent for industrial use, 12 percent for residential use, and 9 percent for commercial use (CEC 1993).

In 1998, the Bay Area accounted for the consumption of 22.98 percent of the state's total gasoline motor fuel (CEC 1999a). Electricity and natural gas are the other two major forms of energy consumed for transportation. Table 3.13.1 presents an estimate of the 2000 transportation energy consumption in California and the Bay Area.

In the Bay Area, as in most other places in the United States, automobiles and commercial vehicles (composed of small, medium, and large trucks) are the largest energy consumers in the transportation sector. Automobiles and commercial vehicles are generally fueled by diesel or gasoline. Other transit modes in the Bay Area include ferries, buses, light rail (San Francisco MUNI and SCVTA rail cars), BART, and commuter rail (Caltrain, Amtrak, and ACE). These transit modes consume gasoline, diesel, and electricity.

[1] A common unit of energy used when discussing transportation energy is the British thermal unit (Btu). This is the unit of energy used in this report. A Btu is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at sea level. Other common units of energy are kilowatt-hours (kWh), therms, and gallons.

Energy Used By Ferries

Energy consumption by ferries in the Bay Area varies, because several different ferry vessel models are used. For example, three different types of ferries run the existing route between San Francisco and Larkspur:

- One monohull, built in 1976, with a capacity for 725 passengers, powered by two 1216 kilowatt (kW) engines;
- A catamaran, built in 1998, with a 325-passenger capacity, powered by four 1194 kW engines; and
- A catamaran, built in 2001, with a 408-passenger capacity, powered by four 1193 kW engines (JJMA 2002).

The two catamarans perform a one-way crossing in 30 minutes, and the monohull does the same crossing in 45 to 50 minutes (GGF 2002). In terms of energy consumption (energy per run and energy per passenger miles traveled [PMT])[2], the two newer catamarans require more energy for a single run than the older monohull vessel, assuming the vessels are running under full passenger capacity. Table 3.13.2 lists the energy consumption for these three ferry vessels.

In terms of ferry usage in the Bay Area, it is evident that the trend in the past 25 years is for the ferries to achieve greater speeds and passenger service. For example, ferry service between Larkspur and San Francisco is now 33-40 percent faster than with the older monohull design. However, as shown in Table 3.13.2, the increase in speed is at a cost of greater energy use.

3.13.1.3 Regulatory Setting

Regulations for transportation energy consumption are generally directed toward fuel efficiency of motor vehicles. The federal Energy Policy and Conservation Act of 1992 established fuel economy standards for on-road vehicles in the United States. This law places responsibility to the National Highway Traffic and Safety Administration (a part of the U.S. Department of Transportation) for establishing vehicle standards and for revising existing standards. The U.S. Environmental Protection Agency (USEPA) administrates the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards. The "California Greenhouse Bill" (AB 1493) signed into law in July 2002 is intended to reduce production of "greenhouse gases," and its implementation may also result in use of more energy-efficient vehicles. There are no federal or state requirements for energy efficiency of vessels.

The California Environmental Quality Act (CEQA) requires that a discussion of the potential energy impacts of a proposed project be addressed, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

[2] When discussing energy consumption by mass transit, it is appropriate to analyze energy expenditures by the proportion of energy consumed and the estimated number of passengers traveling by a specific form of transit. Though mass transit vehicles use more energy per mile traveled than many automobiles, energy consumption often may be less when considering the average energy consumed per passenger mile traveled (PMT). For example, in the U.S. in 1999, personal automobiles used 5,815 Btu/VMT and averaged 3,635 Btu/PMT, while the transit rail system used 69,746 Btu/VMT and averaged 3,075 Btu/PMT (ORNL 2001) Therefore, nationally, rail systems were more energy efficient than personal automobiles when factoring in energy consumed per passenger PMT.

3.13.2 Impacts and Mitigation

3.13.2.1 Significance Criteria

According to Appendix F of the CEQA Guidelines, environmental impacts may include "the project's projected transportation energy use requirements and its overall use of efficient transportation alternative". For the purposes of this analysis, an impact would be considered significant if the Proposed Project would result in:

- A substantial increase in overall energy consumption per passenger miles traveled; or
- A wasteful, inefficient, or unnecessary consumption of energy.

3.13.2.2 Method of Analysis

This energy analysis addresses the changes in energy consumption in the transportation sector in the nine-county Bay Area for the year 2025 between the Proposed Project and the No Project Alternative. Forecasted energy consumption per passenger mile traveled (PMT)[3] was calculated for automobiles, trucks, public buses, transit rail vehicles, and ferries. Ferry energy consumption was calculated using the projected schedule of routes, types of ferries to be used, and passenger volumes. Energy calculations for all other transportation modes were calculated using vehicle miles traveled (VMT) and passenger volume forecasts based on the transportation modeling performed for this project (Cambridge Systematics 2002; Outwater 2002).

For this analysis, consumption of energy by ferry vessels was estimated based on engine power output. Engine power output is generally referred to in kilowatts (kW). Power is converted to energy, in the unit of kilowatt-hours (kW-hrs), by applying a factor of engine running time. The energy unit of kW-hrs can directly be converted to a British thermal unit (Btu)[4] value.

For the No Project Alternative, average power outputs were assumed for each route, based on the current ferries in use on these routes[5]. Characteristics of the current ferries are available in the working document, *New Technologies and Alternative Fuels*, prepared for the WTA by JJMA (JJMA 2002). For the Proposed Project, two ferry fleets were assumed, which is consistent with the Implementation and Operation Plan (IOP). One fleet would consist of 350-passenger ferries with a maximum power output of 8,000 horsepower (5,966 kW). The other fleet would have 149-passenger ferries with a maximum power output of 2,900 horsepower 2,163 kW (Hutchison 2002). Daily energy consumption per PMT was calculated by dividing the average daily energy

[3] When discussing energy consumption by mass transit, it is appropriate to analyze energy expenditures by the proportion of energy consumed and the estimated number of passengers traveling by a specific form of transit. Though mass transit vehicles use more energy per mile traveled than many automobiles, energy consumption often may be less when considering the average energy consumed per passenger mile traveled (PMT). For example, in the U.S. in 1999, personal automobiles used 5,815 Btu/VMT and averaged 3,635 Btu/PMT, while the transit rail system used 69,746 Btu/VMT and averaged 3,075 Btu/PMT (ORNL 2001) Therefore, nationally, rail systems were more energy-efficient than personal automobiles when factoring in energy consumed per passenger PMT.

[4] A common unit of energy used when discussing transportation energy is the British thermal unit (Btu). A Btu is the quantity of heat required to raise the temperature of 1 pound of water 1 degree Fahrenheit at sea level. Other common units of energy are kilowatt-hours (kWh), therms, and gallons.

[5] For the Larkspur ferry route, only the newer catamaran vessels used on this route were assumed to be used for the No Project Alternative. The monohull boats used on this route were constructed in the 1970s and will be taken out of commission by 2025.

consumption by the average daily PMT.

3.13.2.3 Impacts and Mitigation

The following section addresses energy consumption for all transit modes in the Bay Area for the Proposed Project and the No Project Alternative.

Impact E-1 **The Proposed Project could result in more transportation-related energy consumed.**

Compared to the No Project Alternative, the Proposed Project would result in an increase in total daily energy consumption and energy consumption per PMT for all transit modes in the Bay Area. This increase is summarized below.

Alternative	Total Energy Consumption all Transit Modes (Btu)	Percent Increase in Energy Over No Project Alternative	Energy/PMT (Btu/PMT)	Percent Increase in Energy/PMT over No Project Alternative
Proposed Project	1,205,158,328,459	0.09	4,360	0.41
No Project Alternative	1,204,064,104,267	NA	4,342	NA

Automobile usage primarily determines the totals for energy consumption and energy consumption per PMT values. For the two analyzed alternatives, automobiles are predicted to use approximately 92 percent of the total energy consumed by the transportation sector in 2025, and 75 percent of the total PMT. Ferries would consume between 0.22 percent and 0.05 percent of the total energy consumed by the transportation sector and between 0.15 percent and 0.09 percent of the total PMT for the Proposed Project and the No Project Alternative, respectively. Although there is an increase in energy use, it is not a substantial increase regionally, as shown above.

Additional passengers using the planned service routes can increase passenger miles traveled without requiring additional vessels, which would increase the passenger mile traveled measure of efficiency discussed in this impact. As routes and service are implemented, project proponents will make adjustments in service that will have the effect of improving the efficiency of the system, both from energy consumption and cost effectiveness criteria.

Summary of Impact E-1

The Proposed Project would result in a 0.41 percent increase over the No Project Alternative in energy consumption per passenger mile traveled for all transit modes in the Bay Area. This would be a less than significant impact.

Impact E-2 **The Proposed Project could result in higher energy per passenger miles traveled value than other transit modes.**

The design and purpose of the Proposed Project is to have ferry service in the Bay Area increase and improve transportation mobility, service, and choice; provide a service to regional commuters; and provide an additional mode of regional transit in the Bay Area. As discussed in

other sections of this document, the Proposed Project would achieve these goals. In terms of energy consumption, ferries, under the Proposed Project, would have higher energy consumption compared to the other modes of mass transit in the Bay Area, as shown in Table 3.13.3. Part of this higher value of energy consumption is due to the energy efficiency for each mode of transit, passenger capacity of the individual transit vehicles, and the service area of the transit vehicles.

Summary of Impact E-2

- The Proposed Project would result in a higher energy per passenger miles traveled value than other transit modes. This higher energy consumption ratio occurs as a result of the WTA meeting its design and purpose as an effective transportation alternative in terms of service and routes. The difference in energy consumption per passenger mile traveled between ferries and automobiles is greater for ferries but not significantly different (Table 3.13.3). The difference between ferries and other modes is more substantial, and therefore this impact is considered potentially significant.

Mitigation E-2.1: The WTA is planning to continue investigating the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. One promising technology is the use of fuel cells. The WTA has investigated the use of alternative fuels for ferries in: *New Technologies and Alternative Fuels Working Document* (JJMA 2002). Alternative energy sources and engine technologies will become available and will be incorporated as they become feasible and cost-effective.

Impact After Mitigation: This impact could be less than significant with implementation of Mitigation E-2.1. However, the effectiveness of the mitigations cannot be quantified at this time. Therefore, this impact remains potentially significant.

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Table 3.13.1

Transportation Energy Use in California and the Bay Area (2000)

Fuel Type	Units	State	Bay Area	Bay Area % of Statewide Demand
Gasoline/ Diesel	Million gallons	14,378	3,159	22%
Electricity	Million kW-hr	505	416	82%
Natural Gas	Million therms	34	5	15%

Source: Caltrans 2000; CEC 1999b; MTC 2001.

Table 3.13.2

Comparison of Energy Usages of Three Ferries Currently in Use on San Francisco Bay

Boat	Time for Run (minutes)	Energy per Run (Btu/run)	Passenger Miles Traveled per Run (miles)	Energy/PMT (Btu/PMT)
1976 Monohull	45-50	6.225×10^6 6.918×10^6	9207.5	676.1-751.4
1998 Catamaran	30	8.150×10^6	4127.5	1975
2001 Catamaran	30	8.143×10^6	5181.6	1572

Source: JJMA 2002
Note: Assumes ferries are running under maximum capacity

Table 3.13.3
Comparison of Passenger Data for Mass Transit Modes

	Transit Mode	Passengers/Run	Energy/PMT (Btu/PMT)	Total PMT
Proposed Project	Automobile	1.17	5,321	207,919,595
	Buses	56	660	18,083,990
	Light Rail	110	91	2,125,739
	BART	1,056	68	33,151,135
	Commuter Rail	971	102	8,263,795
	Ferries	67	6,297	415,612

Sources: JJMA 2002; Outwater 2002; Cambridge Systematics 2002

4.1 GROWTH INDUCEMENT

The San Francisco Bay Area is attractive not only for its geographic setting, but also for its relatively strong and diverse economy. The Association of Bay Area Governments (ABAG) estimates that the population of the nine-county region will increase by 1.4 million people in the next 25 years, from approximately 6.8 million in the year 2000 to 8.2 million in the year 2025. During the same time period, 252,800 acres would be available for development (residential and commercial/industrial), which is about 5.7 percent of the region's total area. This population growth rate is not as dramatic as in the late 1990s and early 2000s (ABAG 2001).

According to the General Plans of the nine counties, seven will experience housing shortages over the next 25 years. Those shortages will range from 5,450 housing units in Alameda County to 26,480 housing units in Santa Clara County in the year 2025. The average number of persons per household is expected to remain at approximately 2.7 for the Bay Area as a whole. The mean household income for the Bay Area is expected to rise from $93,800 in the year 2000 to $116,400 by the year 2025 (ABAG 2001).

The housing crisis in the Bay Area is negatively affecting the regional transportation system because the centers of population growth (i.e., where people are living or moving to) are not located where most employment opportunities are. Between the years 2000 and 2025, the projected increase in jobs will exceed the number of employed residents by approximately 149,000 people (ABAG 2001). This trend is expected to continue because Bay Area cities and counties seek to maximize job production without commensurate emphasis on housing production (ABAG 2001).

Impact GRO-1 **The Proposed Project would expand ferry service at existing terminals and add new ferry terminals primarily at developed waterfront areas. This could be growth inducing for areas near the terminals.**

The Proposed Project includes expansion of service at existing terminal locations and at new sites selected because they have attributes and public support that indicate that ferry service will be successful in terms of ridership and cost effectiveness. All of the new terminal locations, with the exception of Hercules/Rodeo, would serve areas that are already generally developed with maritime or urban uses. The Hercules/Rodeo site is forecast (in their General Plan) for urban uses.

Growth can be considered negative or positive, depending on the objectives of the local government and the community. Local governments have the responsibility to make land use decisions. Potential growth inducement impacts should be considered by planning staffs at the local level to ensure that specific projects do not induce unplanned or unwanted growth. For these reasons, the Proposed Project is not anticipated to have a significant effect on unplanned growth. However, until site specific analyses are performed, this impact remains potentially significant.

Public Services

With the exception of Hercules/Rodeo, all of the ferry terminals in the Proposed Project are in built-up areas. Therefore, the Proposed Project would minimize impacts to open space resources and limit the expansion of the urban environment. However, redevelopment of an urban area can

carry its own set of environmental impacts, such as creating a demand for additional public services and infrastructure, causing the displacement of people or businesses, or physically dividing a community or neighborhood. For discussions of community impacts related to the displacement of people or businesses and the division of community, refer to Impacts LU-1 and LU-2 in Section 3.7 (Land Use).

A new ferry terminal or expansion of an existing terminal in an urban area could have an adverse effect on local public services such as police, fire, sewer, and water if the demand is great enough to require the expansion of those services. Likewise, the increase of ferries on the Bay could result in impacts to regional public services provided by the U.S. Coast Guard (USCG) (see Navigation Section 3.2 for a discussion on impacts to USCG operations). Typically, all public services are designed to provide adequate services for the growth planned in the local general plan or management plan. However, the exact size and nature of future planned development is not always known, so the capacity of public services is often determined by the maximum development allowed by the local zoning ordinance. Therefore, although many of the proposed ferry terminal locations are not identified in local planning documents, new terminals may not adversely impact public services.

Each terminal location would have a different set of potential impacts on the existing public services and infrastructure of a city or county, depending on the current capacity of local sewer and water infrastructure and the capabilities of the existing public safety workforce. Therefore, it is important that each potential ferry terminal site be considered in light of the local conditions. This is especially true of ferry terminals that are being considered by local agencies as part of a larger project to provide amenities adjacent to the terminal, such as retail or commercial centers (see Cumulative Growth Inducement Impacts, below, for more discussion on adjacent land uses).

Population/Employment

Implementation of the Proposed Project could increase demand for public services, housing, and other services. Specifically, people may move into the areas due to a perceived increase in the regional quality of life or job opportunities afforded by the proposed increase in ferry services. However, a population increase as a result of either of these would not likely be significant relative to the number of people projected to move to the Bay Area in the next 25 years overall (see Section 3.7.1.1). People moving into communities from outside the Bay Area to improve their quality of life would be attracted by the availability of affordable housing, and the climate, and not just by improved ferry service.

New jobs created by the project would create new employment opportunities in the ferry industry. However, the existing ferry operators are not significant employers in the context of overall Bay Area employment, or even when considered within a single community where a terminal might be located. New positions would include additional ferry operators, and on-board and landside support for operation, passenger assistance, ticketing, maintenance, etc. However, while the actual number of employment positions is unknown, it is reasonable to assume that most if not all of the positions would be filled by people currently residing in the Bay Area. Furthermore, job opportunities that are created as a result of the project would occur incrementally, which would make any inmigration to the Bay Area as a result of increased jobs in the ferry industry insignificant. Therefore, the potential impacts due to creating employment opportunities are anticipated to be less than significant.

Cumulative Growth Inducement Impacts

Cumulative growth inducement impacts would involve the implementation of other projects adjacent to ferry terminals that are not associated with the proposed WTA initiative. Cumulative growth inducement impacts due to unplanned development may occur in communities where ferry terminals are proposed because: (1) terminals function as transportation hubs where transit riders congregate, creating a potential real estate market; or (2) ferry service would increase accessibility to communities.

As a transportation nexus, a ferry terminal attracts people using a variety of transportation modes, including private cars, buses, bicycles, walking, and potentially rail. The placement of a new terminal facility or enhancement of an existing terminal could change the local transportation patterns in a community, resulting in a potentially significant impact. Furthermore, ferry terminals could also become destinations for tourists or Bay Area residents, given their accessibility and locations along the shoreline. This concentration of transit users as well as destination-seekers represents a potential market for real estate development or redevelopment that could result in a potentially significant impact on the existing community.

Changes at the local level as a result of providing new or enhanced ferry service could also occur by making local communities more accessible. The benefits of ferry service may be perceived by many as an improvement to their current quality of life, making these communities attractive for commuters to live in. This effect is primarily of concern at terminal locations in relatively undeveloped or less accessible areas (Hercules/Rodeo). Increased accessibility to the relatively urban and suburban communities that would be served by the Proposed Project is expected to benefit the people currently living there.

As discussed above, it is important that each potential ferry terminal site be considered in light of the local conditions and the potential for additional growth to occur. Without proper planning, cumulative growth associated with the Proposed Project and other currently unplanned development could lead to potentially significant impacts on communities, public services, or open space resources, depending on the location.

Summary of Impact GRO-1

- With the exception of Hercules/Rodeo, all of the ferry terminals in the Proposed Project are in developed areas. The Proposed Project is not expected to result in significant growth inducing impacts. However, until site specific analyses are performed, this impact is considered potentially significant.

Mitigation GRO-1.1: Implement Mitigation LU-1.1.

Impact After Mitigation: Impact GRO-1 would be less than significant after implementation of Mitigation GRO-1.1.

4.2 SIGNIFICANT IRREVERSIBLE CHANGES

Significant irreversible changes are considered to involve the use of nonrenewable resources, which from implementation of the Proposed Project could create an irreversible commitment of resources or do irreversible damage to the environment. These impacts fall within three categories:

- The irretrievable commitment of resources, such as energy and construction materials, expended from the expansion of ferry service;
- The irreversible loss of resources due to a direct or indirect impact; or
- An increase in the use of natural resources due to growth.

4.2.1 Irretrievable Commitment of Resources

Natural resources such as fossil fuel energy would be used for the construction of new or expanded facilities as well as for the operation of an expanded fleet of vessels. This EIR evaluates the use of energy for the Proposed Project, based on the use of diesel fuel. It also identifies and evaluates possible alternative means of minimizing the use of this fuel. However, as noted in Section 3.13 (Energy) the Proposed Project would result in a 0.42 percent increase over the No Project Alternative in energy consumption per passenger mile traveled for all transit modes in the Bay Area. The WTA has investigated the feasibility and application of alternative propulsion systems and fuel that can be considered as ferry transit service is expanded.

Construction of new or expanded facilities would require natural resources such as gravel, sand, asphalt, etc. These materials are generally not retrievable, but they are generally not in limited supply.

4.2.2 Loss of Resources from Direct or Indirect Impacts

The implementation of the Proposed Project may lead to adverse impacts on natural resources. The potential for these impacts is addressed in each of the appropriate sections in this EIR. It is not envisioned that new terminal sites or other facilities that would have substantial impacts to areas such as sensitive habitat, aquatic, or community resources would advance very far in the planning process. Specific projects that go forward for consideration will undergo additional site specific environmental review, and avoidance and/or other mitigation measures will have to be applied.

4.2.3 Increase in the Use of Resources from Growth

The potential for growth inducement was addressed earlier in this section. The implementation of the Proposed Project would affect shifts in commuting patterns, but growth changes are not expected on a regional scale. If growth occurred, it would likely be limited to localized areas around some potential terminals. Although some changes in the regional use of natural resources could take place, they are not expected to be significant.

4.3 CUMULATIVE IMPACTS

CEQA requires analysis of cumulative impacts of the Proposed Project and other projects that are planned and that could produce related cumulative impacts. The Proposed Project is treated as a program, and therefore the impact analyses evaluate the whole of the action. This allows for consideration of cumulative project impacts for each subject area. Cumulative impacts could potentially occur regionally or locally. Local cumulative impacts cannot be evaluated in a program EIR as the analyses are not site specific. Site specific analyses of cumulative impacts

(such as site specific traffic impacts, noise, light/glare, etc.) may be required when specific locations and routes are determined.

Regionally, cumulative impacts are included in the analyses for several potential impact areas:

- Section 3.1 describes dredge management for the entire San Francisco Bay area, including existing dredge and disposal activities, current dredging projects, and the LTMS program for dredge management in future years. This includes estimates from the LTMS (USACE 1998) for future baywide (cumulative) dredging volumes. The LTMS program was used as a basis for comparison in the impact assessment, to provide an understanding of the quantity of dredge volumes against the anticipated regional quantities. The WTA Proposed Project would not affect achievement of the LTMS goals.
- The navigation analysis (Section 3.2) includes projected increases in other vessel traffic on the Bay. Cumulative growth in regional vessel traffic was estimated using two extreme scenarios, one low and one high, to which the proposed ferry transits were added. These cumulative scenarios were then used to evaluate the increase in potential ferry interactions between ferries, and between non-ferry vessels.
- The air quality analysis includes projections of Bay Area-wide emissions for cars, busses, and ferries for the pollutants NO_x, PM_{10}, CO, SO_2, and ROG. The total estimated Proposed Project emissions were then compared against the no project alternative, providing an indication of how the cumulative regional pollutant emission "burden" changes with and without the Proposed Project.
- The transportation analysis includes transit forecasts from the Regional Transportation Plan (MTC 2001) and projections from ABAG.
- The energy analysis is based on the same region-wide travel forecasts used for the air quality assessment, and evaluated in terms of energy consumption per passenger mile traveled (PMT) for vehicles and vessels. The total emissions for the Proposed Project were also compared against the No Project Alternative, to show the change in cumulative regional transportation energy consumption with and without the Proposed Project in place.

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As described in Section 2.1, the WTA completed and circulated a Draft EIR (DEIR) in August 2002 for review and comments. The DEIR evaluated three project alternatives for expanding ferry service in the Bay Area as well as a fourth alternative representing the No Project Alternative. The alternatives were analyzed at the same level of detail in the initial DEIR. Each consisted of a set of ferry transit routes and terminals. Together, the alternatives represent a broad range of investment in water transit service expansion. The initial DEIR did not contain a Proposed Project or Preferred Alternative. The alternatives are described in detail in Section 2.2.2.

The Draft Implementation and Operations Plan (IOP) was also circulated for review, describing expansion of service and the additional new routes. Based partially on the technical information included in the environmental document, the Draft IOP made recommendations for phased implementation. All of the routes and terminals identified in the IOP were included as elements of the various alternatives evaluated in the DEIR.

Partly as a result of public comment and review, the Program DEIR was revised to specifically address the expansion of existing service and the new routes as described in the IOP. This recirculated EIR investigated the potential environmental impacts associated with implementation of the IOP. This Revised DEIR was circulated in April 2003. It addressed only the Proposed Project as described in the IOP. The background and analysis for the Proposed Alternative are presented in Section 3.0.

The following sections present the analysis of three ferry alternatives (Alternatives 1 through 3) and the No Project Alternative (Alternative 4) that were presented in the DEIR, but are not being considered for implementation. While public comments were considered and changes have been made to much of the text in Section 3.0, the analyses presented in this section have not been substantially changed from those presented in the DEIR. These analyses are presented here for completeness.

5.1 DREDGING

5.1.1 Dredging Significance Criteria

Impacts would be considered significant if they would:

- Hinder achievement of the Long Term Management Strategy (LTMS) goals for allocation of dredged materials to in-Bay, ocean, and upland reuse sites;
- Result in a substantial adverse impact on water quality;
- Affect threatened, endangered, or protected species in a manner that results in a take under the Endangered Species Act; or
- Result in the reduction of protected wetland habitat as defined in Section 404 of the Clean Water Act or result in alteration of desirable functions and values established in applicable regulations through direct removal, filling, hydrological interruption, or other means.

Potential impacts to habitats due to dredging are addressed in Biology Section 3.5.2, specifically in Biology Impacts B-1 through B-3.

5.1.2 Impacts

Construction and Operation (Maintenance Dredging)

Impact D-1 **Dredging of new channels and maintenance dredging, which would be conducted on a periodic basis in shallow areas, would add to the total annual volume of dredged materials in San Francisco Bay. The increase in dredged volume could hinder achievement of LTMS goals for allocation of dredged materials to in-Bay disposal, ocean disposal, and upland reuse sites.**

Dredging in San Francisco Bay includes dredging for new projects and maintenance dredging for existing navigational channels. The U.S. Army Corps of Engineers (USACE) San Francisco District conducts most of the dredging in the Bay. The long-term dredging and disposal need for the Bay Area is estimated as approximately 300 million cubic yards (mcy) over a 50-year period, or an average of 6 mcy per year (USACE 1998). This is a conservatively high estimate based on historic dredge volumes as well as on proposed projects foreseen during the period of LTMS EIR/EIS preparation. Some of the new projects included in the estimates, such as a round-the-bay channel, have since been eliminated from consideration. There is great variability in dredge volume from year to year, depending on new projects as well as the level of dredging maintenance required, which appears to have declined in recent years. In 2001, for example, total dredging and disposal in the Bay Area was only 2.0 mcy according to USACE data (Dwinell 2002).

The goals of the LTMS include a reduction of in-Bay disposal volumes and increased emphasis on beneficial reuse of dredged material. The most likely beneficial reuses are wetland restoration and levee maintenance and repair. The long-term goal is to reduce disposal at in-Bay sites from approximately 50 percent of recent dredged volumes to approximately 20 percent by

the year 2013. Volume targets have been established for each in-Bay disposal site, based on sediment-dispersive dynamics and historical information. A transition schedule with overall volume targets for in-Bay disposal has been established, as shown on Table 3.1.3. In addition to the target volumes, the LTMS contemplates a contingency volume of 0.25 mcy per year, which would be allowed for emergency situations or for years when sedimentation or other factors result in unanticipated volumes of deposited sediment to be dredged. The remainder of dredged material generated each year should be disposed of at the San Francisco Deep Ocean Disposal Site (SF-DODS) or at any of the existing or potential beneficial reuse and upland sites (Figure 3.1.2).

Figure 5.1.1 presents a Geographic Information System (GIS) map of San Francisco Bay showing the bathymetry and the potential WTA ferry routes and channels that would potentially require dredging. To calculate the potential dredging volumes, three-dimensional segments were delineated on the GIS map for each channel that could require dredging. These segments were defined to allow safe passage of ferries; with a buffer zone 300 feet wide (150 feet to each side of the center line to enable two vessels to pass with sufficient separation) and depth of 7 feet, which is conservative for ferry navigation (i.e., 5 feet maximum navigational draft and 2 feet of required keel clearance). Layer depth to be dredged was derived from bathymetric data.[1]

Potential dredging volumes associated with access to individual ferry terminals were calculated for Alternatives 1 and 2 and are presented in Tables 5.1.1 and 5.1.2, respectively. Alternatives 3 and 4 would not require dredging of new ferry channels as new routes are not proposed for those alternatives. The potential dredging requirements for construction (approach channels for new terminals) are 5.05 mcy for Alternative 1 and 4.70 mcy for Alternative 2. These totals reflect the estimated increase in dredging volumes to create new navigational channels for those alternatives.[2]

Potential construction dredging volumes are considerable when compared to current dredging activities in the Bay. The potential dredge volume for construction of Alternatives 1 and 2 exceeds the total average volume dredged for annual maintenance of USACE channels in the Bay (4.5 mcy). Construction dredging, however, would not occur all at one time. Table 5.1.3 presents the average annual dredging volumes when construction activities are spread over 3-, 5-, or 10-year periods. Actual annual volumes would depend on which new channels were dredged in any given year. In addition to construction dredging, channels would also require maintenance dredging. Although the long-term dredging maintenance requirements cannot be determined without location-specific sedimentation rates and hydrodynamic conditions, they would not exceed the construction dredging volumes, and they would likely recur on 3- to 5-year periods, as is the case for other channels in the Bay. Therefore, the dredging volumes presented

[1] The GIS map was developed using National Oceanographic and Atmospheric Administration (NOAA) National Ocean Service Bathymetric Digital Elevation Models (DEM) that were generated from original point soundings collected during hydrographic surveys conducted by the National Ocean Service and its predecessors. Mean High Water shoreline as defined by NOAA nautical charts was used as a constraining boundary and assigned its local elevation relative to the local datum (typically Mean Low Water) (NOAA-National Ocean Service 1998). Bathymetric data for the John Black Slough was not available from the DEM. Instead, an approximation of average depth within the slough was derived from 1997 and 1998 surveys of San Francisco Bay (National Geophysical Data Center, no date).

[2] In some cases, such as for Harbor Bay where a ferry channel currently exists, some dredging may be required to create the 300-foot-wide and 7-foot-deep channel applied to all terminals in this analysis.

in Table 5.1.3 also represent the maximum potential annual maintenance dredging requirements associated with Alternatives 1 and 2.

As indicated in Table 5.1.3, channel maintenance dredging for Alternative 1 could lead to a maximum increase of 37 percent over average annual USACE maintenance channel dredging. This potential dredging volume would represent 28 percent of the Bay Area's long-term annual dredging requirements of 6.0 mcy estimated by the LTMS. Under Alternative 2, maintenance dredging could potentially lead to a maximum increase of 35 percent over average annual USACE channel maintenance volumes. This volume would represent 26 percent of the estimated LTMS long-term average annual dredging and disposal needs. Should longer maintenance cycles be appropriate, annual dredging volumes would decrease.

Expansion of water transit was not considered as part of the long-term dredging and disposal needs estimate for the LTMS. Given the facts that the LTMS estimate of 6.0 mcy is conservatively high and it includes dredged volumes for projects that will not happen, such as proposed tourism navigation channel ring around the Bay, volumes generated by the WTA ferry expansion may not result in the average annual estimate being significantly exceeded in the long-term. However, the LTMS dictates that only 20 percent of the dredged materials annual volume may be disposed of at in-Bay disposal sites by the year 2013. In-Bay sites are generally reserved for disposal of USACE maintenance dredging materials. Therefore, during project implementation, the WTA would have to ensure that new ferry channel dredged materials could be accommodated in any given year at either the ocean disposal site or at beneficial reuse sites while observing annual and/or total capacity restrictions at those sites.

Summary of Impact D-1

- Alternatives 1 and 2 involve expansion of ferry service to new terminals. If all routes considered in those alternatives were implemented, considerable channel dredging would be required. The resulting cumulative volumes of dredged materials required for construction and maintenance of new channels could hinder achievement of LTMS goals for reduction of in-Bay disposal. Impacts could be potentially significant.
- Alternatives 3 and 4 would not require dredging of new channels. These alternatives would utilize existing channels that are already maintained. Therefore, no impacts are expected.

Mitigation D-1.1: The total amount of dredging required could be minimized by avoiding dredging in those proposed channels that would require removal of the largest sediment volumes. Dredging would not be required if low or no-draft vessels are used. As indicated in Tables 5.1.1 and 5.1.2, four of the potential new ferry terminals, Gnoss Field, Moffett Field, San Francisco International Airport, and Oakland International Airport/Coliseum, together would account for approximately 4.59 mcy of dredged materials. This volume represents 91 percent of the total potential dredging requirements under Alternative 1 and 98 percent of the total under Alternative 2. Tables 5.1.4 and 5.1.5 present the dredging requirements for Alternatives 1 and 2, respectively, recalculated without channel access to the four terminals.

Avoidance of dredging along the identified four major channels, either through elimination of routes associated with those four terminals or use of shallow draft vessels, to and from them would reduce the total dredging requirement for construction under Alternatives 1 or 2 by approximately 4.59 mcy. Consequently, annual maintenance dredging requirements would also be reduced. Under Alternative 1, if zero-draft vessels were used or the above-mentioned routes

eliminated, the potential construction dredging could be reduced from 5,048,630 cy to 460,540 cy. After construction, annual maintenance dredging requirements (assuming a 5-year maintenance cycle) would also be reduced from 1,009,726 cy to 92,108 cy. These average annual volumes represent 1.6 percent of the total long-term average annual volumes projected by LTMS (6.0 mcy). Under Alternative 2, potential construction dredging would be reduced from 4,698,670 cy to 110,580 cy and maximum maintenance dredging requirements would be reduced from 110,580 cy to approximately 22,116 cy, which represents 0.4 percent of the total long-term average annual volumes projected by LTMS. The potential increases in dredging and disposal associated with Alternatives 1 and 2 after mitigation would be small enough to be considered as part of the uncertainty in the estimation of the LTMS long-term needs. More importantly, it would be easier to accommodate these smaller volumes at the ocean disposal site or at existing reuse sites.

Mitigation D-1.2: Consultation with the Dredge Materials Management Office (DMMO) and associated permitting agencies would be required before proceeding with dredging and disposal plans in order to comply with regulatory requirements. At that time, DMMO will advise on available opportunities for the creation of new upland and wetland reuse areas for disposal of dredged materials associated with the proposed ferry routes. Fostering such opportunities would facilitate achievement of LTMS goals for reduction of in-Bay disposal. Potential beneficial dredged sediment reuse sites have been identified throughout the Bay Area by the LTMS (Figure 3.1.2). Those sites and other sites that may be eventually identified should be evaluated in terms of logistics, availability and capacity to accommodate the disposal needs of the WTA ferry expansion.

Impact After Mitigation: In-Bay dredge disposal will be restricted by permit conditions for each individual project and is unlikely to be very much. The LTMS target for the amount of annual in-Bay disposal will vary on timing of when the disposal would occur, based on other scheduled or proposed dredging projects. Mitigations D-1.1 and D-1.2, either separately or in combination, show a means of achieving the LTMS goals by minimizing in-Bay disposal. Adherence to the LTMS goals would yield a less-than-significant impact.

Impact D-2 **Dredging of new channels to accommodate expanded ferry service could locally reduce water quality by exposing and suspending contaminated sediment.**

Bay sediments have been influenced by natural and anthropogenic influxes of toxic chemicals over time, with a significant increase since the 1800s, when mining and industrial activities in the Northern California watersheds became widespread. Dredging and the disposal of sediments directly relate to the health of the Bay because these activities can remobilize previously deposited particulate-bound pollutants. For this reason regulatory controls greatly restrict new activities that might require dredging.

Contaminated sediments are not distributed evenly in the Bay, but tend to be in localized areas of high contamination. Trace metals, pesticides, and numerous organic contaminants are monitored for Bay sediments through the Regional Monitoring Program (RMP). Pollutant concentrations in sediments tend to be highest in harbors, harbor entrances, marinas, and industrial waterways and lowest in the central portions of the embayments.

Sediment "toxic hot spots", where sediment dredging could result in the degradation of water quality, have been identified in San Francisco Bay by the Bay Protection and Toxic Cleanup Program (BPTCP) and are shown in Figure 3.1.4. Areas of particular concern for the WTA expansion are those where ferry terminals coincide with or are in the vicinity of candidate toxic hot spots. Accordingly, dredging in China Basin, Mission Bay, and Richmond may present the potential for disturbance and remobilization of contaminated sediments, and require their eventual safe disposal. Oakland Inner Harbor was also identified by the BPTCP, but no additional dredging would be required for the purposes of the WTA's program. Other channels to be dredged may also contain contaminated sediments. Before dredging, proposed channel bottom sediments would be sampled and tested for contamination in accordance to DMMO guidelines.

Dredging impacts to water quality can be minimized through the use of best management practices (BMPs) including:

- Use of silt curtains, which prevent suspended sediment from migrating out of the immediate project area;
- Dredging only on the incoming tide;
- Hydraulic or closed clamshell dredging to reduce the generation of suspended sediments;
- Shunting, which involves pumping of the free water in a barge to the bottom of the water body which reduces turbidity; and
- Employment of an independent, certified, on-board dredging inspector to ensure compliance with permit conditions.

Monitoring should be conducted during dredging to allow for the following:

- Measurement of contaminated sediment removal efficiency;
- Determination dredged volumes;
- Measurement of sediment resuspension at the dredge site; and
- Checking performance of barriers and other controls.

Summary of Impact D-2

- Alternatives 1 and 2 would require dredging in areas that may contain contaminated sediments. If proposed channel bottom sediments are found to be contaminated after testing, a potentially significant impact to water quality could occur if contaminants were substantially resuspended or contaminated dredged material were not disposed of properly.
- Alternatives 3 and 4 would not require additional dredging. Therefore no impacts would occur.

Mitigation D-2.1: As part of the dredging permit requirements, proposed dredging locations will need to be sampled and tested to determine the extent of contamination, if any. Whenever contaminated materials are to be dredged, negative impacts on water quality could be minimized through the use of the most appropriate dredge type and dredging techniques for each site. Engineering included in the plans and permits for dredging projects should include the use of BMPs described above to reduce potential impact to a non-significant level.

If terminal sites with dredging requirements are selected for development, the Implementation and Operations Plan should include specifications and allocation of responsibility to the entities implementing new channel dredging to adopt adequate dredging techniques and BMPs. Individual project proponents should incorporate appropriate BMPs for dredging plans and specifications. In addition, dredging activities for a proposed terminal or route will require permits. The DMMO will issue a recommendation regarding preferred dredged material management options presented by the WTA, while individual agencies must issue specific regulatory approvals. As part of the permit application and permit conditions, implementation of BMPs will be required by the regulatory agencies.

Mitigation D-2.2: Depending on the logistics and passenger considerations of the terminal or routes being evaluated, the WTA may opt for the use of low or no-draft vessels in proposed channels where channel bottom sediments are contaminated. Avoidance of dredging would eliminate potential impacts.

Mitigation D-2.3: Whenever dredging is considered, sampling and testing will be required by the permit conditions. Depending on sediment testing results, actual amounts of suitable and unsuitable materials for aquatic disposal could be identified.

Impact After Mitigation: Impact D-2 would be less than significant after implementation of Mitigation Measures D-2.1, D-2.2, and D-2.3

Impact D-3 There is a low probability that dredging new channels could remove bottom sediments that could result in a salinity intrusion into groundwater basins.

Maintaining groundwater quality is of concern near ferry terminals or where dredging could impact a groundwater basin's water quality. Groundwater quality can be degraded through the intrusion of saltwater. Saltwater intrusion would reduce the groundwater basin yield, diminishing production from existing activities and limiting future groundwater development. Deep dredging of Bay mud could strip the "cover" from the top of a freshwater reservoir under the Bay, allowing the saltwater to contaminate the fresh water, or allowing fresh water (if artesian) to escape in large quantities, thus causing land to sink. However, the precise location of groundwater reservoirs under the Bay is not yet well known. Dredging Policy 9 of the Amendments to the Bay Plan, found in Chapter 10 of the Final LTMS Management Plan, specifies that "to protect fresh water reservoirs (aquifers): (a) all proposals for the dredging or construction work that could penetrate the mud 'cover' should be reviewed by the San Francisco Bay Regional Water Quality Control Board and the State Department of Water Resources; and (b) dredging or construction work should not be permitted that might reasonably be expected to damage an underground water reservoir Applicants for permission to dredge should provide additional data on groundwater conditions in the area of construction to the extent necessary and reasonable in relation to the proposed project" (USACE 2001).

With the exception of terminals proposed in the San Francisco and Oakland Bay front areas, where groundwater is not used as a fresh water reservoir since it is not considered fit for consumption, other future terminals may be located in the vicinity of aquifers that are subject to protection. Dredging for the purpose of terminal access would not be sufficiently deep to strip the freshwater reservoir cover. Furthermore, in most cases, dredging will be used to rehabilitate

former dredged channels. However, following DMMO procedures, the WTA may be required to document aquifer depth and conditions at proposed terminal locations.

Summary of Impact D-3

- Alternatives 1 and 2 could require channel dredging in areas underlain by freshwater aquifers. Dredging would not extend to depths where protective layers may be damaged. The maximum dredging depth would be approximately -7 feet MLLW, which is well above the top elevations of known aquifers (see Section 3.4.1.6 in Water Resources). Groundwater pollution is not expected to occur as a result of dredging. This would be a less-than-significant impact.
- Alternatives 3 and 4 would not require dredging. No impact would occur.

Mitigation D-3.1: As part of the dredging permit application, individual projects would need to be evaluated for potential threats to groundwater basins in accordance to the Bay Plan requirements. Although this is not expected given the shallow ferry channels, the DMMO may determine whether there is a need for localized studies of groundwater basins and sediment layers to support regulatory permits.

Impact After Mitigation: Impact D-3 would be less than significant after implementation of Mitigation D-3.1.

Impact D-4 Dredging activities could adversely impact threatened, endangered, or protected species.

Dredging and the disposal of dredged material temporarily increases turbidity, which could influence bottom-feeding communities at and near dredge and disposal sites, and may affect the behavior and physiology of fish and other organisms. Increased suspended sediment concentrations are an unavoidable consequence of dredging and disposal of dredged material. During dredging, sediments are suspended as the cutting device excavates material from the bottom. Clamshell dredges also release sediments into the water column as the bucket is raised from the bottom, and hopper dredges release suspended sediments during barge dewatering. Regardless of the dredging method, the aquatic disposal of material increases suspended sediment concentrations at the disposal site. Increased turbidity can cause acute and chronic effects in adult fishes. Direct mortality results from impaired oxygen exchange caused by the laceration, irritation, or clogging of the gills. Even at suspended sediment concentrations adjacent to disposal barges or in the water column immediately following disposal, fish would have to be exposed for several hours in order for death to occur, while plumes of highly concentrated suspended solids last only for minutes.

Potential impacts to endangered species will require reviews and concurrence by federal and state agencies.

Summary of Impact D-4

- Alternatives 1 and 2 require dredging that may adversely affect threatened, endangered, or protected species. This could be a potentially significant impact.
- Alternatives 3 and 4 do not require dredging. No impact would occur.

Mitigation D-4.1: Use of dredge types and techniques and implementation of BMPs as described in Mitigation D-2.1 would minimize negative impacts on threatened, endangered, or protected species. Use of BMPs and appropriate dredging techniques for each dredging project will be part of the DMMO recommendation and incorporated as conditions for regulatory approval of the permit application.

Mitigation D-4.2: Depending on the passenger and logistics considerations of the routes and terminals, the WTA may have the option to use low or no-draft vessels in specified shallow areas. As described in Mitigation D-1.1, this option would reduce the need for extensive dredging and minimize turbidity and potential harmful impacts to biota.

Mitigation D-4.3: Individual projects would undergo consultation with the resource agencies. Several mitigation measures have been proposed by previous projects to reduce or avoid impacts to biological resources related to dredging operations. These include: the use of physical barriers such as silt curtains to contain the turbidity plume; selection of dredging equipment to reduce suspended materials; and, if construction sequencing permits, dredging in shallow water would be restricted to a window between June 1 and November 30.

During the preparation of the LTMS EIS/EIR, the LTMS agencies consulted with U.S. Fish and Wildlife Service, National Marine Fisheries Service and the California Department of Fish and Game regarding potential impact of dredging and dredged material disposal to sensitive biological resources. These resource agencies, in conjunction with LTMS agencies, developed a list of restrictions specific for San Francisco Bay to protect critical habitat for special status and important commercial and recreational species. Figure 3.1.5 shows areas and times of restricted dredging activity related to these species. Conformance to seasonal restrictions as conditions of the dredging permit will minimize impacts to biological resources.

Impact After Mitigation: Impact D-4 would be reduced after implementation of Mitigations D-4.1, D-4.2, and D-4.3. Implementation of site-specific mitigation measures at the project level would further reduce Impact D-4 to less than significant levels.

Impact D-5 **Dredging for construction of access channels to new ferry terminals could result in the loss or disturbance of jurisdictional wetlands.**

Dredging of access channels would be conducted under Alternatives 1 and 2. This impact is addressed in Section 3.5 (Biology), Impact B-1.

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Table 5.1.1
Alternative 1 Potential Construction Dredging Requirements

Ferry Terminal Location	Transit Routes Associated with Dredging	Potential Dredge Volume (cubic yards)	% Contribution to Total
Gnoss Field*	Gnoss Field – S.F. Ferry Building	2,945,000*	58.33
Moffett Field	San Francisco Intl. Airport - Moffett Field Moffett Field – S.F. Ferry Building East Bay/San Leandro Marina - Moffett Field	960,940	19.03
San Francisco Intl. Airport	San Francisco Intl. Airport - Moffett Field San Francisco Intl. Airport - Ferry Building	364,400	7.22
Oakland Intl. Airport/Coliseum	Oakland Intl. Airport/Coliseum – S.F. Ferry Building	317,750	6.29
San Rafael	San Rafael – S.F. Ferry Building	85,270	1.69
Foster City	Foster City - S.F. Ferry Building East Bay/San Leandro Marina - Foster City	78,470	1.55
Mission Bay	Mission Bay - S.F. Ferry Building	77,320	1.53
East Palo Alto	East Palo Alto - S.F. Ferry Building East Bay/San Leandro Marina - East Palo Alto	63,240	1.25
Crockett	Crockett - S.F. Ferry Building	51,910	1.03
Hercules/Rodeo	Hercules/Rodeo - S.F. Ferry Building	49,830	0.99
Candlestick Point	Candlestick Point - S.F. Ferry Building	15,040	0.30
Berkeley/Albany	Berkeley/Albany - Treasure Island Berkeley/Albany - S.F. Ferry Building Richmond - Berkeley/Albany Fort Mason - Berkeley/Albany	13,260	0.26
Port Sonoma	Port Sonoma - S.F. Ferry Building	12,130	0.24
Presidio	Presidio - Fort Baker Fort Mason - Presidio - Fort Baker - Sausalito	7,870	0.16
Coyote Point	Coyote Point - S.F. Ferry Building East Bay/San Leandro Marina - Coyote Point	6,200	0.12
	Total Cubic Yards	**5,048,630**	**100.00**

*Ferry access to Gnoss Field Terminal would require dredging of Black John Slough. Bathymetry data within the slough is partially available. Estimate of dredging based on conservative assumption that the average of existing survey soundings (2 MLLW) is uniform thorough the slough. A total length of 2.5 miles would require dredging to access proposed ferry terminal location. Channel width of 300 feet is assumed as for all other terminals

Table 5.1.2
Alternative 2 Potential Construction Dredging Requirements

Ferry Terminal Location	Transit Routes Associated with Dredging	Potential Dredge Volume (cubic yards)	% Contribution to Total
Gnoss Field*	Gnoss Field – S.F. Ferry Building	2,945,000	62.68
Moffett Field	San Francisco Intl. Airport - Moffett Field Moffett Field - Ferry Building East Bay/San Leandro Marina - Moffett Field	960,940	20.45
San Francisco Intl. Airport	San Francisco Intl. Airport - Moffett Field San Francisco Intl. Airport – S.F. Ferry Building	364,400	7.76
Oakland Intl. Airport/Coliseum	Oakland Intl. Airport/Coliseum – S.F. Ferry Building	317,750	6.76
Mission Bay	Mission Bay – S.F. Ferry Building	77,320	1.65
Berkeley/Albany	Berkeley/Albany – Treasure Island Berkeley/Albany – S.F. Ferry Building Fort Mason – Berkeley/Albany	13,260	0.28
Port Sonoma	Port Sonoma – S.F. Ferry Building	12,130	0.26
Presidio	Presidio - Fort Baker Fort Mason – Presidio - Fort Baker - Sausalito	7,870	0.17
	Total Cubic Yards	**4,748,500**	**100.00**

*Ferry access to Gnoss Field Terminal would require dredging of Black John Slough. Bathymetry data within the slough is partially available. Estimate of dredging based on conservative assumption that the average of existing survey soundings (2 MLLW) is uniform thorough the slough. A total length of 2.5 miles would require dredging to access proposed ferry terminal location. Channel width of 300 feet is assumed as for all other terminals

Table 5.1.3
Potential Annual Average Construction Dredging Requirements and Maximum Recurring Maintenance Dredging Associated with Alternatives 1 and 2

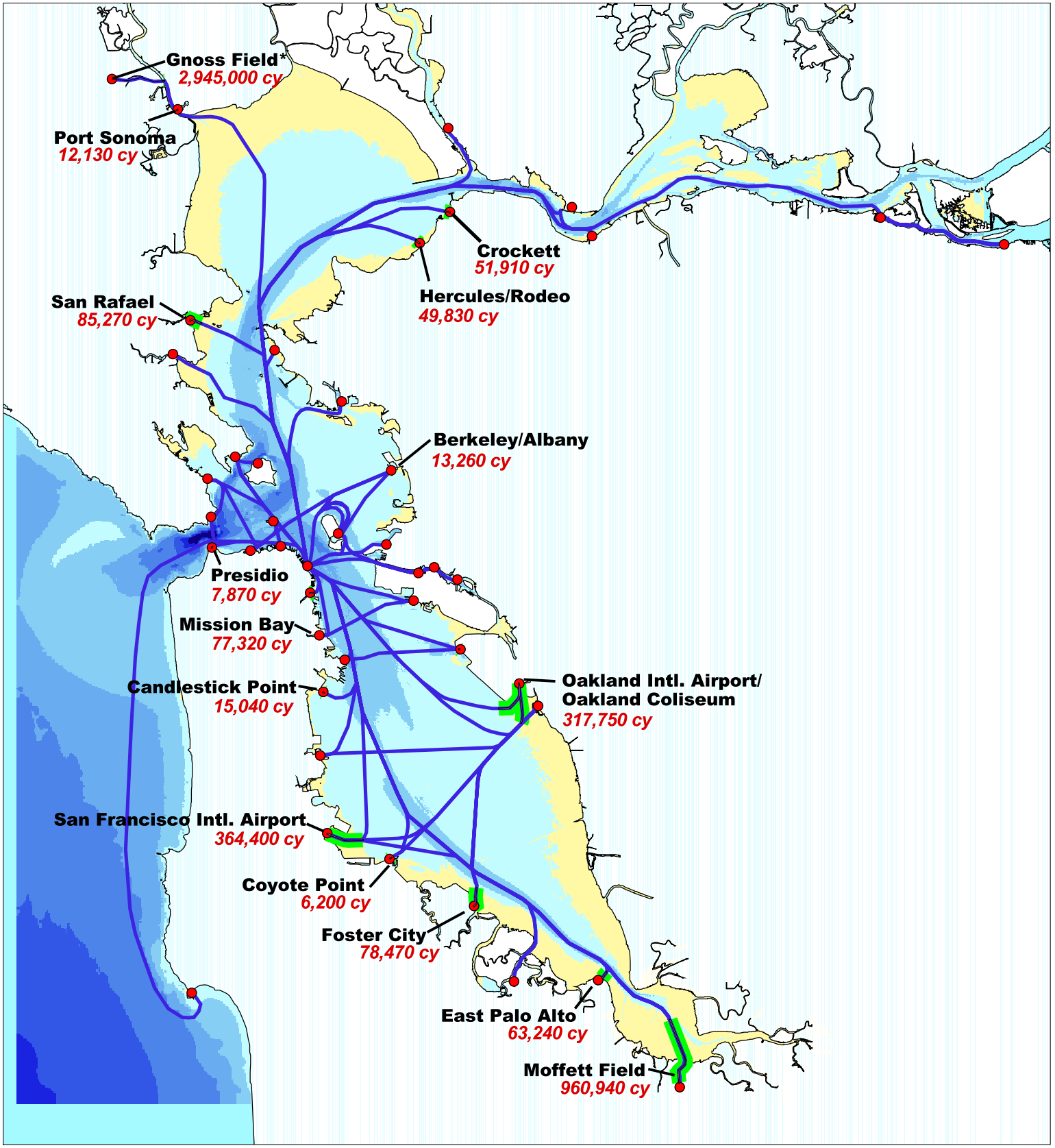
	Total Channel Construction Dredging Requirements (mcy)	3-Year Basis			5-Year Basis			10-year Basis		
		Average Annual Requirements (mcy)	Average % Increase Over Current Annual USACE Projects Volume	% of Projected Long-Term Annual Dredge and Disposal Volume	Average Annual Requirements (mcy)	Average % Increase Over Current Annual USACE Projects Volume	% of Projected Long-Term Annual Dredge and Disposal Volume	Average Annual Requirements (mcy)	Average % Increase Over Current Annual USACE Projects Volume	% of Projected Long-Term Annual Dredge and Disposal Volume
Alternative 1	5.05	1.68	37	28	1.01	22	17	0.50	11	8.5
Alternative 2	4.70	1.57	35	26	0.94	21	15	0.47	10	7.8

Table 5.1.4
Potential Construction and Maximum Recurring Maintenance Dredging Requirements Associated with Alternative 1 with and without Use of Zero-Draft Vessels to Selected Terminals

Ferry Terminal	Total Construction Dredge Volume (cubic yards)	Annual Maintenance Dredge Volume (over 5 years)	Total Construction Dredge Volume Without Major Channels	Annual Maintenance Dredge Volume, Without Major Channels (over 5 years)
Gnoss Field	2,945,000	589,000	0	0
Moffett Field	960,940	192,188	0	0
San Francisco Intl. Airport	364,400	72,880	0	0
Oakland Intl. Airport/Coliseum	317,750	63,550	0	0
San Rafael	85,270	17,054	85,270	17,054
Foster City	78,470	15,694	78,470	15,694
Mission Bay	77,320	15,464	77,320	15,464
East Palo Alto	63,240	12,648	63,240	12,648
Crockett	51,910	10,382	51,910	10,382
Hercules/Rodeo	49,830	9,966	49,830	9,966
Candlestick Point	15,040	3,008	15,040	3,008
Berkeley/Albany	13,260	2,652	13,260	2,652
Port Sonoma	12,130	2,426	12,130	2,426
Presidio	7,870	1,574	7,870	1,574
Coyote Point	6,200	1,240	6,200	1,240
Total	**5,048,630**	**1,009,726**	**460,540**	**92,108**

Table 5.1.5
Potential Construction and Maximum Recurring Maintenance Dredging Requirements Associated with Alternative 2 with and without Use of Zero-Draft Vessels to Selected Terminals

Ferry Terminal	Total Construction Dredge Volume (cubic yards)	Annual Dredge Volume for Maintenance (over 5 Years)	Total Construction Dredge Volume Excluding Zero-Draft Terminals	Annual Maintenance Dredge Volume Excluding Zero-Draft Terminals (over 5 Years)
Gnoss Field	2,945,000	589,000	0	0
Moffett Field	960,940	192,188	0	0
San Francisco Intl. Airport	364,400	72,880	0	0
Oakland Intl. Airport/Coliseum	317,750	63,550	0	0
Mission Bay	77,320	15,464	77,320	15,464
Berkeley/Albany	13,260	2,652	13,260	2,652
Port Sonoma	12,130	2,426	12,130	2,426
Presidio	7,870	1,574	7,870	1,574
Total	**4,698,670**	**939,734**	**110,580**	**22,116**



URS	Water Transity Authority Program EIR	DREDGING AREAS AND DREDGING VOLUMES	Figure 5.1.1
	Project No. 43-00066890		

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5.2 NAVIGATION

5.2.1 Significance Criteria

Impacts would be considered significant if they would:

- Affect the safe navigation of the Bay (including commercial shipping), resulting in substantial increases in the number of incidents reported by the Vessel Traffic Service (VTS); and/or
- Interfere substantially with the recreational water uses in San Francisco Bay through increases in the number of accidents involving the interaction of ferries and recreational vessels.

5.2.2 Impacts and Mitigation

Impact NAV-1 **Existing ferry service results in some navigational incidents, including accidents involving collisions, allisions, and groundings. There is a potential for an increase in these incidents with expansion of water transit service.**

Bay Area ferry service currently serves terminals in San Francisco Bay. Most ferry trips are within the Central Bay. Expanded ferry service could add ferry traffic throughout the Bay, depending on the chosen alternative, involving new trips to and from terminals in localities not currently accessed by ferries. This could lead to a potential increase in navigational incidents.

Three passenger service companies currently provide daily service from 5:30 a.m. to 12:30 a.m. In 2000, ferry traffic reached a volume of 88,469 trips, or approximately 68 percent of the total vessel trips reported by the U.S. Coast Guard (USCG) Vessel Traffic Service (VTS) in San Francisco Bay for that year. Alternatives 1, 2, and 3 involve expansion of ferry service and would increase the number of ferry transits in the Bay. Table 5.2.1 shows the number of ferry trips projected for the year 2025 under each alternative. The year 2025 ferry trips for Alternatives 1 through 3 were derived from projections prepared for the WTA as of April 2002. Ferry traffic projections are calculated through modeling and testing of different assumptions and are subject to revision (Bruzzone 2002). For Alternative 4, the No Project Alternative, the number of trips is assumed to remain constant at the levels reported in 2000.

Available data for San Francisco Bay and other heavily used harbor areas in the United States (presented in Table 3.2.4) suggest that there is no direct correlation between the number of vessel transits and the number of reported incidents. This lack of correlation is also depicted on Figure 3.2.4. For example, despite having the lowest number of transits compared to other U.S. ports, Los Angeles/Long Beach had the highest number of reported collisions per 1,000 transits. Similarly, there appears to be no relationship between higher traffic and reports of near misses, groundings, allisions, or other vessel casualties for the main U.S. harbors.

The comparison of number of transits and number of navigational incidents between different harbors could indicate that some harbors are more navigationally dangerous than others, regardless of the number of trips. However, evaluation of navigational incidents within San Francisco Bay over time also does not show a clear correlation of any increase in incidents with

an increase in transits. USCG incident statistics for the Bay for 1996-2001 are presented in Table 3.2.6. The trend indicated is that both ferry and total transit trips by all vessel types generally increase over time. However, over the same period, the number of incidents does not change in a consistent pattern.

This comparison of recorded navigational incidents and vessel traffic statistics does not appear to associate an increase in trips with an increase in the probability of incidents. Other factors appear to affect the occurrence of navigational incidents for any given volume of harbor transits. These may include the condition of mechanical equipment, navigational aids, and training of pilots for safety. It is important to note that Puget Sound and San Francisco Bay are among the harbors with the lowest number of incidents. Ferries represent approximately 80 and 70 percent, respectively, of Puget Sound and San Francisco Bay annual vessel trips. This could imply that ferry pilots familiarity with the navigational conditions and procedures in those harbors account for fewer incidents.

To evaluate the significance of the increased ferry traffic within the overall vessel traffic in San Francisco Bay, two extreme scenarios were evaluated, as represented in Figures 5.2.1 and 5.2.2. The purpose of this evaluation was to capture the possible range of the contribution of passenger ferry transits to the overall vessel traffic in the Bay. In the conservatively low scenario, all non-ferry traffic would remain at year 2000 levels. This scenario does not consider any further expansion in waterborne traffic that would naturally occur in response to regional economic demand. Alternatively, in the conservatively high scenario, non-ferry traffic would continue to grow steadily based on the rates of increase shown in recent years. This scenario does not consider any logistical constraints or infrastructure limitations on the capacity of the Bay to accommodate waterborne traffic. The number of vessel trips in the Bay in each vessel traffic growth scenario is presented in Table 5.2.2.

Under either scenario, the proportion of ferry transits as part of the total vessel transits would increase from the current level of 69 percent corresponding to Alternative 4. This increase indicates that ferries would account for between 92 and 97 percent of the total vessel transits in the Bay under Alternative 1, between 90 and 96 percent under Alternative 2, and between 70 and 86 percent under Alternative 3. That is, under all alternatives, ferry trips would represent the overwhelming majority of all the vessel transits within the Bay.

Incidents such as collisions and near misses involve the interaction of two vessels. A model was developed by ABS Consulting as part of a preliminary risk assessment for the WTA that counts vessel interactions (ABS 2002). Any vessel (i.e., VTS-monitored vessel, recreational boater, or another ferry) within 0.5 miles of a ferry was considered an interaction. An interaction also includes situations in which a vessel is within 5 minutes of crossing track, and the crossing occurs either within 1 mile ahead or within 0.5 mile behind the ferry. The counting does not define the level of risk related to collision. It only provides a measure of hazardous exposure. The ABS model was used to simulate navigational conditions and produce geospatial distribution of vessels for the year 2000 with the ferry fleets and routes corresponding to Alternatives 1 through 3 and Alternative 4 as the base case. The model results shown in table below indicate that as ferry transits expand compared to the base case, interactions between vessels would grow exponentially.

Alternative	Ferry Transits (percent)*	Total Vessel Interactions (percent)*
Alternative 4 (base case)	100	100
Alternative 3	365	620
Alternative 2	1,228	4,600
Alternative 1	1,559	8,400

Data presented as a percentage of the base case results.
Source: ABS (2002)

The increase in the relative number of ferry transits under Alternatives 1, 2, and 3 imply that the potential interactions between ferries would continue to predominate over the interactions between ferries and non-ferry vessels as well as over those between two non-ferry vessels. Consequently, this comparison indicates that proper maintenance of fleets, ferry pilot training, and the use of appropriate navigation aids will be the most important factors in addressing any potential navigation risks created by the additional transits and the increased hazardous exposure created by the increased interactions. As stated before, increased vessel traffic does not correlate with increased navigational incidents in the nation's harbors. Procedures will continue to be more significant than the number of vessel interactions in determining the level of risk.

The WTA ferry expansion will involve different ferry routes, some of which are common to the four alternatives considered. These routes may pose varying degrees of navigational challenge and location-specific navigational concerns. However, ABS modeling results indicate that the majority of the increased interactions will take place within a square grid northeast of the San Francisco cityfront.

Summary of Impact NAV-1

- Alternatives 1 and 2 could have potentially significant impacts on navigational incidents resulting from the increase in the number of ferry transits and service to and from new terminal locations. The level of significance of such impacts is difficult to determine.
- Alternative 3 could have potentially significant impacts on navigational incidents resulting from the increase in the number of ferry transits. The level of significance of such impacts is difficult to determine.
- Alternative 4 would not involve expansion of ferry transits and would therefore have no impact.

Mitigation NAV-1.1: Implementation of best practices as recommended by the preliminary risk assessment prepared by ABS (2002) will serve to minimize navigation-related risk. These practices (ABS 2002) are listed below:

1. Design and implement a preventive maintenance system that meets or exceeds manufacturer's service requirements.
2. Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as master-in-charge. (Note: Program training should meet or exceed the requirements in the USCG National Maritime Center Policy Letter 06-01 subj.: "Qualification for Issuance of Type Rating Endorsements Authorizing Service on High-Speed Craft.")

3. Design the terminal to facilitate docking under both prevailing and seasonal environmental conditions.
4. When conditions make it difficult for the master-in-charge to effectively maintain situational awareness, assign another person to the bridge watch (i.e., another licensed master or a senior deckhand) to share the workload and serve as a safety double check.
5. Design and install gangway systems (1) that help steady the ferry and hold it firmly to its dock, (2) that can be adjusted to accommodate changing environmental forces, and (3) that can be manipulated by crew having different physical abilities.
6. Install, operate, and maintain technology (e.g., portable pilot units, and/or automatic identification system tracking and display) to facilitate communication of intent and to audit conformance with navigational protocols.
7. Install, operate, and maintain a backup radar and separate power supplies for radars.
8. Train/certify all bridge watchstanders in radar operation.
9. Periodically survey the water depth in vicinity of a terminal to identify shoaling, and set and maintain private markers to identify shoal water.
10. Conduct periodic electrical safety inspections and daily check of ground faults. Install a bridge alarm/indicator that alerts the licensed master of the location of electrical shorts.
11. Install and maintain a fixed fire suppression system that has sufficient capacity to flood the engine room twice with CO_2 or equivalent fire suppression agent.
12. Eliminate or minimize hazardous materials used in maintenance and repair.
13. Use a closed gauging system for checking fuel levels.
14. Develop company policy and standard procedures for emergencies and adverse weather and normal operating conditions. Implement and enforce procedures through training and company communications. Audit conformance. Provide job aids for critical procedures.

    Note: Policy and procedures manual and an operational training program should be developed using the guidance in the USCG Navigation and Vessel Inspection Circular 5-01 subj.: "Guidance for Enhancing the Operational Safety of Domestic High-speed Vessels."

    14a. Develop, communicate, and enforce standard operating procedures for ferry startup and shutdown.

    14b. Develop, communicate, and enforce navigational protocols for routes.

    14c. Identify areas/conditions in which meeting, crossing, or overtaking may significantly increase the risk of collision and develop/enforce a "no passing" policy for those areas.

    14d. Develop and exercise vessel mutual assistance plans.

    14e. Develop and exercise emergency response protocols to facilitate communication and ferry traffic control during emergencies.

    14f. Determine with emergency care providers (e.g., ambulance services) locations along a route at which the ferry can transfer people in medical distress.

14g. Develop, communicate, and enforce a hot work permit program.

14h. Develop, communicate, and enforce lock-out/tag-out program.

14i. Develop, communicate, and enforce a safe lifting program for deckhands.

14j. Develop and enforce standards for emergency training. Establish a frequency for emergency drills that meets or exceeds USCG requirements. Establish criteria for measuring drill performance. Require all shifts and all crew on each shift to participate. Document training.

Impact After Mitigation: Impact NAV-1 would be reduced after implementation of Mitigation Measure NAV-1.1. Ferry transit has operated safely on the Bay, and expansion of service with these measures would minimize risks. However, no system can ensure risk-free navigation conditions in the Bay. This impact is potentially significant because of the remaining risk.

Impact NAV-2 **Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between recreational water users and ferries. This raises concerns for public safety, especially where windsurfers launch and sail in close proximity to ferry vessels.**

Windsurfers typically do not use the Bay marinas. Rather, different launching facilities have developed in the Bay Area because of the need for particular site amenities for that sport, such as shore accessibility and parking, and to take advantage of particular wind and water conditions. The desire to avoid conflicts with other user groups also plays a role in the selection of launch sites. No accidents involving windsurfers and ferries have been documented to date.

Figure 3.2.3 presents the location of existing launch sites relative to existing and proposed ferry terminals. The figure also shows the season during which best windsurfing conditions prevail at each location and, therefore, when these locations are most heavily used. The following proposed terminals would be located in the vicinity of an existing launch site: Benicia, Martinez, Crissy Field, Oyster Point, San Francisco International Airport, and Coyote Point.

Larkspur is the only existing ferry terminal located close to a windsurf launch site. No windsurfing accidents have been reported by ferry operators at the Larkspur terminal even though windsurfing has been a popular recreational activity in the area for many years. This may be attributed to the fact that ferries travel at slow speeds (10 knots) near the terminal and can quickly stop if a windsurfer falls along their path (Clark 2002). No written navigational rules exist for windsurfers, but windsurfers are reported to honor the ferries' approach and departure route since ferries are restricted to the dredged channel. Depending on wind and tide conditions, windsurfers generally sail within a 1-2 mile radius from their launch sites. Windsurfers require a minimum wind speed of 9 knots and typically sail with winds ranging from 15 to 30 knots. Consequently, in the areas where interaction between windsurfers and ferries might occur, windsurfers may be sailing at higher speeds than ferries. On occasion, ferries pick up windsurfers who drift too far from shore and are unable to return. The navigational situation and relationship between ferry operators and windsurfers is reportedly agreeable, and each group is said to "look out for each other" (Clark 2002).

That view of the situation was corroborated by Tom Lloyd, owner of Boardsports Marin located at Larkspur Landing and an experienced windsurfer in the Larkspur channel. Mr. Lloyd noted that "ferries usually honk their horn to alert a windsurfer who has either not noticed the ferry is approaching or who has lost control of their board so that they can get out of the ferry's way. As

long as the two groups communicate and stay aware of their surroundings, there shouldn't be any problems." (Lloyd 2002). The North Bay Chapter of the San Francisco Boardsailing Association monitors the activities between windsurfers and other vessels, including ferries, near Larkspur Landing to ensure a safe recreational environment for their members.

Summary of Impact NAV-2

- Alternatives 1 and 2 would increase the number of ferry transits in the Bay and expand service to and from new terminal locations. Some of those proposed terminals could be located in the vicinity of windsurf launch sites. The impact of increased ferry traffic on windsurfers could be potentially significant.
- Alternative 3 would increase the number of ferry transits in the Bay but would not require new terminals in locations close to launch sites. The impact of increased ferry traffic on windsurfers could be potentially significant.
- Because Alternative 4 does not involve an increase in ferry traffic or new terminals, there would be no significant impact.

Mitigation NAV-2.1: Appropriate training of ferry crew in new terminals located near existing windsurfing launch sites could reduce the risk of incidents involving ferries and windsurfers. The San Francisco Boardsailing Association should participate in the development and delivery of such training.

Mitigation NAV-2.2: Designation of specific ferry employees to stand watch on the bridge of ferries at select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) could reduce the risk of incidents involving ferries and windsurfers.

Impact After Mitigation: Impact NAV-2 would be reduced after implementation of Mitigations NAV-2.1 and NAV-2.2. As exemplified by the case of the Larkspur terminal, windsurfers and ferry crews will "look out for each other" and develop a relationship that will serve to minimize incidents. No system can ensure risk-free navigation conditions in the Bay, and this impact remains potentially significant for Alternatives 1 through 3.

Impact NAV-3 **Increased numbers of ferry transits in the Bay may lead to an increased risk of collision between recreational boaters and ferries.**

As the population of the Bay region increases, more people are expected to use their leisure time in water-oriented recreational activities. According to USCG information, California has 904,863 registered boats in 2000 and ranks second (after Michigan) among the states in the number of registered recreational vessels (motor and non-motor watercraft). Accident statistics indicate that in 2000 there were a total of 900 boat accidents in California, involving 49 deaths and 519 injuries and totaling $3 million in property damages. One third of all California boat accidents that year involved collisions with other recreational vessels. A similar proportion was observed nationwide, with 2,706 accidents out of a total 7,740 involving collision with other vessels (USCG No Date). The majority of accidents between recreational boats are caused by improper control of the vessels due to operator recklessness. National and state statistics of boating accidents do not indicate that there were any accidents involving ferries and recreational boats. The 1996-2001 record of ferry accidents indicates only one collision during that period and it did not involve a recreational boat.

Figure 3.2.1 presents the locations of marinas along the San Francisco Bay shoreline, where local recreational water users berth or store their vessels. While most marinas are concentrated in the Central Bay, once vessels are launched, they can travel virtually anywhere in San Francisco Bay, San Pablo Bay, and the Sacramento River Delta, depending on the capabilities of the vessel and the operator. Therefore, there is potential for interaction between ferries and recreational boaters along any of the existing and potential future ferry routes.

Requirements for the safe interaction between power-driven vessels and between power-driven and sailing vessels are delineated in the International Regulations for Preventing Collision at Sea, Inland Navigation Rules Part B – Steering and Sailing, Rule 18. These regulations govern open bodies of water in which foreign shipping traffic is possible and provide a set of statutory requirements designed to promote navigational safety. These rules include requirements for navigation lights, dayshapes, and steering, as well as sound signals for both good and restricted visibility.

General public education and specific boat operator training in regard to safe operation of boats, appropriate rescue and life-saving equipment, boating under the influence of drugs and alcohol, and other key topics is widely recognized as an important tool to prevent and reduce watercraft accidents. The Federal Boating Safety Act of 971 (recodified under Title 46 of the United States Code) gave the USCG authority to administer two separate grant programs aimed at recreational boating safety. These are a State Grant Program to assist U.S. states and territories and an award program for nonprofit public service organizations to support recreational boating safety activities.

Boating activities in the Bay Area are well organized. Sail races are scheduled and planned well in advance of the events. USCG, the California Department of Boating and Waterways, marina associations, yacht clubs, and community-based entities such as Boat U.S. Foundation have collaborated extensively in matters of boating education and improving recreational navigation safety in Northern California.

Summary of Impact NAV-3

- Alternatives 1 and 2 would increase the number of ferry transits in the Bay and expand service to new terminal locations. Alternative 3 would increase the number of ferry transits in the Bay. The increase in the potential for incidents between recreational vessels and increased ferry traffic is potentially significant.
- Because Alternative 4 does not involve an increase in ferry traffic or new terminals, there would be no impact.

Mitigation NAV-3.1: Additional training, education, and public advisory programs for recreational watercraft users related to navigation safety requirements could reduce the risk of incidents associated with expanded ferry service in the Bay. The WTA could fund or sponsor new education and advisory training programs and strengthen existing ones. Potentially affected recreational users, especially those docking at marinas located in the vicinity of proposed new ferry terminals, could be reached through public notices on ferry routes and schedules.

Mitigation NAV-3.2: Designation of specific ferry employees to stand watch on the bridge of selected ferries to watch for navigational hazards (i.e., during periods of high recreational use,

such as weekends or race events, or when weather hazards exist) could reduce the risk of navigational incidents.

Impact After Mitigation: Impact NAV-3 would be reduced after implementation of Mitigations NAV-3.1 and NAV-3.2. No system can ensure risk-free navigation conditions in the Bay. This could be a potentially significant impact.

References

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Bruzzone, Tony, 2002. PTM, Personal Communication, April.

Clark, David. 2002. Ferry Operator, Larkspur Ferry Terminal, Golden Gate Ferry. San Francisco, California. Personal Communication. March.

Lloyd, Tom. 2002. Boardsports Marin. Personal Communication. April.

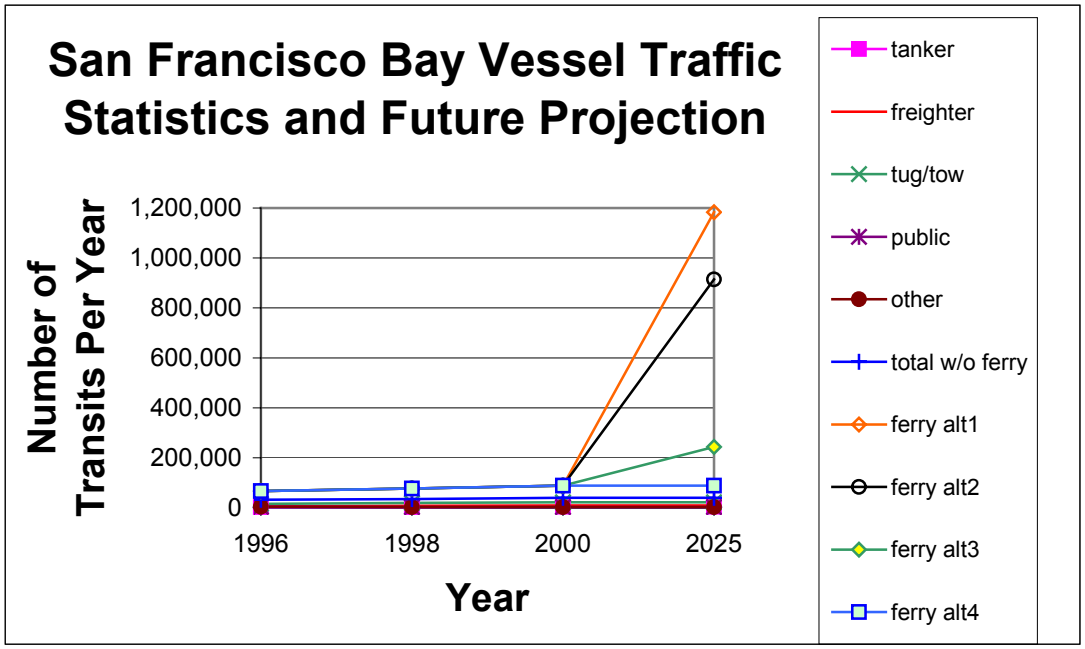
U.S. Coast Guard (USCG). No Date. www.uscgboating.org

Table 5.2.1
Projected Ferry Trips in 2025

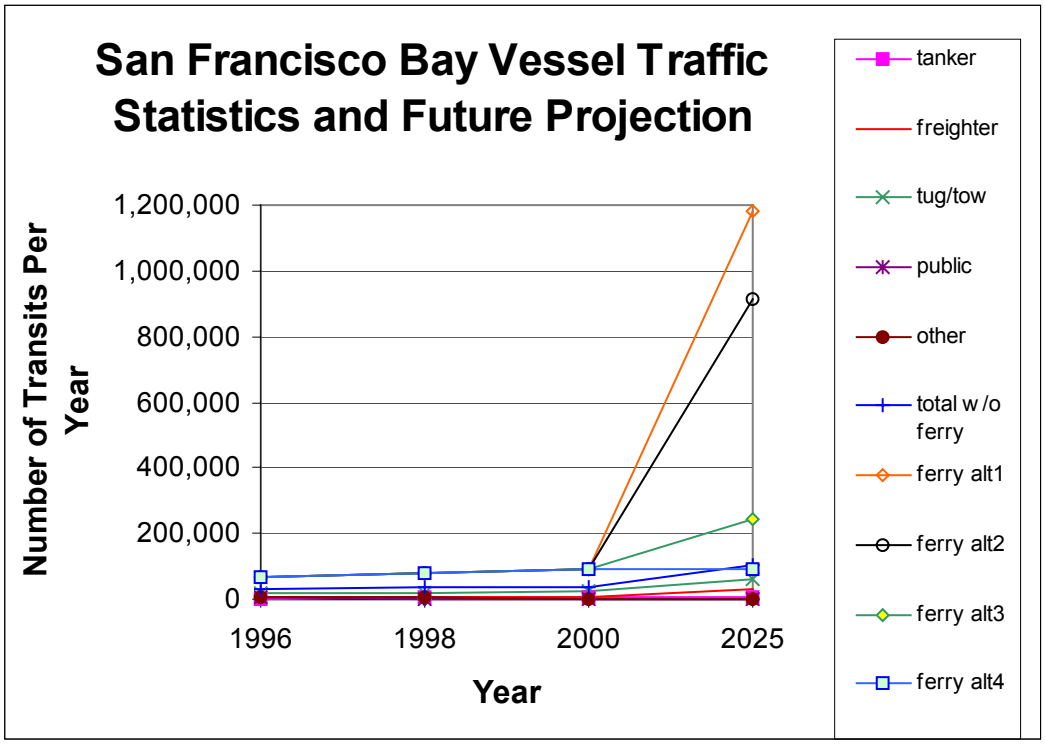
	Number of Projected Annual Ferry Transits
Alternative 1	1,182,980
Alternative 2	914,180
Alternative 3	243,440
Alternative 4	88,469

Table 5.2.2
Projected 2025 Annual Vessel Transits in San Francisco Bay

		2025 Non-Ferry No Growth			2025 Sustained Non-Ferry Growth		
	Ferry Transits	Non-Ferry Transits	Total Transits	% Ferry Transits	Non-Ferry Transits	Total Transits	% Ferry Transits
Alternative 1	1,182,980	39,235	1,222,215	97	103,962	1,286,942	92
Alternative 2	914,180	39,235	953,415	96	103,962	1,018,142	90
Alternative 3	243,440	39,235	282,675	86	103,962	347,402	70



URS	Water Transity Authority Program EIR Project No. 28066519	2025 FERRY TRANSIT PROJECTIONS AND NO GROWTH IN NON-FERRY VESSEL TRIPS	Figure 5.2.1



URS	Water Transity Authority Program EIR Project No. 28066519	2025 FERRY TRANSIT PROJECTIONS AND SUSTAINED GROWTH IN NON-FERRY VESSEL TRIPS	Figure 5.2.2

5.3 WAKE WASH

The following section describes the potential impacts that wake wash from expanded ferry service could have on the environment. This is an evaluation of impacts from the overall ferry service expansion program alternatives, and therefore the discussion addresses the overall potential for impacts, and, where applicable, the mitigation measures that can be adopted to avoid or minimize these effects.

5.3.1 Significance Criteria

Qualitatively, impacts to the shoreline from wake wash resulting from new ferry service would be considered significant if they would:

- Cause a significant increase in wave height (energy) at a shoreline receptor over that of natural wind-driven waves and existing wake; or
- Cause a significant increase in shoreline erosion or loss of wetland habitat; or
- Impact special-status species such as California clapper rail (threatened species) or Pacific harbor seal (protected species).

5.3.1.1 Quantitative Shoreline Significance Criteria

To enable quantitative assessment of potential impacts to shorelines, specific criteria for San Francisco Bay were developed as described in Appendix Wake-D. The significance criteria developed include a 16-cm wake wash wave height at the shoreline and a 1,500-meter distance from sensitive shorelines to ferry routes. Potentially sensitive shorelines include mudflats, salt marshes, narrow channels, and sandy beaches. Potential impacts from increased ferry service would not be significant for rocky or armored shorelines. Erosion at rocky shorelines is a consequence of cumulative extreme storm events and armored shorelines are designed to resist the waves occurring during extreme storm events. The 16-cm criterion is based on an analysis of daily average wind waves. The 1,500-meter criterion is based on distance required for the wake from a vessel's design wake wave height of 27 cm (measured at 300 meters) to attenuate to the 16 cm shoreline criterion. (The 27-cm vessel design criterion is based on the largest anticipated vessel that would be used for the increased ferry service – a 350-passenger, 35+ knot vessel.) The rationale for these criteria is described in detail in Appendix Wake-D.

However, even if the 16-cm and 1,500-meter criteria are not met, wake wave impacts may not be significant at the shoreline and comparison with site-specific data would be necessary to make such a determination. If predicted wake waves at the shoreline are less than 50 percent of the average sustained wind wave height on a monthly basis, significant impacts are not anticipated because the wake wash waves would be indistinguishable from the natural variation of the wind driven waves.

With these criteria, impacts to the shoreline would be considered significant if:

- A ferry route passes within 1,500 meters of a potentially sensitive shoreline and the predicted wake wash wave at the shoreline is greater than the 16 cm shoreline wave height criterion; and

- Predicted wake waves at the shoreline are greater than 50 percent of the average sustained wind wave height on a monthly basis.

To aid in the impact assessment for individual ferry routes and shoreline areas, a Decision Tree was developed. It is shown on Figure 3.3.2 in Wake Section 3.3 for the Proposed Project. The Decision Tree includes the steps required to determine if impacts to shorelines would be significant and potential mitigation measures that could be utilized to reduce potential impacts to less than significant levels.

5.3.1.2 Qualitative Significance Criterion for Clapper Rail Nest Inundation

Impacts to California clapper rail nesting sites could be considered significant if:

- Ferry routes were within 50 meters of known nesting sites.

It is important to note that a clapper rail nest within 50 meters of the route will not necessarily be impacted but only potentially impacted.

5.3.2 Impacts and Mitigation

5.3.2.1 Potential Impacts to Shorelines

Impact WW-1 **New routes and increased frequency of ferry trips across the Bay could increase the wave height (energy) at some shorelines, potentially causing increased erosion.**

Shorelines tend to be in dynamic equilibrium with the "typical" or average wind wave energy reaching them. Erosion could be increased or altered due to additional ferry service if wake wave heights and energy were significantly greater than those of existing wind-driven waves (see Appendix Wake-D for discussion.)

For shorelines at a distance greater than 1,500 meters from a proposed ferry route, impacts are not anticipated to be significant. Impacts could potentially be significant for sensitive shorelines (tidal marshes and mudflats) that are within 1,500 meters of a ferry route. Impacts are not anticipated at rocky or armored shorelines as these shorelines can withstand extreme weather events, which subject them to conditions only experienced every 50 or 100 years. Figures 5.3.1 through 5.3.3 show areas of sensitive shoreline that are within 1,500 meters of a ferry route for Alternatives 1 through 3, respectively. If a potentially sensitive shoreline is within 1,500 meters of a route, it does not indicate there would be impacts, only that there is a potential for significant impacts.

The highlighted shoreline areas are based on an approximate 1,500-meter measurement from the proposed routes. When exact routes are identified, they will need to be accurately plotted on navigational charts. Potential sensitive shoreline areas within 1,500 meters of those routes could then be identified.

A Decision Tree (Figure 3.3.2 in Wake Section 3.3) was developed to help evaluate whether impacts to shorelines would be significant. It includes potential mitigation measures to reduce potential impacts to less-than-significant levels.

For Alternative 1, potentially sensitive shoreline areas within 1,500 meters of proposed ferry routes are highlighted on Figure 5.3.1. Potential sensitive shoreline areas within 1,500 meters of those routes could then be identified. For Alternative 1, potentially impacted shorelines include south of Point Pinole, areas near Port Sonoma, areas in the Carquinez Strait, and Suisun Bay in the North Bay, areas of shoreline adjacent to potential terminal locations in the Central Bay, and areas near potential terminal locations and shorelines near narrow portions of the Bay in the South Bay.

For Alternative 2, potentially sensitive shoreline areas within 1,500 meters of ferry routes are highlighted on Figure 5.3.2. Potentially impacted shorelines include south of Point Pinole, areas near Port Sonoma, and areas in the Carquinez Strait and Suisun Bay in the North Bay, areas of shoreline adjacent to potential terminal locations in the Central Bay, and areas near potential terminal locations and shorelines near narrow portions of the Bay in the South Bay.

For Alternative 3, potentially sensitive shoreline areas within 1,500 meters of proposed ferry routes are highlighted on Figure 5.3.3. Potentially impacted shorelines include south of Point Pinole and areas in the Carquinez Strait in the North Bay, and areas of shoreline adjacent to potential terminal locations in the Central Bay.

Summary of Impact WW-1

- Alternatives 1 and 2 would involve expansion of ferry service and increased numbers of ferry transits. The alternative also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. Different routes could result in larger wave heights from wake wash reaching the shoreline than existing wind-driven waves. Potentially impacted shorelines include south of Point Pinole, areas near Port Sonoma, in the Carquinez Strait, and Suisun Bay in the North Bay, areas of shoreline adjacent to potential terminal locations in the Central Bay, and areas near potential terminal locations and shorelines near narrow portions of the Bay in the South Bay. This is a potentially significant impact.
- Alternative 3 uses existing ferry routes but includes increased frequency of trips. Because the vessels used would have the same or lower design wash heights as those currently in use, impacts are not anticipated to be significant. Potentially impacted shorelines include areas in the Carquinez Strait and south of Point Pinole in the North Bay, and areas of shoreline adjacent to potential terminal locations in the Central Bay.
- Alternative 4 would not increase the number of ferry transits in the Bay. Therefore, no impacts would occur above present conditions.

Potential implementation of the following mitigation measures is shown as a Decision Tree on Figure 3.3.2 in Wake Section 3.3. Appendix Wake-E presents example analyses for representative shoreline types.

Mitigation WW-1.1: To meet the criteria evaluated for this impact, ferry routes and service may need to be modified such that:

- The route alignments are maintained at more than 1,500 meters from potentially sensitive shorelines (e.g., mudflats, unprotected tidal marshes). This should maintain wake impacts to a less-than-significant level.

- Operation of the vessels (primarily speed) should be maintained such that predicted wake wave heights at the shoreline would be less than 16 cm. This would also reduce this impact to a less-than-significant level.
- Operation of vessels maintained such that predicted wake waves at the shoreline would be less than 50 percent of the average sustained wind wave height on a monthly basis.

If resulting ferry routes meet one or more of the above criteria, impacts should be less than significant.

Mitigation WW-1.2: New ferry routes could potentially be modified to redirect energy away from sensitive habitats, to reduce or eliminate increased wake energy. Adjustment to routes can be used to focus wave energy on rocky or armored shorelines or to direct energy away from sensitive areas. Detailed wave refraction, diffraction, and reflection analysis would be required to predict the efficacy of wave energy focussing. This mitigation measure would only be feasible and effective on portions of routes where the operation of the vessel can incorporate these adjustments. For example, the approach routes to terminals near sensitive areas could be designed (directed) such that wake wash is away from sensitive tidal marsh environments, and turning movements are not permitted at a speed and/or direction that exceeds criteria 2 or 3, listed above.

Mitigation WW-1.3: Use of existing low wake vessel technology could reduce both the total wake wash energy and heights of individual waves. As shown in Figure Wake-D-2 (in Appendix Wake-D) existing light-weight high-speed vessels have 25 percent or better wave height and wave energy characteristics than the 350-passenger high-speed vessels presently operating on the Bay.

Mitigation WW-1.4: Use of advanced or state-of-the-art technologies such as low or no-draft vessels, which have almost no wake wash, could be considered.

Mitigation WW-1.5: Operational adjustments, such as slowing vessels down, could be implemented to reduce wake energy near sensitive tidal marsh habitat. Note, as shown in Figure Wake-D-2 (in Appendix Wake-D), a considerable reduction in vessel speed is required with an efficient high-speed vessel before the wake wash height is less than that at design operational speeds. Since this could have a substantial impact to high-speed routes, this measure would only be practicable in specific areas that cannot be mitigated with any of the other measures.

To ensure that ferries do not exceed any slow speed limits that are set, a monitoring and enforcement program should be developed to ensure compliance with routes and speeds. This mitigation could provide funding for the Department of Fish and Game to monitor routes and speeds on a random basis.

Mitigation WW-1.6: If it is not possible to reduce impacts to less than significant levels using the previous mitigation measures, the proposed routes with potentially significant erosional wake wash impacts could be removed from consideration or terminal locations could be changed.

The routes that are most likely to have unmitigable wake wash impacts are those from San Francisco to Pittsburg and Antioch. These routes are within 1,500 meters of the shoreline beside long stretches of tidal marsh.

Impact after Mitigation: Impact WW-1 would be less than significant after successful implementation of one or more of the above mitigation measures. However, these mitigation

measures could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.

5.3.2.2 Potential Impacts to Marinas

Impact WW-2 **Increased frequency of ferry trips across the Bay could increase the wave heights at surrounding marinas, potentially damaging moored vessels and interfering with recreational users.**

Individual wave height is the primary factor of concern for impacts at unprotected marinas, due to the potential for damage of moored vessels, docks, etc., or potential safety issues for users of the marina.

For Alternatives 1 and 2, unprotected marinas could potentially be impacted throughout the Bay if individual wave heights from wake due to additional ferry service were significantly higher than existing waves.

For Alternative 3, unprotected marinas could potentially be affected, primarily in the Central Bay. However, because the vessels used would have the same or lower design wash heights as those currently in use, no significant impacts are anticipated to marinas.

Summary of Impact WW-2

- Alternatives 1 and 2 would involve expansion of ferry service and an increased number of ferry transits thereby potentially increasing wave heights impacting nearby marinas. They also include new routes across the Bay, with the potential to impact areas not currently served by water transit. Different routes or vessels could result in larger wave heights from wake wash reaching the shoreline. Unprotected marinas could potentially be impacted throughout the Bay if individual wave heights from wake due to additional ferry service were significantly higher than existing waves. Therefore, this impact is potentially significant.
- Alternative 3 uses existing ferry routes but includes increased frequency of trips. For Alternative 3, unprotected marinas could potentially be impacted primarily in the Central Bay. However, because the vessels used would have the same or lower design wash heights as those currently in use, no significant impacts are anticipated to marinas.
- Alternative 4 would not add new routes or increase the number of ferry transits in the Bay. Therefore, no impacts would occur above present conditions.

Mitigation WW-2.1: The mitigation measures for impacts to marinas are the same as for Mitigations WW-1.1 through WW-1.6.

Impact after Mitigation: Impact WW-2 would be less than significant after successful implementation of one or more of the above mitigation measures.

5.3.2.3 Potential Impacts on Indicator Species

Impact WW-3 **Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.**

California clapper rail, an endangered species, was used to represent shoreline habitat impacts from vessel wake. As discussed in Section 3.5.1.1, clapper rail are yearlong residents of emergent salt and tidal marshlands in the Bay Area, primarily in marshes south of San Mateo

Bridge and in San Pablo Bay. The known distribution of California clapper rail in the Bay Area is shown on Figure 3.5.12 in Section 3.5 (Biology).

Nests are typically constructed with their bases 10 to 20 cm above the ground and their tops 25 to 30 cm above the ground. Inundation of nests by wake wash has the potential to cause a significant negative impact on the endangered species' survivability during the nesting season (between February 15 and June 15). The nests are generally located at least 100 meters inland from the marshland shoreline.

Wake from passenger ferries near clapper rail nesting sites would not be likely to have detrimental impacts on nests located more than 50 meters from a healthy marsh fringe (see Appendix Wake-D). Wake wash could have significant impacts on nest sites located within 50 meters of the marsh fringe. It is also possible that wake wash could impact nesting areas less than 50 meters from a marsh fringe, under conditions of high wake energy and no wake attenuation (degraded marsh habitat).

Summary of Impact WW-3:

- Alternatives 1 and 2 would involve expansion of ferry service and an increased number of ferry transits thereby potentially increasing wake wash impacts to California clapper rail nesting sites. The alternative also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. Nesting sites could be within 50 meters of ferry routes in areas of Suisun Bay, and near Port Sonoma in the North Bay, and along the shoreline near the Redwood City and Moffett Field terminals in the South Bay. This impact could be potentially significant.
- Alternative 3 utilizes existing ferry routes, but includes increased frequency of trips. Because the vessels used would have the same or lower design wash heights as those currently in use, no significant impacts are anticipated to California clapper rail nesting sites. For Alternative 3, no nesting sites are within 50 meters of ferry routes.
- Alternative 4 would not increase the number of ferry transits or have new routes. Therefore, no impacts would occur above present conditions.

Mitigation WW-3.1: For any shoreline areas that have potential clapper rail nesting habitat within 50 meters of the edge of a marshland (or within marshland that does not appear healthy and could limit attenuation of wave energy as a result) and are along a proposed ferry route, habitat surveys should be conducted to determine if nesting sites exist. If nesting sites do exist within 50 meters of the edge of the marshland, site-specific measurements of wake attenuation should be performed at the potential site to determine if wash will be an issue. An analysis such as that provided as part of the documentation for the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model could be used to predict wave propagation and decay at high water (FEMA 1988). If the measurements/calculations indicate that nest inundation could potentially occur, one of the following additional mitigation measures may be necessary. For nesting sites more than 50 meters from the edge of the marshland, no significant impacts would occur.

Mitigation WW-3.2: Use of existing low wake vessel technology could reduce both the total wake wash energy and heights of individual waves. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less-than-significant levels.

Mitigation WW-3.3: New ferry routes could be adjusted to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels.

Mitigation WW-3.4: Operational adjustments, such as slowing the vessel down near sensitive areas, could be performed during ferry operation to reduce wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less-than-significant levels.

Mitigation WW-3.5: If no other mitigation could reduce impacts to less than significant, the proposed route could be removed from consideration or the terminal location could be changed.

Impact after Mitigation: Impact WW-3 would be less than significant after successful implementation of one or more of the above mitigation measures. Mitigation for any final specific routing that may cause a potentially significant impact should require a Biological Opinion from the U.S. Fish and Wildlife Service under the federal Endangered Species Act.

Impact WW-4 **Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites.**

Pacific harbor seals (*Phoca vitulina*) are common year-round in San Francisco Bay and are protected by the Marine Mammal Protection Act of 1972. Harbor seals haul out in groups ranging in size from a few individuals to several hundred seals. As discussed in the Biology Section, harbor seal habitats used as haul-out sites include tidal rocks, bay flats, sandbars, and sandy beaches and tend to be relatively consistent from year to year. Known locations of haul-out sites are shown on Biology Section Figure 3.5.14. Haul-out sites that support some of the largest concentrations of seals include Corte Madera Marsh and Castro Rocks in the Central Bay, Mowry Slough south of the Dumbarton Bridge, and Yerba Buena Island.

Ferries passing near sensitive areas such as haul-out sites could potentially disturb seals using these areas. As discussed in the Biology Section, seals react to both visual and acoustic disturbances from boats, kayaks, jet skis, aircraft, foot traffic, and dogs in the vicinity of haul-out sites. Disturbances that occur closer to the animals tend to provoke a stronger negative response.

Green et al. (2001) found that watercraft, especially those that exhibit erratic movements, are a common disturbance to seals on San Francisco Bay. Green et al. (2001) conducted studies of disturbances at Castro Rocks and Yerba Buena Island. They found that the average distance at which watercraft caused animals to flee the site (flush) was approximately 183 meters at Castro Rocks and approximately 133 meters at Yerba Buena Island. Larger boats such as tugboats and ferries tended to cause a flush at greater distance than smaller watercraft such as jet skis and kayaks. For example, at Castro Rocks, larger watercraft caused a flush at an average of approximately 264 meters (range 121-511 meters) while jet skis and kayaks caused a flush at an average of approximately 150 meters (range 10-500 meters). Watercraft that exhibit erratic movements such as sudden changes in speed or direction were more likely to cause a disturbance than those traveling at steady speeds, slow speeds and constant direction (Green et al. 2001; Kopec and Harvey 1995).

Ferry routes for Alternatives 1, 2, and 3 are generally well away from most haul-out sites in the Bay. Existing routes pass near Yerba Buena Island and Castro Rocks, two major haul-out sites in the Bay.

Because seal haul-out sites tend to be in rocky areas that experience significant natural wave action, and individual wake wash wave heights are smaller than those generated by average or normal winds, it is unlikely that wake wash from ferries would significantly impact seals. As described in the Biology Section, a greater concern for seals is the startle effect caused by sudden changes in vessel direction or location.

Summary of Impact WW-4

- Alternatives 1 and 2 would involve expansion of ferry service and an increased number of ferry transits thereby potentially increasing wake wash impacts to seal haul-out sites. It includes routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. Passing too close and disturbing marine mammals at these locations would be considered significant. The alternative also includes new routes across the Bay, with the potential to impact areas not currently served by water transit. This impact could potentially be significant.
- Alternative 3 includes routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. However, this alternative utilizes existing ferry routes and vessels used would have the same or lower design wash heights as those currently in use. Therefore no significant impacts are anticipated.
- Alternative 4 would not increase the number of ferry transits in the Bay or include new routes. Therefore, no new impacts are anticipated.

Mitigation WW-4.1: As discussed in Mitigation B-14.1 in the Biology Section (5.5), the National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters (this distance, however, does not take vessel speed or wash into account).

Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Given the site specific information available for San Francisco Bay (Castro Rocks) it is recommended that ferry routes should be at least 100 to 250 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations (see Biology Mitigation B-14.1 in Section 5.5).

Impact after Mitigation: Impact WW-4 would be less than significant after successful implementation of the above mitigation measure.

References

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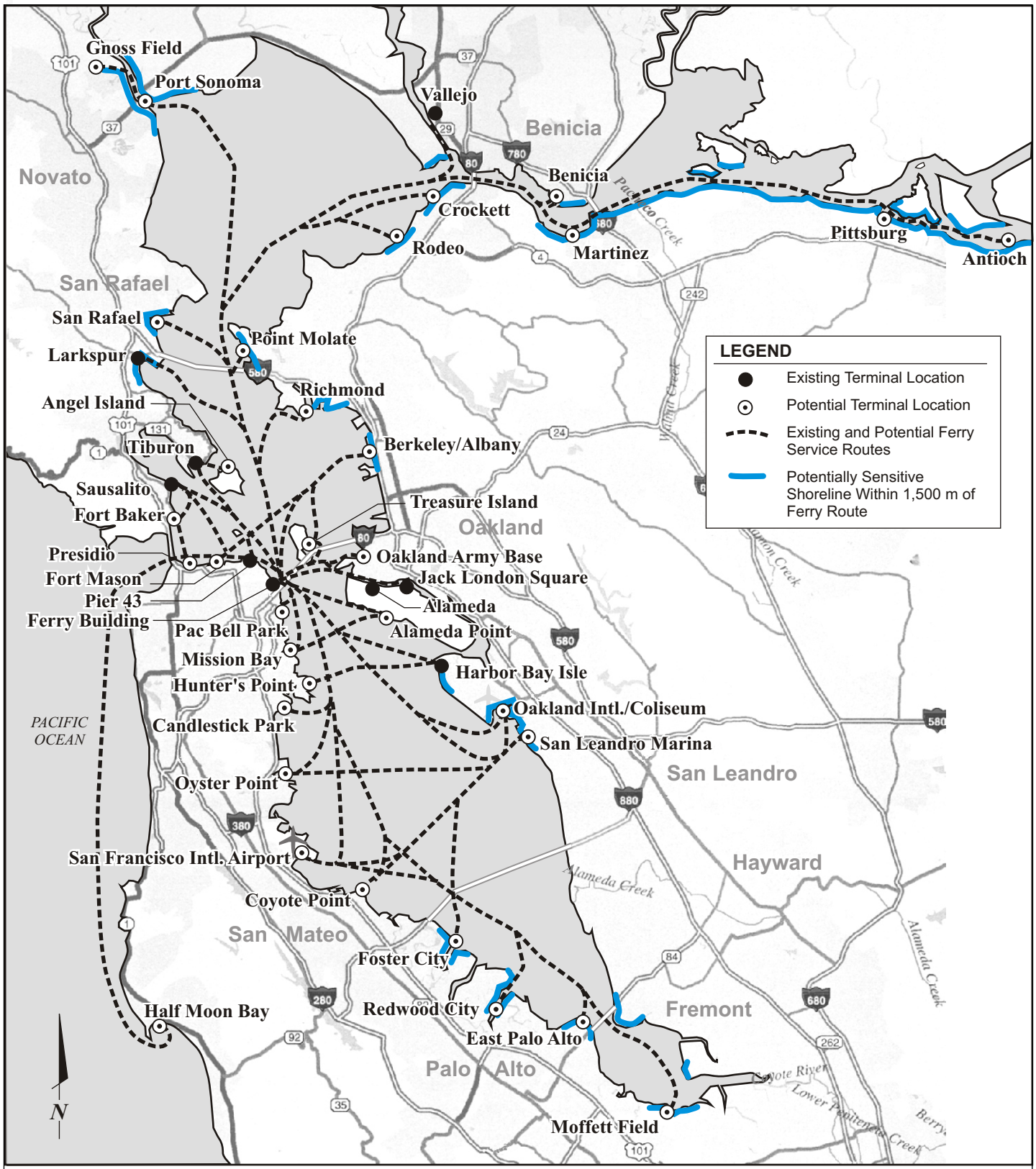
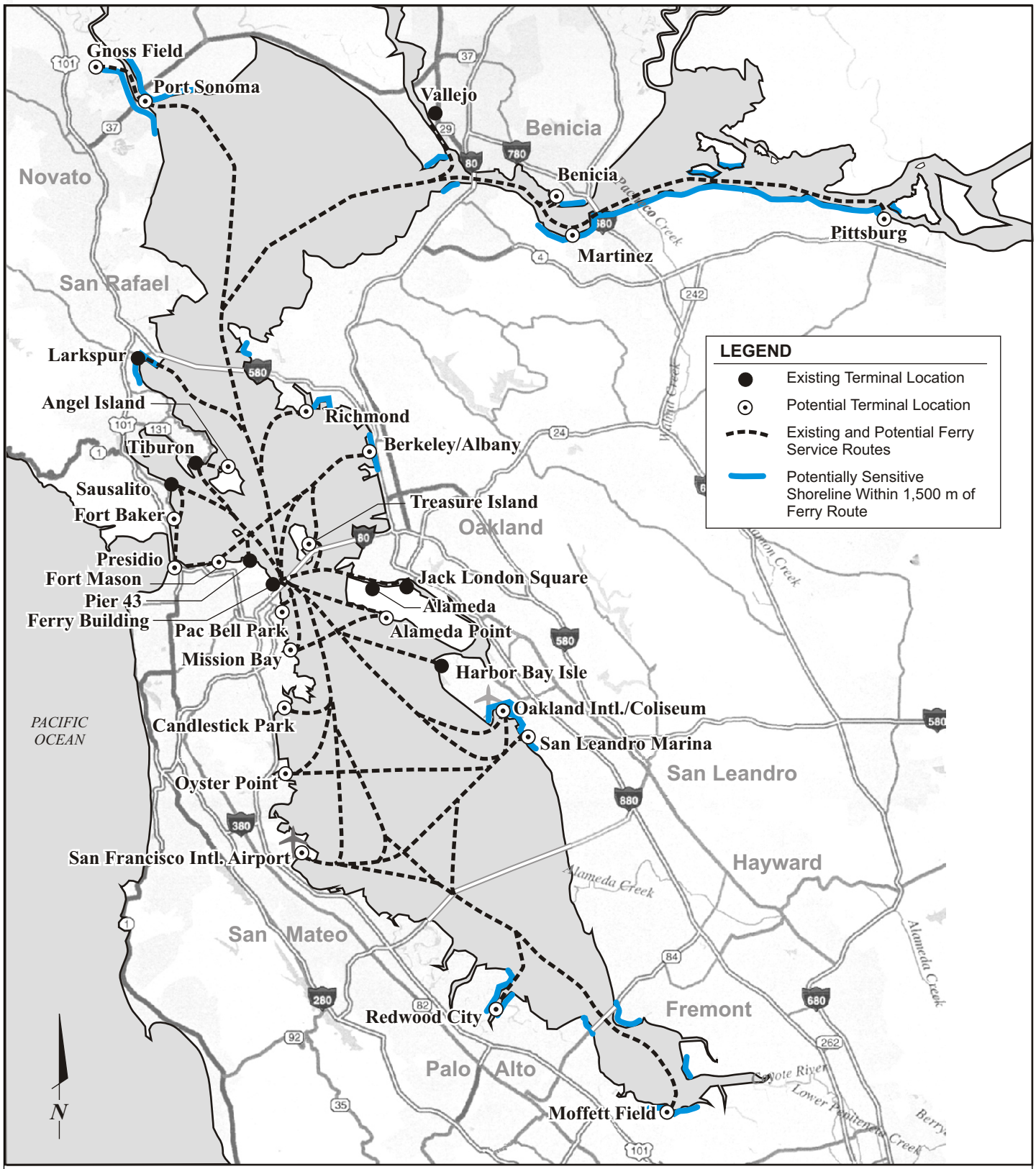
Kopec, D.A. and J.T. Harvey. 1995. Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay, 1989-1992. Moss Landing Marine Laboratory Technical Publication 96-4. Moss Landing, CA. October 10.



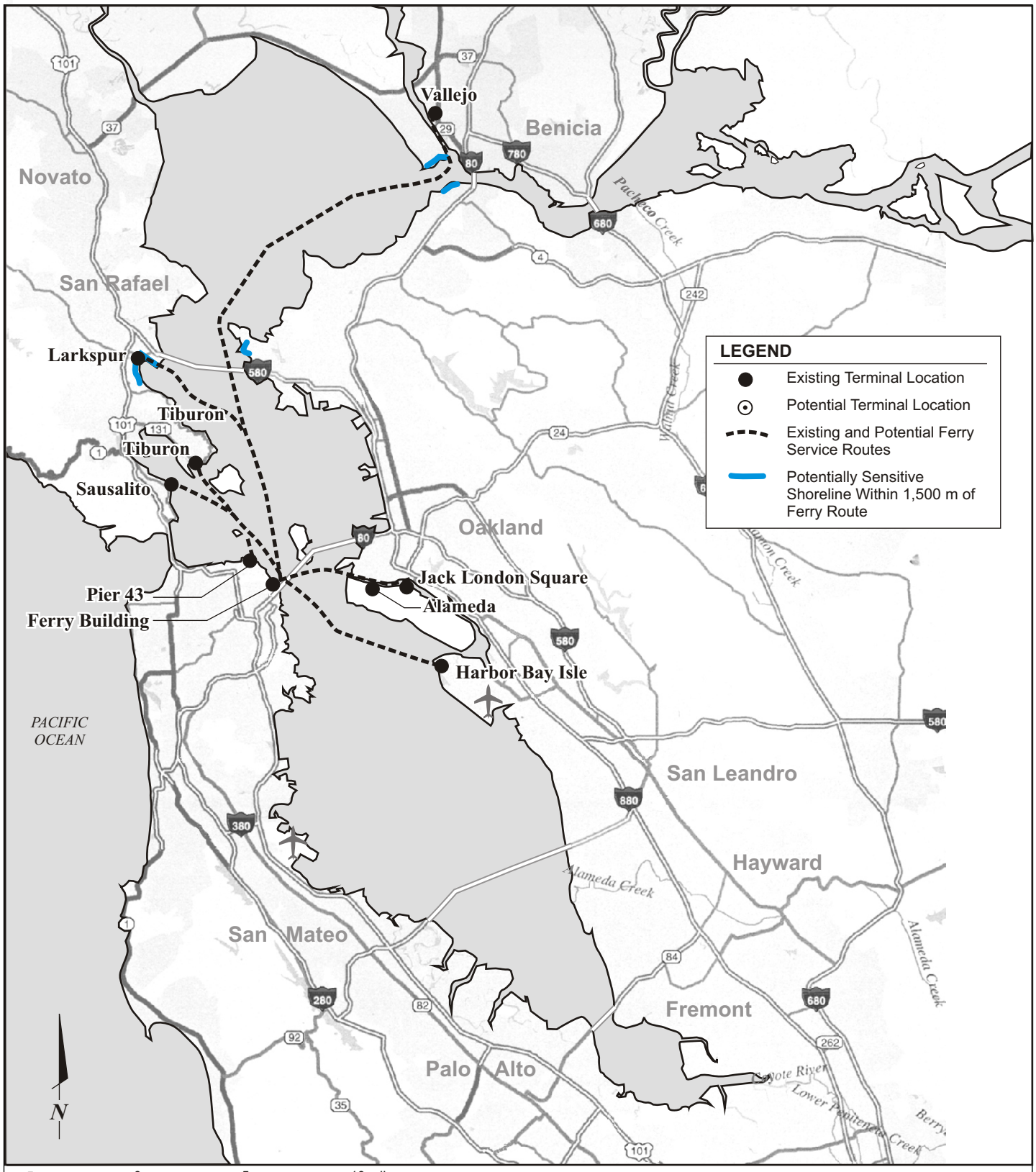
URS	Water Transit Authority Program EIR Project No. 28066519	Potentially Wake Sensitive Shoreline Based on 1,500 m Criterion - Alternative 1	Figure 5.3.1

5/14/03 vsa ...26066591 WTA\F5.3.1_wakeshore_ALT1.cdr



URS	Water Transit Authority Program EIR Project No. 28066519	Potentially Wake Sensitive Shoreline Based on 1,500 m Criterion - Alternative 2	Figure 5.3.2

5/14/03 vsa ..28066519 WTA\F5.3.2_wakeshore_ALT2.cdr



URS	Water Transit Authority Program EIR Project No. 28066519	Potentially Wake Sensitive Shoreline Based on 1,500 m Criterion - Alternative 3	Figure 5.3.3

5/14/03 vsa ...28066519 WTA\F5.3.3_wakeshore_ALT3.cdr

5.4 WATER RESOURCES

5.4.1 Significance Criteria

Impacts to water resources would be considered significant if they would:

- Substantially reduce ability to achieve water quality objectives consistent with improved habitat conditions;
- Cause a degradation in water quality from on-site stormwater discharges due to construction of new terminal facilities, including buildings, roads, parking lots, and associated structures;
- Cause substantial flood hazards to human safety and property damage due to construction of new terminal facilities within a floodplain; or
- Result in a substantial increase in the incidence of fuel spills from ferries.

5.4.2 Impacts and Mitigation

5.4.2.1 Construction and Operation

Impact W-1 **Construction and operation of terminal facilities including parking lots, access roads, and buildings, would increase the amount of impervious surface area at terminal sites causing an increase in stormwater discharge. If the stormwater came in contact with pollutants or eroded disturbed soil, discharge of the runoff could impact the quality of the receiving water.**

Stormwater pollution occurs when rainwater comes into contact with materials on-site and washes contaminants into storm drains, creeks, or directly into the Bay. Sources of pollution during project construction could include oil leaked from heavy equipment and vehicles, grease, hydraulic fluid or fuel, construction materials and products, waste materials, landscaping runoff containing fertilizers, pesticides or weed killers, and erosion of disturbed soil.

Stormwater discharges associated with project construction activities are regulated according to CCR Section 402(p) under the National Pollutant Discharge Elimination System (NPDES) Permitting System. Under the NPDES construction permit, owners of the proposed terminal locations where construction would disturb more than 1 acre of land would have to submit a Notice of Intent (NOI), develop a stormwater pollution prevention plan (SWPPP), conduct monitoring and inspections, retain records of the monitoring, report incidences of noncompliance, and submit annual compliance reports by July 1st of each year.

Summary of Impact W-1

- Alternatives 1 and 2 would involve construction activities and operation of new terminal facilities that could reduce water quality due to stormwater discharges. These impacts could be potentially significant.

- Alternatives 3 and 4 would not involve construction of new facilities and therefore would not result in increased stormwater discharges. No impact would occur.

Mitigation W-1.1: Adoption of measures during construction to prevent, minimize, and clean up spills and leaks from construction equipment would reduce the potential for impacts to water quality. Any equipment with a gas tank or other oil tank, such as heavy excavation machinery, must be considered as a potential source of released oil. Storage and parking of such equipment must take into account oil spill prevention regulations to ensure that the area is free of drains or other venues though which spills may escape containment. These measures must cover construction in new terminals and should to be included by the WTA in the development of an Implementation and Operations Plan.

Mitigation W-1.2: New terminal facilities should be designed such that stormwater runoff would be controlled and discharged in an appropriate manner. Construction and industrial stormwater NPDES permits would be required, and Best Management Practices (BMPs) should be used to reduce the chance of pollutants entering surface and groundwater and therefore reduce the potential for impacts to water quality. Typical pollution control measures include BMPs designed to reduce quantities of materials used that may produce pollutants, change the way various products and materials are handled or stored, employ various structural devices to catch and restrict the release of pollutants from the site, and set out appropriate responses to spills and leaks. The WTA should include BMPs in the development of its Implementation and Operations Plan. Some examples of BMPs include temporary silt fencing, protection devices such as rock aprons at pipe outlets, stabilized pads of aggregate at points where construction traffic would be entering or leaving an unimproved construction site to or from a public street, temporary drain inlet protection devices such as filter fabric and sand bags, concrete washouts for cement mixers, preservation of existing vegetation, vehicle and equipment cleaning, etc.

Impact After Mitigation: Impact W-1 would be less than significant after implementation of Mitigations W-1.1 and W-1.2.

Impact W-2 **Some shoreline areas of the Bay where terminals may be planned are within 100-year floodplains. Construction of new terminal facilities within a 100-year floodplain could expose people to the hazard of flooding and terminal facilities to flood damage.**

Some areas of the Bay along the shoreline and drainage areas leading to the Bay are potential floodplains. Risks associated with building in a floodplain include threats to life and property. The level of risk depends on the type facility; i.e., parking lots, ticket purchase stations, access roads, docks, etc., its location, and appropriate mitigation measures specific to each water transit terminal facility. Local city or county government agencies regulate floodplain construction, management, and mitigation through land use controls, based on determinations of flood elevations. The Federal Emergency Management Agency (FEMA) maintains maps of 100-year flood zones in the Bay counties, which are areas where a flood level have a 1 percent or greater probability of being equaled or exceeded in any given year.

Existing and proposed water transit terminal locations, not including access roads, have been evaluated for their location within the FEMA 100-year flood boundary, based on published FEMA maps (Figure 5.4.1). Two of the potential terminal sites, East Palo Alto and Moffett Field, lie within the 100-year floodplain as mapped by FEMA and may be subject to flooding depending on exactly where the terminal and associated facilities (parking lots, access roads)

could eventually be located. All other potential terminal sites appear outside of the FEMA floodplain areas, as currently mapped.

Summary of Impact W-2

- If all terminals considered in Alternatives 1 and 2 were implemented, construction of terminal facilities in areas within the 100-year floodplain that are subject to the risk of flooding would occur. Impacts at sites within the 100-year floodplain could be potentially significant.
- Alternatives 3 and 4 would not involve construction of new terminal facilities. Existing terminals are outside flood risk areas. Therefore, no impacts would occur.

Mitigation W-2.1: Base flood elevations in the area of the proposed facilities should be verified or determined from FEMA Flood Insurance Rate Maps (FIRMs) when specific sites are chosen. If construction within the 100-year floodplain cannot be avoided, new terminal facilities should be designed to minimize flooding (including retaining walls, levees, construction on fill), post flood hazard warnings, and develop flood evacuation plans. Construction and design should also account for the maximum flood level so that facilities are built above that mark. Terminal design and flood mitigation measures should be presented for approval to the local city or county governmental agency charged with flood control regulations.

Impact After Mitigation: Impact W-2 would be less than significant after implementation of Mitigation W-2.1.

5.4.2.2 Operation

Impact W-3 **Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.**

Marine oil spills can result from leaks or breaks in vessel fueling equipment, vessel accidents, mechanical or structural failures, or human errors such as valves left open or misaligned. Ferry refueling and other operations involving the handling of potentially harmful products and materials are carried out under strict U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) regulations prohibiting water pollution. Existing regulations and codes treat large vessels, including transit ferries, like major industrial facilities sited on land. They are recognized as potential "point specific" sources of water pollution. Detailed procedures and engineering requirements have been written into public law to prohibit harmful spills and discharges.

Data for water pollution from ferries in San Francisco Bay are presented in Table 3.4.1. Six incidents of pollution occurred from ferries from 1998 to 2001; the largest spill size was 15 gallons. The total number of ferry transits during the four years of record was 317,335, which means that approximately two one-thousandths of one percent of transits (0.002 percent) resulted in an incident of pollution. While statistics for the existing ferry system indicate a low-probability and low-volume situation, spills may continue to happen. Spills could occur in transit, as a result of a navigational incident, such as collision or grounding, or due to equipment failure or malfunction. Spills can also take place at the refueling station as a result of accidental releases or malfunctions.

Currently, each of the three Bay Area ferry operators has concentrated its fueling operations at a single company location (i.e., Larkspur, Mare Island and Pier 41). Current Bay Area ferry service requires approximately 77,000 gallons of fuel weekly to operate. Expansion of ferry service would require additional fuel storage and transfer capacity. This will require the expansion of existing fueling operations at the three centralized locations and/or the construction and operation of new fueling facilities at other locations to be determined. Both the expansion of existing facilities and the construction of new facilities would require permits according to relevant regulations and codes.

The National Oceanographic and Atmospheric Administration's (NOAA) Hazardous Materials Response and Assessment Division and Office of Response and Restoration have issued a fact sheet on small diesel spills, that is, in the range between 500 and 5,000 gallons (www.response.restoration.noaa.gov). This would be the general range of potential spills from vessels in the current and proposed ferry fleet. Diesel fuel is a light, refined petroleum product with a relatively narrow boiling range, meaning that, when spilled on water, most of the oil will evaporate or naturally disperse within a few days or less. According to the NOAA fact sheet, this is particularly true for small spills, even in cold water. Consequently, after a few days there is rarely any oil on the surface for oil spill responders to recover.

After spilling on water, diesel oil spreads very quickly to a thin film. Even when the oil is described as a heavy sheen, it is 0.0004 inches thick and contains about 1,000 gallons per square nautical mile of continuous coverage. Diesel has a very low viscosity and is readily dispersed into the water column when winds reach 5-7 knots.

Diesel oil is much lighter than water (specific gravity is about 0.85, compared to 1.03 for seawater). It is not possible for this oil to sink and accumulate on the seafloor as pooled or free oil. However, it is possible for the oil to be physically mixed into the water column by wave action, forming small droplets that are carried and kept in suspension by the currents. Oil dispersed in the water column can adhere to fine-grained suspended sediments, which would eventually settle on the estuary bottom. However, this process is not likely to result in measurable sediment contamination for small spills.

Diesel oil is not very sticky or viscous, compared to black oils. When small spills do strand on the shoreline, the oil tends to penetrate porous sediments quickly, but also tends to be washed off quickly by waves and tidal flushing. Shoreline cleanup is usually not needed. Diesel oil is readily and completely degraded by naturally occurring microbes, under time frames of one to two months.

Diesel is considered to be one of the most acutely toxic oil types. Fish, invertebrates and seaweed that come in direct contact with a diesel spill may be killed. However, according to the NOAA fact sheet, small spills in open water are so rapidly diluted that fish kills have never been reported. Fish kills have been reported for small spills in confined, shallow water. Crabs and shellfish can be tainted from small diesel spills in shallow, nearshore areas. Small diesel spills can affect marine birds by direct contact, though the number of birds affected is usually small because of the short time the oil is on the water surface. Mortality is caused by ingestion during preening as well as to hypothermia from matted feathers. According to NOAA's experience with small diesel spills, few birds are directly affected. However, small spills could result in serious impacts to birds under the "wrong" conditions, such as grounding of a vessel next to a large nesting colony or transport of diesel sheens into areas of high bird concentrations.

Summary of Impact W-3:

- Alternatives 1, 2, and 3 would involve expansion of ferry service and increased numbers of ferry transits. Alternatives 1 and 2 introduce new routes across the Bay, with the potential to impact areas not currently served by water transit. Alternative 3 utilizes existing ferry routes, but increased the frequency of trips. Based on the historic record, spills associated with ferry operations have an extremely low probability of occurrence. This has likely been due to the procedures followed by the ferry operators. Alternatives 1, 2, and 3 will not result in a substantial increase in the incidence of spills assuming continued use of similar procedures. This impact will likely not be significant in terms of its low probability and past record. However, a potentially significant spill could still occur.
- Alternative 4 would not increase the number of ferry transits in the Bay. Therefore, no impacts would occur above present conditions.

Mitigation W-3.1: Although this impact is considered a low probability, a spill still has the potential to occur and safety and avoidance measures are prudent. The Harbor Safety Committee of the San Francisco Bay Region adopted a Harbor Safety Plan in 1992 for San Francisco, San Pablo, and Suisun Bays. The plan, as mandated by the California Oil Spill Prevention and Response Act (OSPRA) of 1990, is aimed at improving the prevention, removal, abatement, response, containment, and cleanup and mitigation of oil spills in the state's waters. OSPRA also requires an annual review of the harbor safety plans to be submitted to the state Oil Spill Prevention and Response Administrator for comment and approval. The Bay Area ferry operators participate in the Harbor Safety Committee. The safety issues raised by expansion of ferries in the San Francisco Estuary and relevant recommendations and modifications will need to be incorporated into the annual plan review. A strengthened Harbor Safety Plan would reduce the potential for impacts to water resources resulting from expansion of ferry operations.

Mitigation W-3.2: Ferry operators need to update their contingency plans and continue to utilize emergency response services for pollution incidents. Several Oil Spill Response Organizations (OSROs) operate in the Bay and collaborate with the U.S Coast Guard (USCG), California Office of Spill Prevention and Response (OSPR), and other organizations in the Unified Command System during drills and spill responses. Ferry operators have retained OSRO services and maintain response equipment on board vessels and at ferry terminals. As part of the WTA ferry expansion program, the contingency plans, drill exercises, and emergency response service agreements would be reviewed, and modified if necessary, to reduce potential impacts to water resources resulting from spills. Such modifications would include ensuring that all the spill response equipment required at new terminals is made available. Review of updates and modifications to plans will be done under the USCG's regular oversight of oil spill contingency plans. The work of updating and expanding the spill response plans should be based on NOAA's Environmental Sensitivity Index (ESI). The ESI involves the systematic compilation in a standardized format of information related to coastal shoreline sensitivity, biological resources and human uses. ESI maps have been prepared for San Francisco Bay and are useful tool for setting protection priorities and cleanup strategies before a spill occurs (NOAA No Date).

Mitigation W-3.3: Development and maintenance of a regular program to train fueling operators on correct fueling methods to minimize spills due to human error or improper use of equipment would decrease the potential for spills. The WTA should sponsor such training and incorporate it as part of its Implementation and Operations Plan.

Mitigation W-3.4: New vessels to be adopted in a ferry expansion program and the equipment to service any new fleets should include technological designs to avoid fuel spills. The WTA Implementation and Operations Plan should require review of new vessels and equipment to be introduced to new routes and or for existing route service expansion

Mitigation W-3.5: Adoption of applicable measures recommended by the Ferry Safety Plan under preparation (ABS Consulting 2002) would minimize safety risks and prevent navigational incidents with the potential for spills. Ferry operators must take those new measures into account by ferry operators in their updates to contingency plans and OSRO service agreements.

Impact after Mitigation: The potential for Impact W-3 would be significantly reduced after implementation of Mitigations W-3.1 through W-3.5. Nonetheless, unintentional fuel releases may take place despite those measures. Site-specific emergency response and cleanup measures would be applied to address any actual spills and mitigate their impacts. Although there is a small chance of a fuel release, the potential to occur remains and could lead to a potentially significant impact.

References

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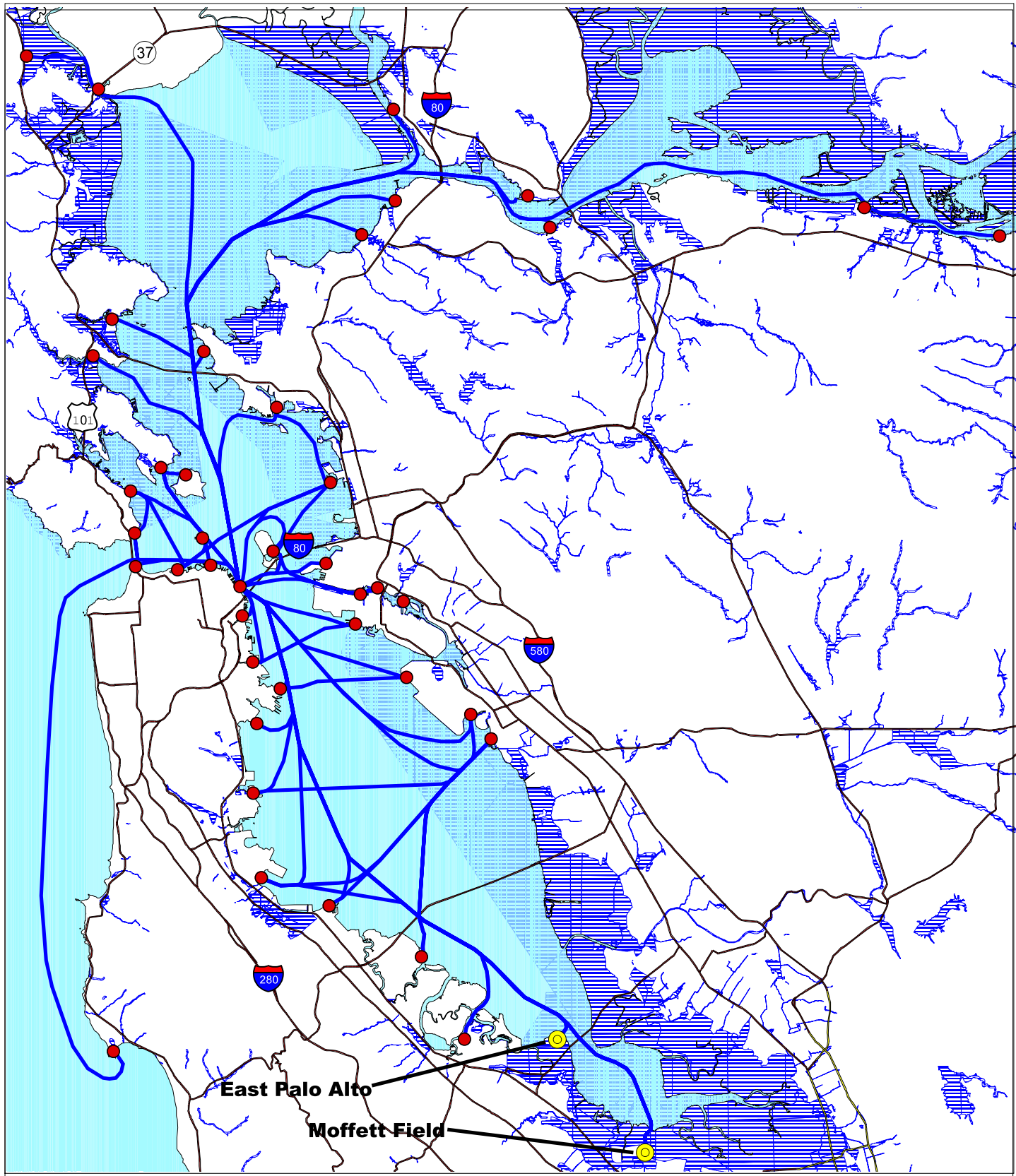
National Oceanographic and Atmospheric Administration (NOAA). No Date. www.mapfinder.nos.noaa.gov/ mapfinderHTML3/surround/esi/atlas.html



LEGEND

Primary Roads

FEMA 100-yr Floodplain

Proposed Ferry Terminal Within FEMA 100-yr Floodplain

Existing or Proposed Ferry Terminal Outside of FEMA 100-yr Floodplain

3 0 3 6 Miles

Scale 1:385,000

N

URS

Water Transit Authority Program EIR

Project No. 43-00066890

FERRY TERMINALS WITHIN FEMA 100-YR FLOOD ZONE

Figure 5.4.1

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5.5 BIOLOGY

The following section describes the potential impacts that expanded ferry service could have on the biological environment. It is organized by each major biological habitat or species type (e.g., overall Bay habitat, benthic environment, fish, marine mammals, etc.). Where applicable, impacts are distinguished between construction of ferry facilities and operation of vessels. This section is an evaluation of impacts from the overall ferry service expansion program alternatives and, therefore, the discussion addresses the overall potential for impacts and, where applicable, the mitigation measures that can be adopted to avoid or minimize these effects. Where differences in the magnitude or type of effect occur between alternatives, the differences are broken out per alternative. Otherwise, the impacts are discussed and evaluated for all of the program alternatives.

5.5.1 Significance Criteria

Impacts would be considered significant if they would:

- Substantially affect threatened, endangered, or protected species;
- Alter or diminish designated critical habitat[1] or special aquatic sites, including eelgrass beds, mudflats, and wetlands;
- Result in the reduction of protected wetland habitat as defined in Section 404 of the Clean Water Act and/or in Section 6610 of the San Francisco Bay Conservation and Development Commission (BCDC) McAteer-Petris Act or result in alteration of desirable functions and values through direct removal, filling, hydrological interruption, or other means;
- Cause the introduction or substantial spread of invasive nonnative plants or wildlife;
- Interfere substantially with the movement of resident or migratory fish or wildlife species;
- Cause substantial or sustained impact to spawning habitat of commercially important species (e.g., Pacific herring); and/or
- Cause underwater sound pressure levels during construction or operation that exceed National Marine Fisheries Service (NMFS) guidelines for protection of marine mammals (i.e., 160 decibels [dB] referenced to 1 micropascal [160 dB re 1 μPa]).

5.5.2 Impacts and Mitigation

5.5.2.1 Potential Impacts on Habitat

This section identifies impacts that could potentially affect biological habitat types. These habitat types include tidal marshes (including salt and brackish marshes), mudflats, agricultural baylands, salt ponds, and sandy or rocky shorelines.

[1] Habitat, whether occupied by listed species or not, that has been determined to be essential for the conservation and management of a listed species and has been formally described in the Federal Register.

Impact B-1 **Loss of jurisdictional wetland habitat could occur as a result of dredging and construction of terminal facilities if these facilities are located in or near wetland habitats.**

Construction of terminal facilitates and access channels under Alternatives 1 and 2 could result in the loss or disturbance of jurisdictional wetlands. The impact would be site-specific and would depend ultimately on the design and specific location of terminal facilities and access channels. Loss of jurisdictional wetland habitat would be considered a significant impact.

Habitat types in the vicinities of existing and potential terminals are shown on Figures 5.5.1 though 5.5.5. The following describes mapped wetland areas that occur in proximity to some of the sites and routes that could potentially be added or expanded with each alternative. New terminal sites, associated landside facilities, and access routes have not been specifically located or evaluated for the program EIR and, therefore, the following is a description of known wetland habitats in the general area that should be avoided if facilities are advanced for further consideration.

- Alternative 1 – Comprehensive System: Several Alternative 1 potential terminal locations could be located near large wetland areas, including Gnoss Field, Port Sonoma, East Palo Alto, and Moffett Field. Other locations near smaller wetland areas include Benicia, Martinez, SFO, Coyote Point, and Foster City.
- Alternative 2 – Expanded System: New terminal locations that could potentially result in wetland impacts include (from north to south) Pittsburg, Benicia, Martinez, Port Sonoma, Gnoss Field, SFO, and Moffett Field. As noted above, the latter three sites are located near large wetland areas.
- Alternative 3 – Enhanced System: Tidal marsh occurs near the Larkspur terminal; however, no new construction would be implemented for Alternative 3 (or Alternative 4, the No Project Alternative).

Summary of Impact B-1

- Alternatives 1 and 2 could potentially result in significant impacts to wetlands due to new construction.
- Alternatives 3 and 4 would not involve construction of new facilities and therefore would not result in direct removal of jurisdictional habitat. No impacts would occur.

Mitigation B-1.1: The above-mentioned locations, while having the potential for wetland impacts, have not been specifically surveyed for wetland habitat occurrence with respect to project features because no specific improvements are proposed. Existing mapping of wetlands, discussed in Section 3.5.1, was used to identify areas of known wetland presence, but these maps and databases are of a regional nature. As part of the environmental studies and documentation for specific projects, wetland areas should be delineated on a site-specific basis. Disturbance of wetlands should be avoided in the design of project features.

Mitigation B-1.2: In cases where wetland impacts are unavoidable, suitable compensatory mitigation should be designed and implemented in consultation with the appropriate regulatory agencies.

The Goals Project (1999) has described habitat restoration goals and 115 potential restoration sites around the Bay, representing tens of thousands of acres of potential habitat restoration. While not

all of these sites may be available or suitable for the types of mitigation necessary for impacts from terminal construction, there are large amounts of area that could potentially be used by the WTA for compensatory mitigation. Total area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation.

Impact after Mitigation: Impact B-1 would be significant if loss of wetlands could not be substantially avoided and/or successfully mitigated. The residual impact cannot be quantified until site-specific mitigation measures are designed and, thus, could be significant.

Impact B-2 Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.

Construction activities such as dredging in tidal wetland areas could result in the spread of nonnative invasive plant species that are of concern in San Francisco Bay. Of particular concern is the nonnative smooth cordgrass, *Spartina alterniflora*. This species has the ability to invade and exclude and/or hybridize with the native Pacific cordgrass, alter native northern saltmarsh habitat, colonize tidal mudflats, and reduce open-water areas, potentially resulting in reduced habitat for foraging shorebirds, fish, and invertebrates. Most smooth cordgrass occurs in the South Bay (SFEISP 2002).

Dredging in areas of nonnative cordgrass infestations could increase the spread of this species by creating root fragments and rhizomes that could disperse with the tides. Erosion from ferry operations, which could disperse root fragments and rhizomes, is not expected to be significant when using the prescribed measure discussed under Wake Wash Impact WW-1.

Summary of Impact B-2

- Alternatives 1 and 2 could involve construction of new facilities, several of which are in the South Bay where smooth cordgrass is most widely distributed. According to mapping by the Invasive Spartina Project, this species may occur in areas near the potential San Leandro, Oakland Airport/Coliseum, Oyster Point, SFO, Coyote Point, Foster City, Redwood City, East Palo Alto, and Moffett Field terminal locations. Spread of this species due to project construction would be considered significant.
- Alternatives 3 and 4 would not involve new dredging; thus, no impacts are expected.

Mitigation B-2.1: Preconstruction surveys by a qualified biologist/botanist should be conducted to identify and map areas of smooth cordgrass within potential terminal locations where this species could potentially occur. Identified areas of nonnative cordgrass should be removed to the extent feasible prior to dredging activities. The methods of removal should be developed in coordination with the U.S. Army Corps of Engineers (USACE). Eradication of this species at a site should be done well in advance of construction.

Impact after Mitigation: Impact B-2 would be less than significant after successful implementation of Mitigation B-2.1.

Impact B-3 **Project construction could result in the removal of or disturbance of "Special Aquatic Sites" including eelgrass beds, mudflats, and wetlands.**

Eelgrass beds, mudflats, and wetlands are considered special aquatic sites and are subject to USACE jurisdiction under Section 404 of the Clean Water Act and BCDC jurisdiction under Section 66605 of the McAteer-Petris Act. Eelgrass in the Bay provides spawning habitat for herring, serves as a nursery ground, and provides shelter for juvenile fish, among other functions. Mudflats serve as important foraging areas for shorebirds species and provide shallow-water habitat for juvenile fish.

Eelgrass and mudflats could be impacted directly by removal or disturbance during dredging. Deepening areas to create channels could result in the permanent loss of these habitat types. In addition, eelgrass beds may be impacted indirectly during construction by sedimentation of areas adjacent to dredging operations. Potential removal or other disturbance causing degradation to eelgrass beds or mudflats would be considered a significant impact.

For Alternatives 1 and 2, any of the potential terminal locations that would require dredging could result in the removal of mudflat habitat in nearshore areas. Though site-specific surveys have not been conducted, for Alternative 2, locations that have the potential to include mudflats to varying degrees include Moffett Field, SFO, Oakland International Airport/Coliseum, Berkeley/Albany, Port Sonoma, and Martinez. Alternative 1 would include these as well as Crockett, Hercules/Rodeo, San Rafael, Coyote Point, Foster City, East Palo Alto, and Moffett Field.

Known eelgrass beds are located near the entrance to the potential Richmond terminal and at Coyote Point. Coyote Point would not be affected by Alternative 2. Routes that could use low or no-draft vessels (e.g., approaching Moffett Field, East Palo Alto) may avoid or substantially minimize the direct permanent loss of mudflat habitat.

In addition to potential impacts from dredging, eelgrass may also be affected by ferry operations (e.g., wake and prop wash) if vessels pass in close proximity to eelgrass beds. As noted above, known eelgrass beds occur in proximity to Richmond and Coyote Point.

Potential wetland impacts are addressed under Impact B-1.

Summary of Impact B-3

- Alternatives 1 and 2 would require dredging to access potential terminal locations. This dredging may impact mudflats and/or eelgrass beds. Impacts to these special aquatic sites would be considered significant.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Mitigation B-3.1: Disturbance of eelgrass beds and mudflats should be avoided in the design of project features and routing of ferries.

Mitigation B-3.2: As part of the environmental studies and documentation for specific projects, specific areas of eelgrass beds and mudflats that could be impacted should be specifically determined.

The general locations of eelgrass beds in the Bay were mapped in the late 1980s (Figures 3.5.15 through 3.5.17). However, recent comprehensive mapping of eelgrass beds in the Bay has not been conducted. If any project construction were to occur in the vicinity of any of these known beds, updated mapping of the extent of the beds should be conducted. Methods include use of side-scan

sonar techniques, possibly in conjunction with other techniques such as visual surveys. In addition, areas that are less than 3 meters deep may have a reasonable potential to support eelgrass while areas less than 1.5 meters deep have a moderate potential to support eelgrass. Areas such as these should be surveyed to determine the current status of eelgrass prior to design and construction, and this information should be used to avoid or substantially minimize impacts.

In cases where impacts to eelgrass beds or mudflats are unavoidable, suitable compensatory mitigation should be designed in consultation with the appropriate state and federal agencies such as the USACE, the U.S. Environmental Protection Agency (USEPA), California Department of Fish and Game (CDFG), BCDC, and the San Francisco Bay Regional Water Quality Control Board (RWQCB). However, it should be noted that very little eelgrass mitigation has been done in San Francisco Bay and that mitigation of eelgrass impacts may not be feasible or successful in all cases.

If eelgrass is unavoidable or impacts cannot be reduced to an acceptable level, compensation or offsetting mitigation options could be further investigated. Mitigation should provide enhanced functions and values relative to the impacted special aquatic sites. A mitigation plan should be prepared that identifies the specific habitat restoration methods, the criteria to be used for monitoring and evaluating the success of the mitigation effort, and a contingency plan if the mitigation fails.

Mitigation B-3.3: Indirect impacts to eelgrass beds from sedimentation may be avoided or reduced through the use of silt curtains to protect the beds from sedimentation or other methods that would otherwise protect the eelgrass from turbidity plumes generated during dredging. Mitigation for indirect effects would need to be evaluated on a case by case basis as the techniques used may differ from site to site. For example, at a given location, the specific dredging requirements and the potential for sediment plume generation and specific areas that may be impacted by the sediment plume should be evaluated. If it appears eelgrass could be affected by sedimentation, site-specific conditions (depth, etc.) and local tidal currents would be assessed to determine the best way to deploy mitigation such as silt curtains.

Impact after Mitigation: The applicability and potential for success of eelgrass impact mitigation should be determined on a site-specific basis. For some sites, impacts would be less than significant after implementation of Mitigations B-3.1 through B-3.3. However, for some sites, impacts could still be potentially significant.

5.5.2.2 Potential Effects on Plankton/Productivity

Impact B-4 **Turbidity caused by dredging would reduce light penetration in the water column and could locally reduce phytoplankton production.**

Increased sediment concentrations in the upper water column reduce sunlight penetration, which in turn can reduce the depth of the zone in which phytoplankton are productive. Phytoplankton productivity is reduced at suspended sediment concentrations that may occur in estuaries during periods of high runoff or when wind and currents agitate sediments.

The Port of Oakland evaluated turbidity plumes associated with clamshell dredging operations for its 50-foot deepening project (Port of Oakland 1998). The results indicated that increases in turbidity tended to be localized, with the most concentrated portion of the plume located near the bottom and with decreasing concentrations nearer the surface. The studies showed that light transmissivity in a 13-meter (42-foot) water column decreased by approximately 5 percent (from 40

to 35 percent transmissivity) in near-surface waters, while transmissivity near the bottom decreased by as much as 35 percent (to only 5 percent transmissivity at the bottom).

Turbidity plumes are anticipated to dissipate quickly after dredging activities are completed. Sand settles very rapidly, in a matter of minutes. Silts settle more slowly, on the order of approximately 1.2 meters (4 feet) per day. Very fine clay particles can remain suspended in the water column for longer periods of time.

The impact of dredging and dredge material disposal on phytoplankton is anticipated to be localized to the dredging areas (within 100 to 200 meters) and short-lived because the material dissipates and settles relatively quickly out of the upper water column.

Due to the relatively small scale of dredging operations for most projects (and assuming that not all dredging for all potential locations would occur simultaneously), it is unlikely that any of the dredging necessary for construction of new terminals, access channels, or maintenance dredging would result in a reduction in phytoplankton productivity that would significantly affect Bay-wide production at other trophic levels (e.g., benthos, fish, etc.). However, each individual project should be reviewed with respect to dredging needs, sediment types, and local current conditions to evaluate the potential dredge plume at a given location.

No established threshold of significance exists for this impact; however, the impact of increased suspended solids on estuary zooplankton is not expected to be significant for the same reason stated above for phytoplankton: primarily because turbidity plumes are expected to be localized and short-lived.

Summary of Impact B-4

- Alternatives 1 and 2 would require dredging to access potential terminal locations. This dredging could cause turbidity plumes that could locally reduce phytoplankton productivity during the period that dredges are operating. This impact to productivity in the Bay is expected to be local and short-lived. This impact is expected to be less than significant.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

No long-term impacts to plankton and productivity are expected from implementation of the ferry system alternatives.

5.5.2.3 Potential Effects on Benthos

Potential impacts to benthic communities that could occur during construction of new terminals or dredging new channels include:

- Removal of benthic organisms during dredging operations and sedimentation in adjacent areas;
- Temporary loss of benthic prey items for larger animal species such as fish, birds, and mammals; and
- Potential reduction of native benthic species and increases or spread of nonnative species during the recolonization of bottom habitat disturbed by construction activities.

Impact B-5 **Disturbance of benthic habitat from dredging could result in the temporary loss of benthic (bottom dwelling) organisms.**

Dredging of sediments for creation of channels, which would be necessary under Alternatives 1 and 2, could result in the temporary loss of benthic (bottom dwelling) organisms in dredged sediments. Some benthic species serve as sources of food for diving birds, fish, and mammals such as harbor seals and, thus, the loss of organisms could temporarily and locally decrease food resources.

In addition to the direct loss of organisms, additional organisms could be impacted by the settling of suspended sediments in areas adjacent to the dredging operations. This increased sedimentation could potentially bury fauna or clog feeding and respiration structures. The potential impacts of sedimentation would be dependent on the amount of dredging, current patterns, rate of accumulation, and the types of benthic organisms present. For example, burrowing organisms would likely be less impacted or could withstand deeper burial than surface and suspension feeding organisms, which do not possess a strong ability to burrow upward through newly deposited sediments. Studies reported by the Port of Oakland (1998) suggested that average critical burial depths ranged from 5 centimeters maximum for surface feeders to 30 centimeters for active burrowers.

Effects on adjacent areas could be minimized through the use of physical containment systems such as silt curtains. Feasibility of the use of silt curtains would need to be evaluated on a site-specific basis. Silt curtains tend to be logistically difficult to deploy and ineffective in areas of high current velocity.

Following dredging, disturbed areas are anticipated to recolonize, first with opportunistic species. These species, characterized by rapid growth and reproduction, may not be the same species that were present in the area prior to the disturbance. Marine benthic invertebrates usually colonize disturbed sedimentary habitats via pelagic larvae that settle from the water column. Early colonists are often polychaete worms with opportunistic life histories, which includes short generation times, high number of larvae, and high mortality rates (Oliver et al. 1977; Lenihan and Oliver 1995; Conlan et al. 1998).

Routine maintenance dredging would continue to periodically disturb the benthic community.

Summary of Impact B-5

- Alternatives 1 and 2 would require dredging to access potential terminal locations. This dredging could result in the removal of benthic organisms from the dredged areas. In addition, some loss or degradation of the benthos in areas immediately adjacent to the dredged areas is anticipated due to increased sedimentation. The disturbed areas are expected to recolonize with organisms once the dredging is complete; thus, benthic prey items would return. The temporary loss of benthic organisms is considered less than significant given the total areas of potential dredging under Alternatives 1 and 2 relative to the available benthic habitat in the Bay and assuming that not all dredging for all locations would occur simultaneously. Total dredging for the project, assuming full buildout of Alternative 1, would disturb approximately 0.1 percent of shallow benthic habitat in the Bay.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Impact B-6 **Disturbance of habitat from dredging may result in the spread of nonnative benthic invertebrate species.**

San Francisco Bay has been disturbed by a wide variety of human activities, including the introduction of nonnative benthic invertebrates (Cohen and Carlton 1995; Cohen 1996). Among the benthic infauna, the average number of introduced species is highest throughout the main estuary and into fresh-brackish water habitats (34-79 percent); is lower in the Central and South Bay marine muddy habitats (23 percent), and is lowest in the Central Bay sandy habitats (11 percent) (Lee et al. 1999). The opportunistic life histories of many introduced species are widely recognized; they are similar to early colonists in a natural succession. However, unlike early native colonists, some nonnative species can be strong competitors that persist and are not replaced by less opportunistic native species later in succession (Nichols et al. 1985). Certain nonnative species such as *Potamocorbula* appear to have a greater impact on the ecosystem than other species. Lee et al. (1999) indicate that although the Bay has been invaded by more than 200 species, only a small subset, such as *Potamocorbula*, mitten crabs, and green crabs, are considered to pose a threat to ecosystem sustainability. Many of the nonnative species inhabiting the Bay serve ecological functions similar to native species.

Disturbance of sediments from dredging operations could lead to recolonization of the disturbed areas by increased densities of nonnative species. However, given the areas that could be dredged under Alternatives 1 and 2 relative to the available benthic habitat in the Bay (0.1 percent under full buildout of Alternative 1), this impact is not considered significant. In addition, as mentioned, many nonnative species serve ecological functions (e.g., prey items) similar to native species. The project would not result in the introduction of any new species to the Bay.

Summary of Impact B-6

- Alternatives 1 and 2 would require dredging to access potential terminal locations. Recolonization after dredging could result in an increase in the number of nonnative species in the disturbed areas. However, based on the small areas that could be dredged relative to the available benthic habitat in the Bay (0.1 percent under full buildout of Alternative 1), and given that most nonnative species serve ecological functions similar to native species, this impact is considered less than significant.
- Alternatives 3 and 4 would not involve new dredging; thus, no impacts are expected.

5.5.2.4 Potential Effects on Fish

Impact B-7 **Dredging could adversely affect fish species near the construction activities.**

Increased turbidity levels caused by dredging can adversely affect dissolved oxygen levels in the water and oxygen uptake by fish in the immediate vicinity of the plume due to clogged or lacerated gills. Studies cited by the Port of Oakland indicated that juvenile Chinook salmon showed damage to the gill tissues after exposure to suspended solids concentrations of 1,547 mg/L for 96 hours. Because fish tend to avoid areas of high turbidity and return when concentrations of suspended solids are lower, impacts are generally expected to be minimal. Nevertheless, dredging in areas where fish migrate or otherwise could not avoid the sediment plume could be potentially significant. Impacts due to dredging are discussed further under Impact D-4.

Summary of Impact B-7

- Alternatives 1 and 2 would require dredging that could adversely affect fish species and movements. This impact is considered potentially significant.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Mitigation B-7.1: Mitigation for Impact B-7 is the same as discussed under Impact D-4.

Impact after Mitigation: Impact B-7 would be reduced after implementation of Mitigations D-4.1 and D-4.2, and D-4.3 (Section 3.1). Implementation of site specific mitigation measures at the project level would further reduce Impact B-7 to less-than-significant levels.

Impact B-8 Dredging and associated turbidity could affect spawning by Pacific herring.

Increased turbidity and sedimentation could adversely affect Pacific herring (*Clupea harengus*), a commercially important species which spawns in the Bay. The herring attach their eggs to hard substrates (rock, pilings, etc.) and vegetation, including eelgrass, in areas primarily located in the Central Bay (see Figure 3.5.6). If dredging occurred during spawning season (December through March) in areas where spawning has occurred, eggs attached to these substrates could be impacted by sedimentation. Herring could also be excluded from areas where they might otherwise spawn if construction activity were occurring and turbidity levels were high. Since this species is commercially important, impacts to herring spawning would be considered significant.

Herring spawning generally occurs in the central portion of the Bay (Figure 3.5.6). Alternative 1 terminal locations within known herring spawning boundaries that could require dredging include the Presidio, Candlestick Point, Mission Bay, SFO, Coyote Point, Harbor Bay Island, Berkeley/Albany, and Richmond. Alternative 2 would include the Presidio, Mission Bay, SFO, Harbor Bay Island, and Berkeley/Albany.

Summary of Impact B-8

- Alternatives 1 and 2 would require dredging at some locations in the Bay used by herring to spawn. Turbidity and sedimentation could adversely affect herring eggs. This impact would be considered potentially significant.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Mitigation B-8.1: Dredging should be avoided in known herring spawning areas during the spawning season. If dredging must occur during this time period, qualified biological monitors should be present to monitor spawning in the work area. If spawning is noted in the construction area, dredging operations should be halted in areas where high turbidity could affect the attached eggs. The dredging should be halted until the eggs have hatched. In San Francisco Bay, this is typically 10 to 15 days (average = 10.5 days) (Goals Project 2000).

Mitigation B-8.2: The use of silt curtains while dredging may reduce turbidity adjacent to the dredging area. The use of silt curtains, however, would need to be evaluated on a site-specific basis to determine feasibility for a given area. Silt curtains can to be logistically difficult to deploy and can be ineffective in areas of high current velocity.

Impact after Mitigation: Impact B-8 would be less than significant after implementation of Mitigations B-8.1 and B-8.2.

Impact B-9 **Underwater noise from pile driving and other construction activities could affect nearby fish.**

Fish could be temporarily displaced by noise from construction activities (barges, workboats, etc.), but would return once the construction activities ceased.

Construction activity associated with pile driving will result in increased underwater noise and acoustic pressure waves. Underwater noise and acoustic pressure resulting from pile driving could affect aquatic resources by causing both behavioral avoidance of the construction area and/or sublethal or lethal effects on sensitive species. Fish mortality resulting from pile-driving activities could be considered a significant impact, particularly if the activity results in take of listed species such as winter-run chinook.

The severity of adverse effects on fish (e.g., behavioral avoidance) is dependent upon a number of factors, including the concentration and location of fish within the area, species-specific differences in sensitivity to acoustic pressures, the depth of water, bottom- and surface-water characteristics, and the type of pile (steel, concrete, and hammer size). Exposure to sound pressure levels associated with pile driving also decreases in water exponentially as a function of the distance from the source.

Sound pressure levels of 180 dB re 1 μPa are known to cause permanent injury to the lateral line and inner ear of fishes (Hastings et al. 1996). Damage to these organs results in disorientation and the inability to locate food and avoid predators. Delayed mortality may also occur. Exposure to low-frequency underwater sound may also result in reduced hatching rates of fish eggs and reduced larval fish survival. Fish eggs are known to be especially vulnerable to vibration and acoustic pressure waves during the first few days after fertilization. Fish larvae and small juvenile fish have been found to be much more vulnerable to elevated sound pressure levels than adult fish (Yelverton et al. 1975).

Although specific designs are not available, it is assumed that any piles needed to construct terminal facilities would likely be small (24- to 36-inch diameter) and would likely be concrete as is typically used in these applications. Concrete piles tend to generate lower underwater sound pressure levels than steel piles. In addition, smaller piles need much smaller hammers, resulting in lower underwater sound pressure levels than large piles. Pile driving for terminal facilities would be very unlikely to generate sound pressure levels even close to those referenced above. Therefore, it is not expected that significant fish mortalities would result from driving small concrete piles. However, further analysis would be needed once specific designs and specifications for individual projects are known.

Recent experience in San Francisco Bay during a pile installation test for the Bay Bridge East Span indicated that the use of large pile drivers can result in the mortality of fish with swim bladders (Caltrans 2001). Pile driving for the Bay Bridge East Span test resulted in fish mortalities. The Bay Bridge project, however, is using large (8-foot-diameter, approximately 300-foot-long) steel piles and some of the largest pile-driving hammers available. Pile driving for terminal facilities would include much smaller concrete piles and would be unlikely to have the same sorts of impacts as the much larger-scale Bay Bridge project.

Summary of Impact B-9

- Alternatives 1 and 2 could require pile driving. Fish mortality from this activity could potentially be a significant impact.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Mitigation B-9.1: Mitigation for this potential impact would need to be evaluated on a site-specific basis. Once specific designs and construction specifications are know for a particular site, sound pressure levels should be estimated to the extent possible. Underwater sound monitoring should be conducted if estimated sound pressure levels could approach those that may harm fish (e.g., 180 dB). Measures to reduce sound pressure levels in surrounding waters, such as bubble jackets surrounding the piles, may need to be deployed if sound pressure levels exceed those that could harm fish.

Impact after Mitigation: Impact B-9 would be less than significant with successful implementation of Mitigation B-9.1.

5.5.2.5 Potential Effects on Birds

Impact B-10 **Construction could result in loss of habitat for waterfowl, shorebirds and other birds.**

Construction in tidal wetlands and dredging of mudflats could result in the loss of foraging, roosting, and possibly nesting habitat for various bird species. The impact would be site specific and would depend on the design and specific location of terminal facilities and access channels. Loss of habitat could be considered a potentially significant impact. The impacts to general habitat are further discussed under Impacts B-1 and B-3.

Summary of Impact B-10

- Alternatives 1 and 2 could potentially result in significant habitat impacts due to new construction.
- Alternatives 3 and 4 would not involve construction of new facilities and therefore would not impact habitat.

Mitigation B-10.1: Mitigation for Impact B-10 is the same as for Impacts B-1 and B-3.

Impact after Mitigation: Impact B-10 would be less than significant with successful implementation of Mitigation B-1.1 and/or Mitigations B-3.1 through B-3.3.

Impact B-11 **Ferry traffic (primarily in South Bay) could disturb roosting and foraging waterfowl in shallow areas of the Bay.**

San Francisco Bay is an important stopover for many species of migratory waterfowl in the Pacific Flyway. Waterfowl are sensitive to the noise level, speed, size, and visual effects of travelling vessels, and generally react to this disturbance by flushing (taking flight away from the area of disturbance). Huffman (1999) noted that after repeated disturbance events, the number of birds in an area would decrease and subsequent disturbances resulted in greater proportions of birds leaving the area. Birds generally returned to an area after a 10- to 35-minute period of no disturbance. The

degree of tolerance to disturbance from vessel traffic varies greatly depending upon the species, tide, flock characteristics, location, and season (Davidson and Rothwell 1993; Mori et al. 2001; Keopff and Dietrich 1986 in Hockin et al. 1992). Surf scoters, canvasback, and lesser scaup appear to be more sensitive than other species (Goals Project 2000; Korschgen and Dahlgren 1992; Korschgen et al. 1985; Huffman 1999).

When waterfowl flush or take flight when disturbed, they often circle several times before landing (Huffman 1999). Flying is a high-energy activity for waterfowl (Korschgen and Dalhgren 1992) and frequent flying due to human disturbance may take away from the energy reserves that would normally be used to complete migration. Large flocks appear to be more susceptible to disturbance than small flocks and canvasback and scaup are especially vulnerable (USFWS 1992; Mori et al. 2001).

The projected ferry routes for full buildout of Alternatives 1 and 2 would bisect areas of the Bay that are used as foraging and roosting areas for diving birds, particularly surf scoter, canvasback, lesser and greater scaup, and ruddy duck. Other waterfowl, such as dabbling ducks, typically utilize habitat such as salt ponds and marshes more frequently than open-water habitat in the Bay (Accurso 1992), and may be less impacted by disturbance from ferries.

Disturbance to waterfowl would be greatest with Alternatives 1 and 2 in the South Bay (from approximately the San Mateo Bridge south) due to the relative number of ferry routes and proposed frequency of trips that bisect the Bay in areas where vessel traffic frequency is now relatively low. South Bay routes (particularly those that cross areas less than about 6 meters in depth), in combination with the frequency of ferry traffic, could disturb roosting and foraging waterfowl more often (than existing conditions) and leave less undisturbed open-water habitat for the birds. Figures 3.5.7 and 3.5.8 indicate use of the shallow areas by waterfowl and show potential ferry routes. If it is assumed that waterfowl within 100 meters of a ferry route would be disturbed as a ferry passes, then approximately 6,326 and 5,061 acres of shallow, open-water habitat would be routinely disturbed by passing ferries for Alternatives 1 and 2, respectively. These acreages represent approximately 6 (Alternative 1) and 7.5 (Alternative 2) percent of the available shallow bay habitat. This disturbance does not represent a permanent loss of habitat, but rather the area of habitat where disturbance may take place. Waterfowl may use these when ferries are not present.

A terminal at Port Sonoma would add a route across San Pablo Bay that would increase vessel traffic frequency over current usage in this area; however, large areas of San Pablo Bay would remain undisturbed by ferry traffic, leaving undisturbed shallow open-water roosting and foraging habitat. This impact is considered potentially significant for routes in the South Bay.

Alternative 3 would increase vessel frequency on existing routes. These routes are generally within the deeper portions of Central Bay and the shipping channel to the north where waterfowl densities are lowest. Therefore, potential impacts are not considered to be significant.

Summary of Impact B-11

- Alternatives 1 and 2 would add ferry routes that would bisect areas of waterfowl roosting and foraging habitat. Large portions of San Pablo Bay in the north would remain undisturbed by ferry traffic. In the South Bay, however, the number of routes and frequency of ferry traffic, particularly shallow areas south of SFO, could increase the frequency that flushing of waterfowl flocks occurs and reduce the amount of undisturbed open-water habitat. This impact would be considered potentially significant.

- Alternative 3 would increase vessel frequency on existing routes where roosting and foraging waterfowl densities are lowest. This impact would be less than significant.
- Alternative 4 would not result in changes to existing service and no new impacts are expected.

Mitigation B-11.1: Ferry routes, particularly in the South Bay, should be consolidated within common corridors to leave as much undisturbed shallow open-water habitat as possible. Alternatively (or in addition to route consolidation) the frequency of ferry traffic could be reduced, thereby reducing the frequency of disturbance to waterfowl. Reduction in ferry traffic would likely be done as part of other resource issues (e.g., air quality).

Impact after Mitigation: The residual impact to waterfowl after Mitigation B-11.1 is implemented would depend on the amount of route consolidation or vessel frequency reduction that is feasible. The residual impact cannot be quantified and, thus, could be potentially significant.

5.5.2.6 Potential Effects to Marine Mammals

Impact B-12 **Increased turbidity and activity from dredging operations could affect marine mammal foraging.**

Increased turbidity during dredging may disturb foraging activities by decreasing visibility and removing benthic prey. Figure 3.5.14 shows haul-out and feeding areas. The effects of localized turbidity plumes during dredging are not expected to be significant as marine mammals typically are well adapted to low light levels because they feed deep in the water column often at night, and in areas with decreased visibility. It is likely that most dredging would take place during daylight hours.

Dredging could also temporarily remove or displace benthic prey species for marine mammals (e.g., small bottom fish such as gobies fed on by seals or amphipods fed on by gray whales). This impact is not expected to be significant due to the localized nature of the dredging impacts and the relatively large feeding ranges of marine mammals in the Bay.

Summary of Impact B-12

- Alternatives 1 and 2 would require dredging at some locations, causing localized increases in turbidity. For the reasons stated above, this impact would be considered less than significant to marine mammal populations in the Bay.
- Alternatives 3 and 4 would not involve new dredging; thus, no impacts are expected.

Impact B-13 **Underwater pile driving noise could disturb marine mammals.**

If pile driving in aquatic environments is required under any of the alternatives, construction could result in temporary disturbance to foraging or migrating marine mammals. Under the Marine Mammal Protection Act of 1972 (amended in 1994), it is forbidden to intentionally harass marine mammals. Harassment is defined under the Act as "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption to migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment)." Pile driving activities would be considered Level B harassment.

NMFS considers, as a guideline, underwater sound pressure levels at or above 160 dB re 1 μPa as constituting harassment to marine mammals. Studies have suggested that sound pressure levels above 180 dB re 1 μPa can cause temporary hearing impairment in marine mammals. Caltrans (2001a) measured sound pressure levels exceeding this guideline in areas near the installation of a test pile for the Bay Bridge East Span Project. It should be noted that these were very large piles, using some of the largest pile-driving hammers available. Pile driving of this magnitude is not expected for the WTA project.

Several studies have been conducted on the behavioral reactions of marine mammals to underwater sounds. As reported in a summary of these studies by Richardson et al. (1995), reactions often involved cessation of feeding, resting, or social interaction, and increased alertness or avoidance behaviors. Avoidance reactions in pinnipeds (seals and sea lions) often involved movement from haul-out sites to water (or vice versa).

The potential for adverse underwater sound pressure levels during construction would depend largely on whether in-water piles are necessary for terminal or docking facilities, the types and sizes of piles necessary, the substrate and depth of the area where piles are needed, and the proximity of pile-driving activities to sensitive areas such as haul-out and feeding locations. Any work that could result in sound pressure levels exceeding NMFS guidelines would be considered significant. However, as discussed in Impact B-9, pile driving for terminal facilities would involve much smaller (24- to 36-inch diameter) piles than the piles used for the Bay Bridge project, and sound pressure levels are unlikely to be above the NMFS guideline values.

Summary of Impact B-13

- Alternatives 1 and 2 could require in-water pile driving for some potential terminal locations. Impacts to marine mammals would be considered significant if sound pressure levels exceeded NMFS guidelines.
- Alternatives 3 and 4 would not involve new construction; thus, no impacts are expected.

Mitigation B-13.1: An Incidental Harassment Authorization from NMFS may be needed for pile-driving activities, particularly if activities are to occur near sensitive areas such as haul-out sites. Known haul-out sites are shown on Figure 3.5.14. Most potential new construction would not occur near major haul-out sites. Potential terminals nearest haul-out sites include Coyote Point and Foster City (near Bair Island). Pre-construction surveys should be conducted to determine use of the area by marine mammals before pile driving begins. Marine mammal monitoring should be conducted during construction in conjunction with underwater noise monitoring. A "safety zone" should be established based on the initial monitoring. Pile-driving activities should not commence until marine mammals are not sighted within the safety zone for approximately 15 to 30 minutes.

Impact after Mitigation: Impact B-13 would be less than significant after implementation of Mitigation B-13.1.

Impact B-14 Transiting ferries could disturb marine mammals resting at haul-out sites.

Haul-out sites are areas where seals and sea lions pull themselves from the water to rest. Some of the sites are also used for breeding and raising pups. Known haul-out locations around the Bay are shown on Figure 3.5.14. Ferries passing near sensitive areas such as haul-out sites could potentially

disturb seals using these areas. Human activities have been shown to adversely affect the behavioral patterns of marine mammals. Seals react to both visual and acoustic disturbances (Richardson et al. 1995). According to Green et al. (2001), the primary sources of disturbance for harbor seals in San Francisco Bay are boats, kayaks, jet skis, aircraft, foot traffic, and dogs in the vicinity of haul-out sites. Disturbance sources that occur closer to the animals tend to provoke a stronger negative response. Long-term disturbances in close proximity to haul-out sites have resulted in documented abandonment of sites.

Green et al. (2001) found that watercraft, especially those that exhibit erratic movements, are a common disturbance to seals on San Francisco Bay. Green et al. conducted studies of disturbances at Castro Rocks and Yerba Buena Island. They found that the average distance at which watercraft caused animals to flee the site (flush) was approximately 183 meters at Castro Rocks and approximately 133 meters at Yerba Buena Island. Larger boats, such as tugboats and ferries, tended to cause a flush at greater distance than smaller watercraft such as jet skis and kayaks. For example, at Castro Rocks, larger watercraft caused a flush at an average of approximately 264 meters (range 121 to 511 meters) while jet skis and kayaks caused a flush at an average of approximately 150 meters (range 10 to 500 meters). Watercraft that exhibit erratic movements such as sudden changes in speed or direction were more likely to cause a disturbance than those traveling at steady speeds, at slow speeds, and in a constant direction (Green et al. 2001; Kopec and Harvey 1995).

Ferry routes for Alternatives 1, 2, and 3 are generally well away from most haul-out sites in the Bay. Existing routes pass near Yerba Buena Island and Castro Rocks, two major haul-out sites in the Bay.

Summary of Impact B-14

- Alternatives 1, 2, and 3 all have routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. Passing too close and disturbing marine mammals at these locations would be considered significant.
- Alternative 4 would not involve changes over existing conditions. No new impacts are expected.

Mitigation B-14.1: Although NMFS does not regulate normal watercraft operations or require Incidental Harassment Authorizations for regular shipping and pleasure craft operations (Fahy 2002), NMFS does have guidelines, outlined below, for avoidance of marine mammals to reduce disturbance.

NMFS Guidelines

Animal or Sensitive Site	Minimum Distance
Whales	91 meters (100 yards)
Pinnipeds (seals and sea lions)	46 meters (50 yards) in water 91 meters (100 yards) from haul-out sites
Dolphins	46 meters (50 yards)

This guidance, however, does not take potential boat speeds and related wake effects into account. Distances discussed in the literature indicate that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Site-specific information available for San Francisco Bay (Castro Rocks) showed average disturbance from larger vessels occurring at distances of about 250

meters. Therefore, ferry routes should be at least 100 to 250 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations.

Impact after Mitigation: Impact B-14 would be less than significant after implementation of Mitigation B-14.1.

Impact B-15 High-speed ferries could potentially strike gray whales in San Francisco Bay.

Because of the increase in gray whale sightings in San Francisco Bay over the last several years, concern exists about collisions between whales and vessels during normal operations. As discussed in Section 3.5.1, as the gray whale population in the Pacific has returned to historic levels, the number of whales entering San Francisco Bay during their migration has increased. Since this phenomenon, the frequent of use of the Bay by whales, is relatively recent, the length of time whales stay in the Bay and the average number of whales in the Bay at a given time are not well known.

An attempt to statistically estimate the probability of a vessel making contact with whales was made using an unpublished whale strike model and a Monte Carlo simulation. The whale strike model was developed by Tregenza et al. (www.chelonia.demon.co.uk) to predict the probability of a pilot whale being struck in the Canary Islands where ferries cross perpendicularly to a whale migration route. Both models assume whale behavior is random, that is, the whales can statistically be at any location at any given time.

The Monte Carlo model was developed because initial runs of the whale strike model predicted a certainty (probability of 1) of a whale collision in a test case where a significant probability of no collision should have resulted. The Monte Carlo model was tested (calibrated) against known whale observations along the Larkspur ferry route. Again, a certainty of a whale collision was predicted in a situation where no collisions have actually occurred. Discussions of the models with ecological modeling specialists indicated the weakness of both models is that whale behavior in the Bay is not random. Whales are not migrating perpendicularly to ferry routes but are probably feeding at preferred locations and likely are actively avoiding ferry vessel routes. For a meaningful statistical prediction of a collision between a ferry and a whale to be made, it will be necessary to develop a greater understanding of whale behavior and movements in the Bay. As alluded to above, no documented collisions between gray whales and any type of vessel have occurred in San Francisco Bay (Cordero 2001). Whales have been stranded in the Bay and areas just offshore. However, it is often difficult to determine the exact cause of death. The fact that gray whales are sighted in the Bay, however, suggests that at least the potential exists for a ferry to strike a whale at some point. Any whale strike would be considered a significant impact.

Summary of Impact B-15

- Alternatives 1, 2, and 3 include increased numbers of vessel transits across the Bay. Every transit represents a potential for a whale strike. The potential would be greatest with Alternative 1 because it would have the largest number of ferries traveling on the Bay. Although the likelihood of a whale strike is very low, such a strike would be a significant impact.
- Alternative 4 would not increase the number of vessel transits. Therefore, no impact would occur above existing conditions.

Mitigation B-15.1: Ferry operators should be aware of the potential for whales entering the Bay and should be familiar with spotting whales at the surface. The USCG reports whale sightings and distance to vessels when they receive a report of a whale sighting. Ferry captains should be made aware of these reports and exercise diligence when a whale sighting has been reported.

The ferry system should implement a program of informing ferry operators of whale sightings and locations. For example, if one captain sights a whale, it should be reported through a network to all other captains. Operators should be informed or reminded during seasonal periods of heightened whale activities or presence. If whale sightings continue to increase in the Bay, having dedicated lookouts on board or other detection equipment could be warranted. Devices (such as sound-generating equipment) used to scare whales from the area may be considered intentional harassment by NMFS and would not likely be allowed.

Mitigation B-15.2: Ferries could be equipped with a whale detection system such as forward-looking sonar. Such a system is currently under development and being tested on a NOAA vessel in Cape Cod Bay.

Impact after Mitigation: Implementation of Mitigations B-15.1 and B-15.2 would reduce the chances of a whale strike; however, some probability, though small, would still remain of an accident occurring. One gray whale represents approximately 0.004 percent of the total estimated population of 26,000 whales along the Pacific coast, and the rare occurrence of a whale strike would not likely have an effect on long-term regional gray whale populations. However, the possibility of a whale strike is still considered potentially significant.

5.5.2.7 Potential Effects on Special-Status Species

Impact B-16 **Project construction and/or operation could result in the "take" of state or federally listed species or loss or degradation of their habitat.**

Activities that could affect listed species or their habitat include construction of ferry terminals, dredging or excavation near wetland habitats, or operational impacts such as wake effects on species such as California clapper rail. Alternatives 1 and 2 would have the greatest likelihood of impacting listed species or their habitat since these alternatives involve construction of new facilities.

"Incidental take" permits of fully protected species cannot be authorized by CDFG. Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Table 3.5.4 provides a comprehensive list of special status species in the Bay Area. Figures 3.5.10 through 3.5.12 show the known distributions of salt marsh harvest mouse, black rail, and clapper rail. Potential impacts to special status species would be addressed on a site specific basis.

Summary of Impact B-16

- Alternatives 1 and 2 could potentially result in the take of listed species due to new construction. The greater potential for impacts to listed species would be in or near wetland areas and primarily in the North and South Bay areas.
- Alternative 3 would not involve construction of new facilities and therefore would not likely result in the take of listed species or loss of their habitat.

- Alternative 4 would not involve changes over existing conditions. No new impacts are expected.

Mitigation B-16.1: Table 3.5.4 lists threatened, endangered, and other special-status species that could occur around the Bay Area. Construction sites should be reviewed for potential occurrence of listed species and critical habitat using the literature and tools such as the CNDDB. Field surveys by qualified biologists should be conducted in areas of potential occurrence or with suitable habitat for listed species. Areas with listed species should be avoided.

In areas where construction is likely to result in a take of a listed species, consultation should be initiated with USFWS, NMFS, and CDFG as required by the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA). Specific mitigation measures will likely be required as a result of that consultation and must be incorporated into the specific project design or mitigation plan. Measures may include redesign of project features to avoid impacts to listed species or their habitat or include restoration or creation of replacement habitat.

Impact after Mitigation: The significance of impacts after implementation of project-specific mitigation measures would need to be evaluated after design of those specific measures. Impacts could still be potentially significant.

5.5.2.8 Potential Water Quality Effects on Biological Resources

Impact B-17 **Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality, which could, in turn, affect local biological resources.**

This impact is potentially significant and is discussed, along with mitigation, under Wake Wash Impact W-1.

Impact B-18 **Contaminated sediments could potentially become resuspended during construction and dredging operations and could cause toxicity to Bay organisms.**

Contaminated sediments exist at various locations in the Bay. Dredging of these sediments could release chemicals to the water column that could result in toxicity to Bay organisms. The potential release of sediment contaminants and mitigation measures are discussed in detail in Dredging Impact D-2.

Impact B-19 **Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.**

Fuel spill could expose Bay fish and wildlife to toxic pollutants in fuels and oils. This impact is potentially significant and is addressed in Impact W-3.

5.5.2.9 Potential Wake Effects

Impact B-20 **Vessel wakes could potentially cause erosion and loss of wetland habitats, impact special-status species such as the clapper rail and salt marsh harvest mouse, and impact marine mammals through disturbance at or erosion of haul-out sites.**

These potential impacts and mitigation measures are addressed in Section 3.3, Wake.

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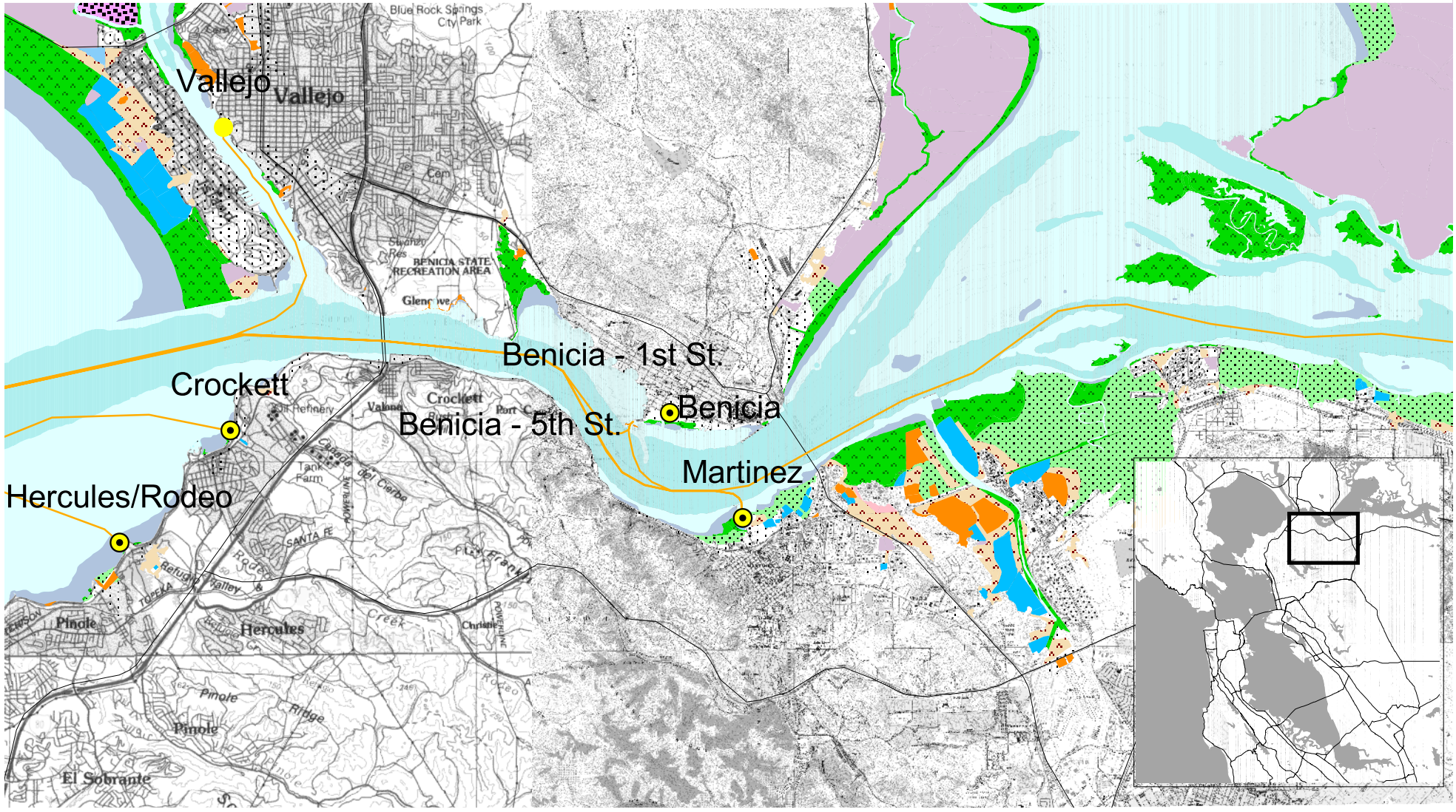


URS

Water Transit Authority
Program EIR

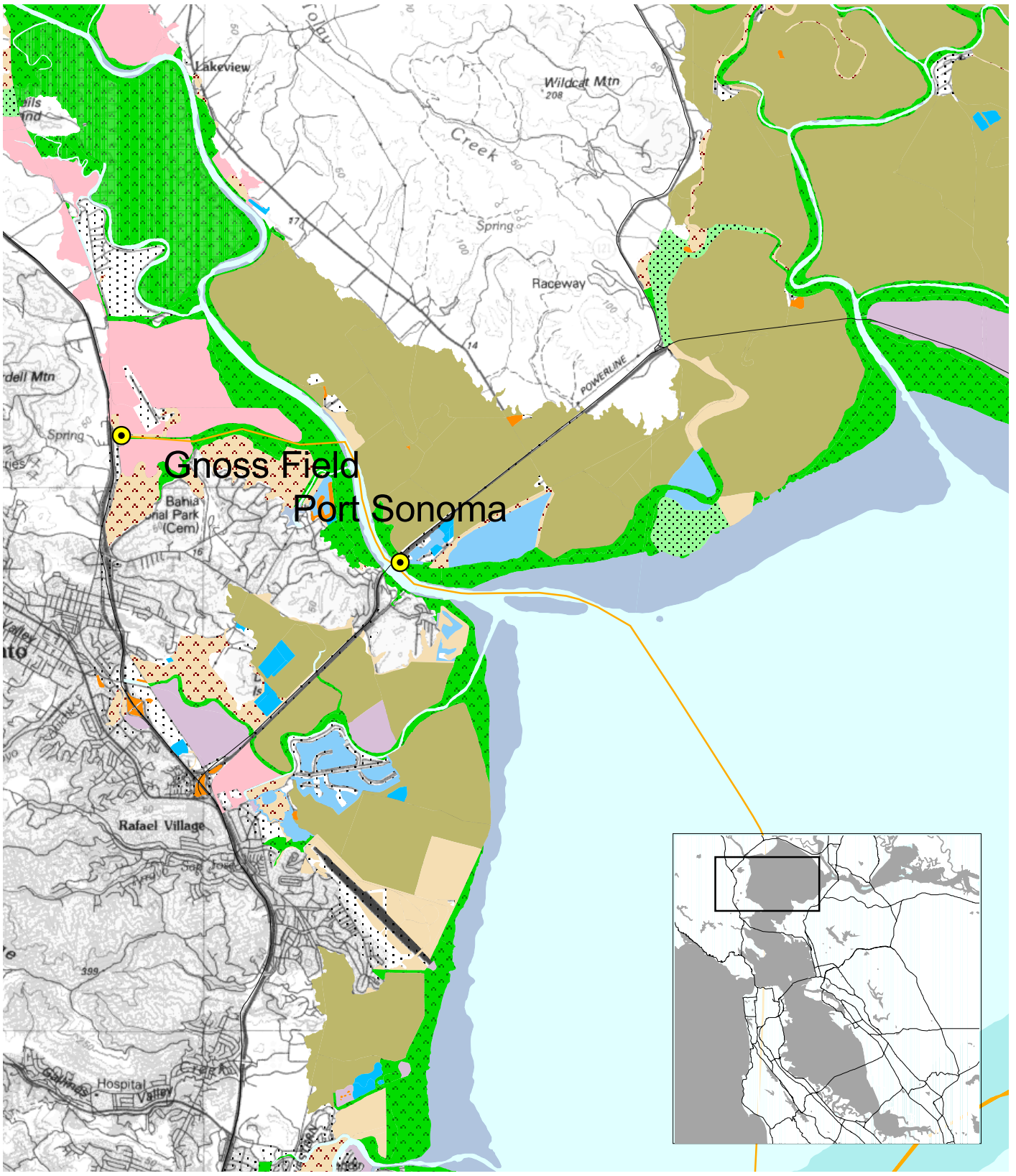
Project No. 43-00066890

HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - CARQUINEZ STRAIT

Source: Goals Project 1999

Figure 5.5.1

L:GIS/projects/wta/apr/habitat_types.apr



URS	Water Transit Authority Program EIR Project No. 43-00066890	Habitat Types for Existing and Potential Terminal Locations - Port Sonoma Source: Goals Project 1999	Figure 5.5.2

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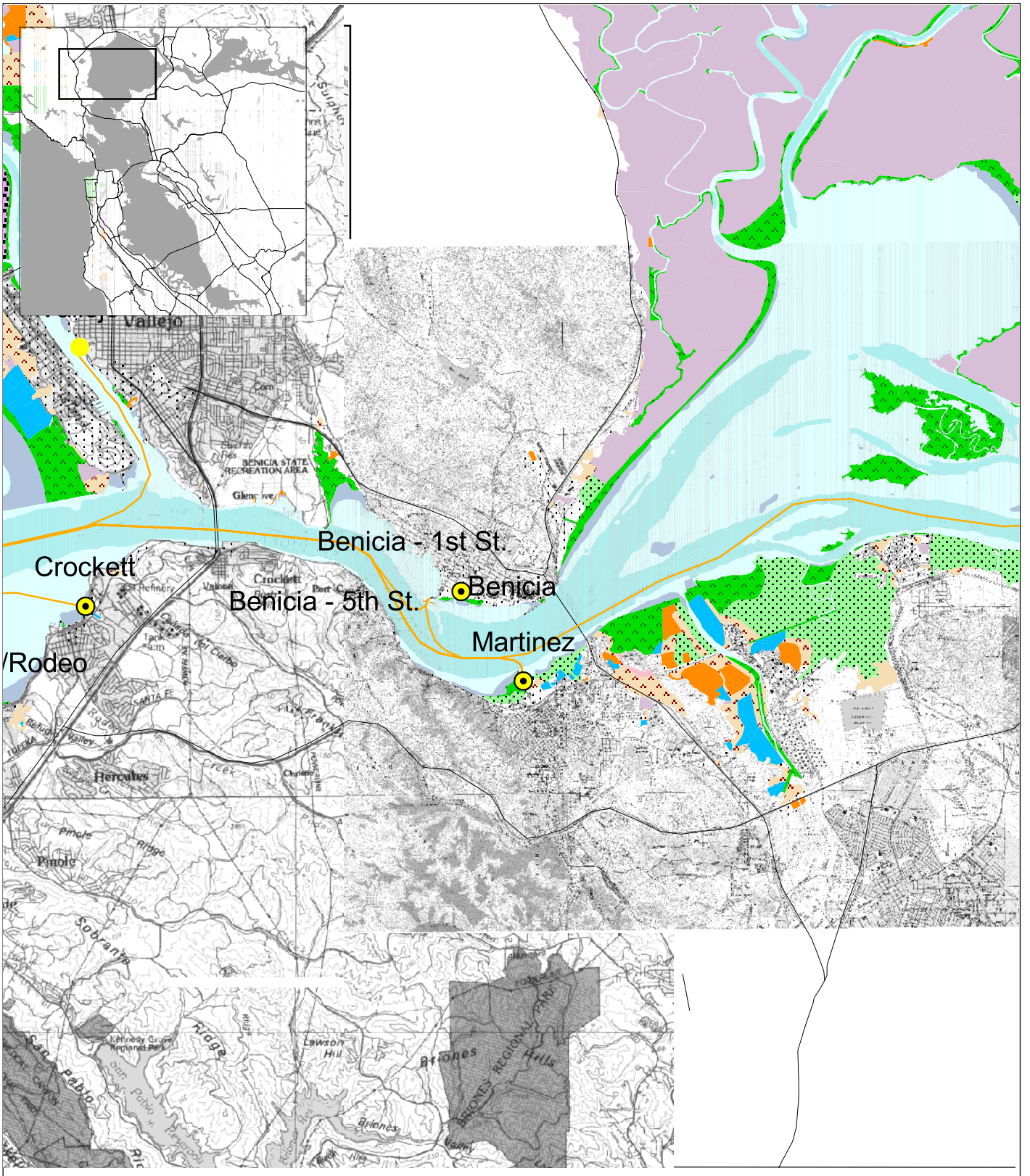

URS	Water Transit Authority Program EIR Project No. 43-00066890	Habitat Types for Existing and Potential Terminal Locations - Central Bay Source: Goals Project 1999	5.5.3

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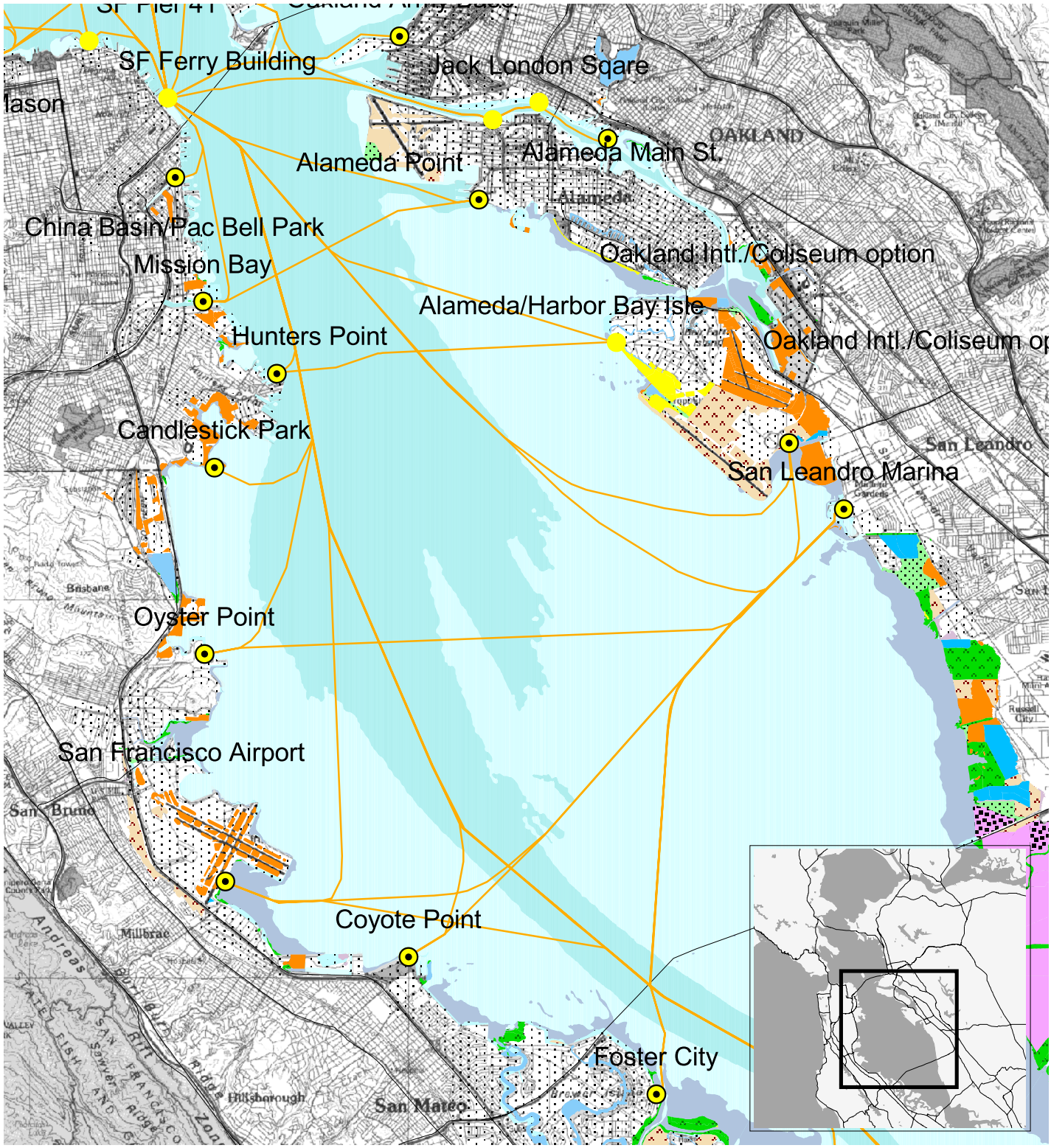

URS

Water Transit Authority
Program EIR

Project No. 43-00066890

HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - SOUTH BAY

Source: Goals Project 1999

Figure 5.5.4

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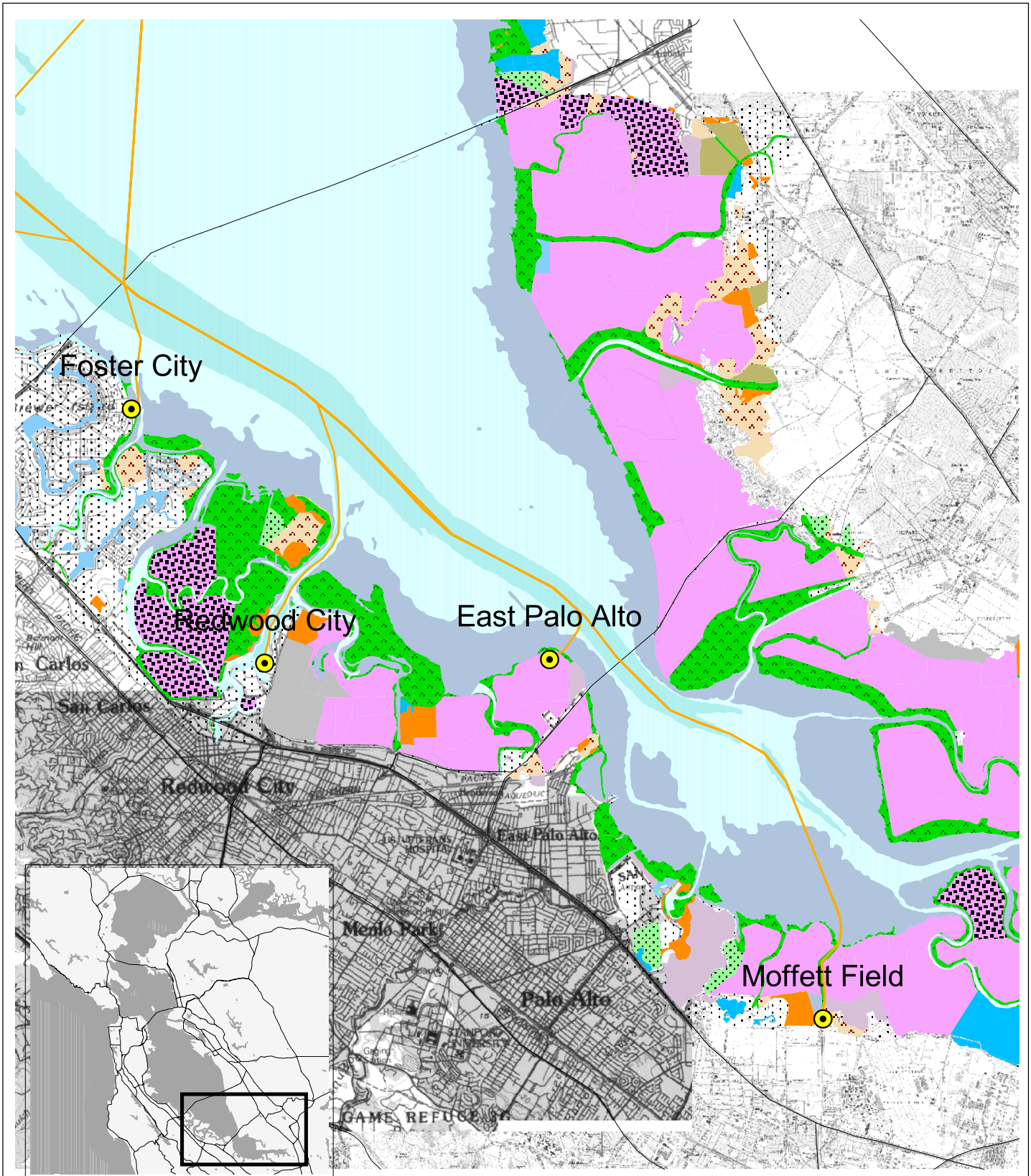

Lagoon
Muted Tidal Marsh
Salt Pond
Inactive Salt Pond
Tidal Marsh
Managed Marsh
Diked Marsh
Deep Bay
Shallow Bay
Bay Flat
Farmed Bayland
Storage Basin
Ruderal Bayland
Undeveloped Fill
Developed Island or Fill

Terminal Locations
Existing
Proposed

N
0.5 0 0.5 Miles
Scale 1:125,000

URS

Water Transit Authority
Program EIR

Project No. 43-0006689

HABITAT TYPES FOR EXISTING AND POTENTIAL TERMINAL LOCATIONS - EXTREME SOUTH BAY

Source: Goals Project 1999

Figure
5.5.5

L:GIS/projects/wta/apr/habitat_types.apr

5.6 AIR QUALITY

5.6.1 Impact Assessment Methodology

The air quality study addresses impacts from both vehicle and ferry emissions sources for the different alternatives and modes of travel. The evaluation is based on a calculation of the total emissions from all modes of travel (ferry, car, bus) that might be affected by implementation of the WTA program. The different types of travel modes generate different rates of emissions.

The overall impacts from the system as a whole, i.e., ferries, passenger cars, and buses, were evaluated to obtain a regional, cumulative emissions estimate for each of the project alternatives and for the No Project alternative. For purposes of evaluating the significance of impacts, the estimated emissions from all these modes were summed for each alternative. The total emissions were then compared among the alternatives to determine if any would result in an overall decrease or increase in emissions. This is discussed in more detail under "Significance Criteria" below. This comparative evaluation was done instead of examining the emissions from each individual source alone and comparing them to a threshold level. Nevertheless, in addition to a discussion of the regional emissions impacts under the "Project Impacts" section, each individual impact is broken out for discussion to fully disclose all anticipated environmental impacts.

The ferry and vehicle emissions are presented for the criteria pollutants, which include oxides of nitrogen (NO_x), reactive organic gases (ROG), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter (PM_{10}).

5.6.1.1 Vehicle Emissions

Vehicle emissions (passenger cars and buses) were calculated using forecasts of total vehicle miles traveled for the year 2025, and ferry emissions were calculated using the projected schedule of routes and frequencies for that same year. The emissions calculations were performed for the three project alternatives and the No Project alternative. The year 2025 is consistent with the MTC travel forecast model that was used as a basis for the vehicle forecasts.

Vehicle emissions were modeled using EMFAC2000, which incorporates anticipated emissions changes for future years, i.e., emissions decrease due to expected improvements in engine and fuel technology and the retirement of older vehicles from the fleet. For example, year 2025 passenger car emissions of ROG, CO, and NO_x are anticipated to decrease from 1.5, 10.8, and 1.0 grams per mile, respectively, in 2002 to 0.3, 1.5, and 0.2 grams per mile, respectively, in 2025. PM_{10} emissions are not expected to change significantly in the future. Emissions from cold starts were included in the total vehicle emissions. Cold starts occur after a vehicle has been off for more than four hours, and cold-start emissions represent a major portion of the total trip emissions for a vehicle.

5.6.1.2 Ferry Emissions

Ferry emissions were estimated assuming that EPA Tier 2 standards would be in effect, which require new diesel engines manufactured after the year 2007 to meet lower emissions than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would use engines that would at least meet the EPA Tier 2 standards. This emission

level was used as the "baseline" level, i.e., the level at which the highest emissions from ferries would be expected by the time the year 2025 comes. The ferry emissions for the WTA program were developed for the future projected year 2025, using a combination of site-specific data, readily available emission factors, and current and projected operating conditions. Existing data for each ferry system were reviewed and analyzed. Initially, future baseline emissions were based upon peak and off-peak conditions, where peak hours represented 6 hours per day and non-peak hours represented 6.5 hours per day. Baseline emissions for each period were calculated by multiplying together the total travel time from all ferries, the average horsepower rating, and the emission factors for marine diesels. Total travel time was computed for both peak and non-peak periods by: (1) dividing the total time within each period by the frequency of visits by each ferry to obtain the number of trips; (2) multiplying the number of trips for each ferry by the estimated time per trip; and (3) summing the trip times for all ferries. For the No Project alternative the average horsepower rating was calculated as the mean rating for all of the existing ferries (Hutchison 2002). The ferry system schedules for each of the alternatives is presented in Appendix AIR-A.

The significance criteria used for this study and a discussion of each of the impacts follows.

5.6.2 Significance Criteria

The significance criterion used in this EIR is as follows:

- Emissions that are higher for the proposed project than for the No Project alternative (Alternative 4) would have a significant impact.

As applied to the WTA program, this involved calculation of total emissions by criteria pollutant, and by alternative, for each mode of travel: ferry, bus, and passenger car. These are compared to Alternative 4 to determine whether an alternative results in overall higher or lower regional emissions. This criterion was used because it allows comparison of alternatives on a regional scale, consistent with the WTA program. This type of significance criterion was used in the 2001 Regional Transportation Plan (RTP) EIR issued by the Metropolitan Transportation Commission.

In addition, since the impact from each travel mode is discussed separately under "Project Impacts," an increase in emissions from a particular mode by itself (e.g. ferry) over those for the No Project Alternative for that mode is considered a significant impact.

5.6.3 Impacts and Mitigation

Impact A-1 **Regional cumulative emissions from passenger cars, buses, and ferries together would increase under Alternatives 1, 2, and 3 over those under the No Project Alternative (Alternative 4). The increase of Alternative 1, 2, and 3 cumulative emissions (unmitigated) represents the following percentage increase over total, current Bay Area emissions:**

	Alternative 1 (percent)	Alternative 2 (percent)	Alternative 3 (percent)
NO_x	4	4	0.1
SO_2	1	1	0.2
PM_{10}	0.7	.6	0.1
CO	0.04	.04	.01
ROG	0.02	0.2	.05

The evaluation of significance is based on the sum of vehicle (passenger car and bus) emissions plus ferry emissions for a given alternative. If the emissions sum of vehicles plus ferries for a given project alternative (Alternative 1, 2, or 3) is less than the emissions sum of vehicles plus ferries for the No Project Alternative (Alternative 4), the impact is considered less than significant. If, however, the sum of vehicles plus ferry emissions from any of the project alternatives is greater than the sum of passenger car plus ferry emissions from the No Project Alternative, then the impact is considered significant. This comparison is done for each of the pollutants.

Tables 5.6.1 through 5.6.3 summarize emissions from ferries, passenger cars, and buses for each of the alternatives. Tables in Appendix AIR-C present the route information (e.g. frequencies, number of vessels, sailing times) for each alternative, as well as the per-route emissions.

Summary of Impact A-1

- Alternative 1 emissions from vehicles (passenger cars and buses) plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 emissions from vehicles plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 emissions from vehicles plus ferries are greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-1.1: Emissions from ferries under Alternatives 1, 2, and 3 could be reduced by elimination of routes with low ridership to consolidate ridership on the most effective service routes. For example, an evaluation of only the following routes was performed:

- Alameda to San Francisco
- Harbor Bay to San Francisco
- Oakland to San Francisco
- Sausalito to San Francisco
- Tiburon to San Francisco
- Berkeley to San Francisco
- Richmond to San Francisco
- Larkspur to San Francisco
- Martinez to San Francisco
- Vallejo to San Francisco

- Hercules to San Francisco
- Pittsburg to San Francisco

Impact after Mitigation: Providing full service on only the routes listed above reduces the net pollutant increase by half. Thus, emissions from ferries and vehicles (cars and buses) would be reduced but would remain greater under Alternatives 1, 2, and 3 than they are under the No Project Alternative. This impact would remain potentially significant.

Mitigation A-1.2: NO_x and PM_{10} emissions from ferries would be reduced by using SCR and particulate traps. The WTA evaluation considered a range of vessel types, fuels, and propulsion systems (in JJMA 2002) that could be potentially used on the projected service routes. These different technologies result in various levels of emissions of NO_x, ROG, CO, SO_2, and PM_{10}. Some examples of the technologies include diesel engines fueled with natural gas, gas turbines fueled with diesel or natural gas, and diesel engines fueled with diesel with selective catalytic reduction (SCR) and particulate traps. The WTA's evaluation of vessel technology involved a comprehensive investigation of emerging technologies and their relative suitability to Bay Area passenger service. Section 2.5 summarizes the evaluation that was performed in coordination with the "Clean Marine Ad Hoc" Work Group. The use of SCR and particulate traps is examined here as mitigation of emissions from ferries.

Impact after Mitigation: Ferry emissions from diesel engines with SCR and particulate traps would be less under Alternatives 1, 2, and 3 than those for the No Project Alternative for NO_x and PM_{10}, resulting in a less-than-significant impact for those two pollutants. ROG, CO, and SO_2 emissions would remain greater than those for the No Project Alternative, resulting in a significant impact for those pollutants. It should be noted that the sum of NO_x and ROG emissions decreases under Alternative 2 with this mitigation. This is important because NO_x and ROG are precursors to ozone, and the Bay Area does not attain the ozone standard. Therefore, the project serves to decrease the contribution to this non-attainment pollutant. The reduction of PM_{10} is also important because it is a nonattainment (state standards) pollutant in the Bay Area. The Bay Area is in attainment for both SO_2 and CO. The residual emissions of SO_2, CO, and ROG represent the following percentage increase over total current Bay Area emissions (there is a net decrease of NO_x and PM_{10}):

Reduced Alternative 2 with Mitigation A-1.2

NO_x	Net decrease
SO_2	0.6 percent
PM_{10}	Net decrease
CO	0.007 percent
ROG	0.04 percent

In conclusion, after application of these emission reduction measures, there remains a small regionwide increase in SO_2, CO, and ROG. ROG is primarily of concern because it is an ozone precursor, and as noted above this mitigation measure results in a net decrease in ozone precursors. The remaining pollutants of concern, SO_2 and CO, are currently in attainment in the Bay Area, but because they show a small regionwide increase, this impact is identified as potentially significant.

Impact A-2 **Total vehicle miles traveled are reduced with Alternatives 1, 2, and 3 as commuters use ferries for all or a portion of their commute. This results in a beneficial reduction in overall passenger car pollutant emissions in comparison to Alternative 4 (No Project).**

The California Air Resources Board (CARB) model EMFAC2000 was used to calculate regional emissions based on vehicle miles traveled (VMTs) for each alternative. EMFAC2000 is the latest in a series of California emission factor models that calculates emissions of CO, NO_x, ROG, and PM_{10} for current and future years. This is the model accepted by the CARB and most local air pollution control districts for analysis of motor vehicle emissions in California. The EMFAC2000 model reflects the emissions decreases from motor vehicles in future years due to anticipated improvements in engine and fuel technology.

Emission factors from the EMFAC2000 model were used to estimate emissions for the No Project Alternative and Alternatives 1 through 3. In addition, emissions from cold starts based on trip purpose were also calculated for each of the alternatives, using factors from the EMFAC2000 model. The cold-start emissions were incorporated into the daily total emissions presented in Tables 3.6-5 through 3.6-7.

Daily vehicle miles traveled (VMTs), total vehicle trips, and trip purpose for each of the alternatives (including No Project) were obtained from the traffic analysis performed by Cambridge Systematics for the WTA.

Summary of Impact A-2

- Alternative 1 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.
- Alternative 2 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.
- Alternative 3 emissions from passenger cars are less than those for the No Project Alternative, resulting in a less-than-significant impact.

Impact A-3 **Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to a localized violation of the short-term carbon monoxide standard.**

As vehicles in a parking area leave a ferry terminal, there could be a concentration of cold-start emissions at those locations, instead of the emissions being dispersed throughout the Bay Area at people's homes, as during the morning commute. This "clustering" of cold-start emissions during the evening commute hour could produce a violation of the one-hour carbon monoxide standard at locations near the terminal parking lots. This is a potentially significant impact.

Summary of Impact A-3

- Alternatives 1, 2, and 3 could result in cold-start emissions during the evening commute period that would lead to a violation of the short-term carbon monoxide standard, leading to a potentially significant impact.

Mitigation A-3.1: Cold-start emissions would be reduced by restricting the number of cars parking at the ferry terminals. This could be accomplished by limiting the amount of parking at the ferry terminals to a level less than full ridership. Parking management strategies could also be implemented, such as fees for parking and provision of preferential parking for carpools and vanpools In addition, feeder shuttle buses could be equipped with zero emission or ultra-low emission engines.

Impact after Mitigation: The effectiveness of Mitigation A-3 cannot be quantified, as the design and exact number of ferry terminals is not defined at this time. Therefore, the impact remains potentially significant.

Impact A-4 **Criteria pollutant emissions from ferries would increase under Alternatives 1, 2, and 3 over those from the No Project Alternative. Emissions from NO_x would be less than 5 percent of total Bay Area emissions for Alternatives 1 and 2, and less than 1 percent of total Bay Area emissions for Alternative 3. Emissions of SO_2 would be 1 percent or less of total Bay Area emissions for the three project alternatives. Emissions of PM_{10}, CO, and ROG would all be less than 1 percent of Bay Area total emissions for each of the three alternatives.**

Ferries would be a source of CO, NO_x, ROG, and PM_{10} emissions. NO_x and ROG are of major concern due to their photochemical reactions downwind of specific sources and are considered regional emission concerns. Since the majority of the emissions occur during transport, emissions from the ferry exhaust are mobile and therefore dispersed over a significant spatial region. PM_{10} emissions are a concern due to the toxicity of PM_{10} emissions from diesel exhaust.

Summary of Impact A-4

- Alternative 1 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-4.1: See Mitigations A-1.1 and A-1.2.

Impact After Mitigation: Ferry emissions of NO_x and PM_{10} would be less under Alternatives 1, 2, and 3 than for the No Project Alternative, resulting in a less-than-significant impact for those two pollutants, but ROG, CO, and SO_2 emissions would remain greater than those for the No Project Alternative, resulting in a significant impact for those pollutants. However, the project with this mitigation decreases ozone precursors, as discussed in Impact After Mitigation A-1.2, above.

Impact A-5 **Ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel. Emissions from Alternatives 1, 2, and 3 would be greater than those from the No Project Alternative.**

In 1998, the California Air Resources Board (CARB) formally identified particulate matter emitted by diesel-fueled engines as a toxic air contaminant (TAC). Diesel engines emit TACs in both gaseous and particulate forms. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by the EPA as hazardous air pollutants (HAPs), and by the CARB as TACs. Because by weight, the vast majority of diesel exhaust particles are very small (94 percent of their combined mass consists of particles less than 2.5 microns in diameter), both the particles and their coating of TACs are inhaled into the lung. While the gaseous portion of diesel exhaust also contains TACs, the CARB's August action was specific to diesel particulate emissions which, according to supporting CARB studies, represent 50 to 90 percent of the mutagenicity of diesel exhaust (CARB 1998).

Diesel particulate emissions were calculated as described above under "Ferry Emissions." For the purposes of characterizing potential air toxic impacts, the entire mass of estimated particulate matter emissions from diesel engines is considered toxic.

Since the majority of diesel particulate matter is in the fine fraction (less than 2.5 micrometers in diameter, or $PM_{2.5}$), it can remain airborne for several days. The area of impact will depend on meteorological conditions. If light to moderate wind conditions prevail in the project area, diesel particulate is likely to be dispersed widely and have its impact on a regional scale. During periods of very light wind speeds, low inversion heights, and atmospheric stability, diesel particulates may remain in the project area and have a relatively larger local impact. Because health risks relate to long-term, lifetime exposure, it is long-term average exposure to diesel particulate that is of most concern. Due to the prevailing meteorological conditions in the project area and the distance of the closest residential areas from the emissions sources, levels of particulate in the area of local impact are expected to be well dispersed. Nevertheless, any substantial increase in such emissions could be potentially significant.

Summary of Impact A-5

- Alternative 1 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 2 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.
- Alternative 3 $PM_{2.5}$ emissions from ferries would be greater than those for the No Project Alternative, resulting in a significant impact.

Mitigation A-5.1: See Mitigations A-1.1 and A-1.2. Those mitigation measures include the use of Selective Catalytic Reduction (SCR) and particulate traps on ferry engines to reduce emissions.

Impact after Mitigation: Ferry $PM_{2.5}$ emissions from Alternatives 1, 2, and 3 would be less than those for the No Project Alternative, resulting in a less-than-significant impact.

Impact A-6 **Buses traveling to and from the ferry terminals would emit criteria pollutants in the exhaust. The emissions increases for NO_x, PM_{10}, and ROG would be less than 10 pounds per day. Emissions increases of CO would be 50 pounds per day for Alternatives 1 and 2 and less than 30 pounds per day for Alternative 3.**

Bus mileage traveled was obtained for each of the alternatives from Cambridge Systematics. Alternatives 1, 2, and 3 would increase bus service to the ferry terminals, and there would be an associated increase in criteria pollutant emissions. This would lead to a significant impact.

Summary of Impact A-6

- Alternative 1 would increase emissions from buses over those of the No Project, resulting in a significant impact.
- Alternative 2 would increase emissions from buses over those of the No Project, resulting in a significant impact.
- Alternative 3 would increase emissions from buses over those of the No Project, resulting in a significant impact.

Mitigation A-6.1: Emissions would be reduced by decreasing or not providing bus service to new terminals.

Mitigation A-6.2: Bus emissions would be reduced by fueling buses servicing the new terminals with compressed natural gas (CNG), propane, fuel cells, or other low-emission technology that could become practicable in the future.

Impact after Mitigation: Emissions from buses for Alternatives 1, 2, and 3 would be equal to or less than those for the No Project Alternative, and the impact would be less than significant.

Impact A-7 **Air pollutants would be deposited on the bay, increasing the levels of nitrates and sulfates in the water.**

A fraction of airborne pollutant emissions from ferry fuel combustion would be deposited on the Bay. Emissions of nitrogen and sulfur oxides would be deposited as nitrates and sulfates, respectively. A portion of the particulate matter in the diesel exhaust, mostly in the fine fraction ($PM_{2.5}$) would also be deposited. Not all of the exhaust emissions would be deposited on the Bay; some would be transported over land by winds.

The amount of pollutants deposited on land versus on the Bay depends on several factors including the proximity of the ferry to land, the distance the ferry travels over water, the amount of wind transporting the pollutants, and the location of the exhaust port on the ferry. The most pollutant deposition would likely occur from ferries traveling the longest routes, e.g. San Francisco to Redwood City and San Francisco to Port Sonoma.

Summary of Impact A-7

- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 1, leading to a potentially significant impact.

- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 2, leading to a potentially significant impact.
- Deposition of nitrates and sulfates on the Bay from ferry emissions would increase under Alternative 3, resulting in a potentially significant impact.

Mitigation A-7: See Mitigations A-1.1 and A-1.2.

Impact after Mitigation: Deposition of nitrates and sulfates from ferry emissions from Alternatives 1, 2, and 3 would be less than those for the No Project Alternative, and the residual impact is less than significant.

Impact A-8 Construction of ferry terminals would create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO_x, CO, SO_2, and PM_{10} in construction equipment exhaust.

Construction-related pollutant emissions have not been quantified because the specific plans for each terminal are not defined at this time. Furthermore, the BAAQMD does not require quantification of construction emissions, but does require a discussion of construction mitigation measures. As for any construction project, there can be occasional concentrations of emissions from construction activities that temporarily approach or exceed air quality standards.

Summary of Impact A-8

- Construction impacts under Alternatives 1, 2, and 3 could be potentially significant.

Mitigation A-1.1: The BAAQMD CEQA Guidelines contain a list of mitigation measures to control fugitive dust emissions from construction activities. These measures involve activities such as watering and covering exposed soil surfaces to minimize dust emissions. The BAAQMD considers construction impacts to be less than significant if the recommended mitigation measures are used. Each individual ferry expansion project should employ the current BAAQMD-recommended construction emissions control measures to reduce impacts.

Impact after Mitigation: Construction impacts under Alternatives 1, 2, and 3 would be less than significant.

References

Bay Area Air Quality Management District (BAAQMD) 2001. Clean Air Plan 2000.

Hutchison, Bruce. 2002. Personal communication regarding power output of ferry engines.

John J. McMullen Associates, Inc. (JJMA). 2002. New Technologies and Alternative Fuels: Working Paper on Alternative Propulsion and Fuel Technology Review. May.

Table 5.6.1
Emission Estimates for Year 2025 No Project vs. Alternative 1 (lbs/day)

FERRIES

	Year 2025 No Project	Year 2025 Alternative 1	Project Increase over No Project (difference)
NO_x	3394	62627	59233
SO_2	117	2156	2039
PM_{10}	202	3733	3531
CO	194	3609	3415
ROG	179	3306	3127

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Alternative 1	**177,573,856**

		Year 2025 No Project				Year 2025 Alternative 1				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 1 Decrease (lb/day**
NO_x	0.152	59598	6346	2885	68829	59504	6341	2880	68726	-102
PM_{10}	0.015	5881	70493	33141	109516	5872	70442	33086	109400	-116
CO	1.544	605385	2752	1480	609617	604440	2750	1477	608668	-950
ROG	0.158	61950	153	74	62177	61853	153	74	62080	-97

BUSES

Alternative 3 Shuttles to Ferry Terminals

Vehicle Miles Traveled 10272

	EMFAC2000 Emission Factors (g/mi) -	Year 2025 Alternative 1 Emissions (lb/day)
NO_x	0.325	7
PM_{10}	0.038	1
CO	2.203	50
ROG	0.368	8

Table 5.6.2

FERRIES

	Year 2025 No Project	Year 2025 Alternative 2	Project Increase over No Project (difference)	Year 2025 "Reduced Routes" Alternative 2	Project Increase over No Project (difference)	Year 2025 "Reduced Routes Alt. 2 with SCR and Particulate Traps	Project Increase over No Project (difference)
NO_x	3394	54459	51065	25459	22065	2665	-729
SO_2	117	1875	1758	876	759	1172	1055
PM_{10}	202	3246	3044	1518	1316	80	-122
CO	194	3126	2932	1459	1265	1459	1265
ROG	179	2873	2694	1343	1164	721	542

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Alternative 2	**177,618,525**

		Year 2025 No Project				Year 2025 Alternative 2				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 2 Decrease (lb/day)**
NO_x	0.152	59598	6346	2885	68829	59519	6342	2881	68743	-86
PM_{10}	0.015	5881	70493	33141	109516	5874	70452	33097	109422	-94
CO	1.544	605385	2752	1480	609617	604592	2751	1478	608821	-797
ROG	0.158	61950	153	74	62177	61869	153	74	62096	-81

BUSES

Alternative 3 Shuttles to Ferry Terminals

Vehicle Miles Traveled 10272

	Year 2025 Alternative 2	
	EMFAC2000 Emission Factors (g/mi) -	Emissions (lb/day)
NO_x	0.325	7
PM_{10}	0.038	1
CO	2.203	50
ROG	0.368	8

Table 5.6.3
Emission Estimates for Year 2025 No Project vs. Alternative 3 (lbs/day)

FERRIES

	Year 2025 No Project	Year 2025 Alternative 3	Project Increase over No Project (difference)
NO_x	3394	14850	11456
SO_2	117	511	394
PM_{10}	202	885	683
CO	194	849	655
ROG	179	783	604

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Alternative 3	**177,811,385**

		Year 2025 No Project				Year 2025 Alternative 3				
	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)	**Alt 3 Decrease (lb/day)**
NO_x	0.152	59598	6346	2885	68829	59584	6344	2884	68812	**-17**
PM_{10}	0.015	5881	70493	33141	109516	5880	70473	33125	109477	**-39**
CO	1.544	605385	2752	1480	609617	605249	2752	1479	609479	**-138**
ROG	0.158	61950	153	74	62177	61936	153	74	62163	**-14**

BUSES

Alternative 3 Shuttles to Ferry Terminals

Vehicle Miles Traveled **5825**

	EMFAC2000 Emission Factors (g/mi) -	Year 2025 Alternative 3 Emissions (lb/day)
NO_x	0.325	4
PM_{10}	0.038	0
CO	2.203	28
ROG	0.368	5

5.7 LAND USE

5.7.1 Significance Criteria

Impacts would be considered significant if they would:

- **Cause community displacement.** Implementation of the project would have a potentially significant impact if an alternative could result in the displacement of existing houses or businesses, either directly or indirectly.
- **Disrupt community cohesion.** Implementation of the project would have a potentially significant impact if an alternative physically divides, or otherwise substantially disrupts, a community, either directly or indirectly.
- **Result in disproportionate physical impacts to low-income or minority communities.** Implementation of the project would have a potentially significant impact if an alternative disproportionately causes adverse physical impacts to low-income or minority persons. Following criteria were used for determining low-income and minority communities:
    - ***Low Income*:** A community is defined as low income when the median household income of a census tract is below the 2002 California Department of Housing and Community Development (HCD) low-income limit for the parent county.
    - ***Minority Community*:** A minority community is defined as a having at least 70 percent of the population share be one or more minority group (as compared to a 50 percent average for the Bay Area as a whole) (MTC 2001).

Because formal federal environmental review and compliance is not required at this program EIR stage, these definitions are not based strictly on federal guidelines. In terms of low income, the most recent HCD data was used, which are based on federal (HUD) standards for determining low income. The definition of a minority community was used from the Metropolitan Transportation Commission (MTC) EIR for their 2001 Regional Transportation Plan (RTP), which is the most recent analysis of potential adverse environmental impacts to minority communities conducted by a regional transportation agency in the Bay Area.

5.7.2 Impacts

5.7.2.1 Construction and Operational Impacts

Potential WTA ferry terminal locations can be divided into locations that have existing, operating terminals, and locations that do not currently have operating terminals. The expansion and enhancement of ferry services would affect a wide range of land uses and communities along the Bay shoreline. The majority of the potential terminal locations for Alternatives 1 and 2 would require construction of new ferry terminals. Brief descriptions of potential local settings for new or enhanced terminal locations are provided below. The descriptions note when planning departments have identified potential changes in land use for a particular area, as some areas may have changed by the time a ferry terminal site is considered. The numbers in

parentheses correspond to terminal locations shown in Figures 2.1, 2.2, and 2.3. More detail on each potential ferry terminal site is contained in Tables 5.7.1 through 5.7.3.

Alameda – Harbor Bay (14)	The existing ferry terminal at Harbor Bay Parkway and Mecartney Road on the northwest side of Bay Farm Island, Alameda, is located within a single-family residential area. The terminal was built as a requirement of the part of the Harbor Bay Business Park development, an employment center for 85 companies located approximately one-half mile south of the terminal site.
Alameda Main Street (15)	The existing ferry terminal is located on Main Street along the Oakland Estuary. The site is between the former U.S. Naval Air Station Alameda and the Alameda Gateway site. Due to redevelopment plans for these areas, significant changes will occur including mixed-use business park development with office, commercial, and light industrial uses.
Alameda Point (13)	A ferry could be located on the decommissioned Naval Air Station Alameda, which is under redevelopment as a mixed-use residential/commercial neighborhood. The area will include residential units, industrial/office space, retail businesses, and cultural/institutional facilities.
Alcatraz Island (38)	The existing ferry terminal is on the northeast side of Alcatraz Island. The terminal is next to a visitor's center and visitor amenities and is downhill from the cellblock buildings of the penitentiary. The island retains its historic buildings and appearance as a former prison, and the ferry terminal facilities and surroundings are the first facilities that visitors see when approaching the island.
Angel Island (5)	There is existing ferry service to Angel Island—the largest island in San Francisco Bay and a California State Park. The terminal is located at Ayala Cove on the north side of the island in Marin County. The island is composed of hilly grasslands and forest with recreational facilities, trails, and sites of historical interest including the Immigration Station, Fort McDowell, and the West Garrison.
Antioch (46)	A potential ferry terminal could be located at the marina in Antioch. The site is surrounded by a parking lot, boat slips, restaurants, and commercial uses. Adjacent to the marina is a downtown setting with commercial, office, and residential land uses.
Benicia (40)	The potential terminal site would be located adjacent to the downtown area. It would be near the commercial core as well as single- and multi-family housing.
Berkeley/Albany (7)	This terminal site would be located south of Golden Gate Fields, or at the foot of University Avenue. A hotel and conference center is proposed just north of the terminal location, and retail space is proposed to the south. The remaining shoreline would be part of the Eastshore State Park.

Candlestick Park (34)	The San Francisco Planning Department stated that a new marina complex with space for a ferry landing and concessions is planned near Candlestick (3Com) Park. The football stadium is surrounded by a large parking lot and nearby mudflats that are planned for restoration to natural salt marsh habitat. An interpretive center is proposed to promote environmental education.
China Basin/ Pac Bell Park (11)	A potential location is just south of the ballpark in the South of Market neighborhood of San Francisco, a light industrial area of the city with numerous high-technology firms and multiple-unit residential buildings. This highly developed and active area of San Francisco includes the Moscone Convention Center, the San Francisco Museum of Modern Art, and the Yerba Buena Center for the Arts.
Coyote Point (35)	This ferry terminal would be in San Mateo at Coyote Point. There is an existing marina, open space park, public museum, and golf course at this location. The nearest residential units are to the south of East Poplar Avenue.
Crockett (27)	Railroad tracks run along the entire shoreline of Crockett, and uses along the waterfront include residential, industrial, and commercial. Downtown Crockett has many historical buildings and narrow streets. The City of Crockett discourages cars downtown.
East Palo Alto (37)	Although there is currently no marina in East Palo Alto, a potential location for a new terminal in this area is Cooley Landing. The area is currently a junkyard/scrap yard with wetland habitat nearby. Extensive redevelopment is proposed for this area, which would include residential, retail, commercial, and office uses.
Fort Baker (8)	The proposed ferry terminal would be located at Fort Baker, on Horseshoe Bay just east of the Golden Gate Bridge in Sausalito. The site is within the Golden Gate National Recreation Area and the scenic Marin Headlands. The ferry would service the proposed conference and retreat center in the rehabilitated historic structures.
Fort Mason (31)	Ferry service is proposed to Fort Mason Center in San Francisco. The site is a converted military base with a variety of nonprofit organizations and activities including arts, education, ecology, and recreation. It is part of the Golden Gate National Recreation Area, near major tourist attractions like Ghirardelli Square, and surrounded by dense urban neighborhoods.
Foster City (36)	The waterfront in the vicinity of a potential Foster City terminal site includes a park that is currently closed and used as staging area for work on the San Mateo Bridge, a residential area, and office uses.
Gnoss Field (44)	A potential ferry terminal could be located northeast of Novato along the Petaluma River. The site is on a slough near the Marin County Gnoss Field general aviation airport, the Northwestern Pacific railroad tracks, and Highway 101.

Half Moon Bay (43)	The Half Moon Bay terminal would be located at an existing harbor that is surrounded by a golf course, beaches, and natural reserves along the coastline. Recent real estate development has made Half Moon Bay into a new bedroom community serving San Francisco and the Peninsula.
Hercules/Rodeo (28)	Hercules is a rapidly growing city stretching from San Pablo Bay to the rolling coastal hills. The City of Hercules has proposed mixed-use development along the waterfront, primarily single-family residential and commercial. The Rodeo Marina is surrounded by a retail, commercial, and residential area and the Lone Tree Regional Shoreline.
Hunters Point (33)	This potential ferry terminal site could be at the decommissioned Hunters Point Shipyard in the southeast corner of San Francisco. The shipyard consists primarily of abandoned industrial and residential buildings, which are being used in limited capacities. The proposed redevelopment of the former U.S. naval base is conversion to civilian use as a waterfront mixed-use, live-work community.
Larkspur (1)	The existing ferry terminal complex in Larkspur, Marin County, includes four vessel slips, a parking lot, bus parking, fuel storage, and maintenance and administration offices. Across the street is Larkspur Landing, an outdoor shopping complex with retail businesses and restaurants.
Mare Island (25)	A ferry terminal is proposed for service to Mare Island, a former naval shipyard. The island currently has many old military buildings, some of which are occupied by businesses and some are of which are vacant or closed. Reuse plans call for creating a job center with mixed land uses such as industrial and office as well as residential units, a regional park, expansion of the golf course, and the construction of a bridge at the southern end of the island.
Martinez (24)	A ferry terminal is proposed in the vicinity of the Martinez Yacht Harbor at the end of North Court Street. The harbor extends into the Carquinez Strait and is surrounded by the Martinez Regional Shoreline Park to the east and west and the Martinez Waterfront Park to the south. The parks form a half-mile buffer between downtown Martinez and the harbor. Other potential sites could include areas near the Martinez Intermodal Station.
Mission Bay (12)	Ferry service is proposed to the Mission Bay Redevelopment Area, approximately 1 mile southeast of downtown San Francisco. The site is currently an industrial area and former rail yard proposed for redevelopment as a dense urban neighborhood with housing, offices, retail, parks, and a school.
Moffett Field (22)	Ferry service is proposed for Moffett Field in Mountain View/Sunnyvale, Santa Clara County. This decommissioned base along the South Bay shore includes two runways, barracks, administrative buildings, aircraft hangars, military housing, and the NASA/Ames research center. Reuse plans are being developed and may include a NASA Research Park, a California Air and Space Center, and other intensified land uses.

Oakland Army Base (OARB) (32)	The former OARB is currently a mix of maritime, industrial, and former army base facilities. A redevelopment plan is being prepared for this area which would include business parks, light industrial, maritime support, new marine terminals, and public parks. A new terminal to serve this area would be located along the Inner Harbor.
Oakland International Airport/Coliseum (42)	A potential ferry terminal could be located either on the west side of San Leandro Bay adjacent to the Oakland International Airport or on the east side near the Oakland Coliseum. The area is a mix of industrial, business parks, airport-related services, and low-density commercial/office.
Oakland/Jack London Square (16)	The existing ferry terminal is at the end of Clay Street within the commercial/retail district of Jack London Square. This active area includes restaurants, small shops, entertainment, residential units, and office space and is within walking distance of downtown Oakland.
Oyster Point (19)	A ferry terminal is proposed at the end of Oyster Point Boulevard in the Oyster Point Marina/Park. The marina is surrounded by a shoreline park extending north and south along the Bay. The area inland of this park includes primarily low-density offices, technology parks, and light industrial areas with very few housing units.
Pittsburg (26)	A ferry terminal could be located at the Pittsburg Marina/Central Harbor, Contra Costa County. The waterfront area is immediately adjacent to the downtown core of Pittsburg with urban commercial and residential areas. There are few visual and physical connections between downtown and the water.
Point Molate (29)	A ferry terminal could be located at Point Molate, a decommissioned Navy contaminated site (brownfield). The area is currently vacant with some shoreline recreational uses.
Port Sonoma (45)	A ferry terminal could be located at the existing Port Sonoma Marina, along the Petaluma River in Sonoma County. The surrounding area is under agricultural use (some of which has conservation easements) and provides important wildlife habitat. The site is also near Route 37 and the former Northernwestern Pacific Railroad, but it is miles away from urban centers.
Presidio (10)	A former military base, the Presidio is now part of the Golden Gate National Recreation Area. It includes public open space, residential uses, historic buildings, and office space. New construction at the Presidio is limited to maintain the significant open space and preserve natural, historic, scenic, and recreational features.
Redwood City (21)	The proposed ferry terminal site in Redwood City is on a narrow spit of land adjacent to Redwood Creek and surrounded by wetlands and salt evaporation beds. Commercial development is the primary land use planned for the area, including a large existing development at Pacific Shores. The Port of Redwood City is serving a growing industrial role for the delivery of bulk construction materials to the South Bay.

Richmond (4)	Given Richmond's extensive waterfront, there are a variety of potential locations for a ferry terminal, including the existing decommissioned terminal at the end of Harbor Way South. The shoreline in the vicinity of the existing terminal includes a vacant parking lot, debilitated historical industrial factory, the Port of Richmond shipping yard, a small park, and R&D office facilities. Redevelopment of this area may include new land uses such as office, research and development, residential, mixed-use development, parks, promenades, and open space.
San Rafael (30)	A ferry terminal could be located at the marina in San Rafael. The area surrounding area includes a supermarket, a neighborhood shopping/ commercial area, and residential units (including houseboats).
Sausalito (3)	The existing ferry terminal is located in the middle of downtown Sausalito, Marin County, and is easily accessible from the shopping area of central downtown. The picturesque town includes boutiques, restaurants and public parks. Multifamily housing dominates the nearby residential area.
Sausalito/ Bay Model (3)	A second ferry in Sausalito could serve the Bay Model, a public museum of the Bay Ecosystem. The area surrounding the museum is industrial. The location is within the Marinship Specific Plan Area (1983), the intent of which is to preserve water-oriented areas and prevent large-scale development.
San Francisco Ferry Building (20)	The historic San Francisco Ferry Building is currently being redeveloped as a major retail/commercial structure. The project will result in new and improved ferry terminal facilities and enhanced public access and aesthetic character. The surrounding area includes high-rise buildings with offices, retail, and restaurants.
San Francisco, Pier 41-43 (9)	Ferry service is currently provided from Pier 41 in San Francisco, which is a major tourism center due to its location next to Pier 39, a year-round festival marketplace. The neighborhood adjacent to the terminal includes tourist and residential uses including retail, restaurants, other services, and single-family and multifamily housing.
San Francisco International Airport (18)	A ferry terminal could directly serve San Francisco International Airport in Millbrae, San Mateo County. The airport has seen rapid growth in air traffic and is continuing to explore means for expanding services, such as potential runway expansion.
San Leandro Marina/East Bay (17)	The City of San Leandro's marina is a potential location for a new ferry terminal. The waterfront in San Leandro is primarily devoted to open space in the form of parks and golf courses. The city has identified the marina as the focus of future development activity, including a potential hotel development.
Tiburon (2)	The existing Tiburon ferry terminal is located on the west end of Tiburon near the Belvedere border and looks directly across to Angel Island. Main Street, the downtown retail area with boutiques, restaurants, and other small-scale retail, is directly adjacent to the terminal. An adjoining

multiple-unit residential area quickly gives way to lower-density residential as the distance from downtown increases.

Treasure Island (6) A ferry terminal is proposed on Treasure Island, in San Francisco Bay between San Francisco and Oakland. The island is composed of the natural island of Yerba Buena and the artificial Treasure Island. The site is a decommissioned military base with offices, housing, warehouses, and other structures. The Draft Reuse Plan emphasizes publicly oriented uses such as recreation, entertainment, retail, and hospitality.

Vallejo (25) The existing Vallejo ferry terminal provides service from Mare Island Way in Memorial Park. The terminal is adjacent to Vallejo's city hall, main post office, and library and is close to downtown Vallejo. In addition, the redevelopment of Mare Island may generate increased ferry ridership. Buildout of the former base will include a variety of uses including residential, wetland research center, regional park, an 18-hole golf course, dredge ponds, schools, and light industrial.

Alameda, Candlestick Park, and Treasure Island are the only locations identified that have already adopted plans for developing a new ferry terminal. In most cases, however, the development of a new terminal would not be compatible with local land use policies such as land use designations and zoning ordinances. Although Alternative 3 would only result in terminal enhancement, some activities may result in the need to change a land use designation or require a Conditional Use Permit.

As discussed in Section 3.7.1.4, analysis under the California Environmental Quality Act (CEQA) is required for general plan amendments to change a land use designation, or Conditional Use Permits (or similar permit) needed by local zoning ordinances. Therefore, any impact to an existing land use that may occur as a result of constructing a new ferry terminal or other facility would require additional CEQA review. As such, the development and implementation of a specific route(s) would require site-specific CEQA review for most of the new terminals proposed.

Based on the land use data collected and analyzed for the project, it appears that the large majority of proposed terminal locations would not be consistent with local land use policies. However, until such time that parcels are identified for potential ferry terminals, the compatibility of each proposed terminal with existing land uses and zoning ordinances remains unknown.

Any potential terminal site must be identified using some level of analysis or waterfront planning process with consideration to the surrounding land uses in order to adequately ensure the terminal will be a compatible use. This can be accomplished under CEQA or conducted as an independent analysis. This requirement for the WTA and local proponents of specific ferry expansion projects to comply with CEQA is not identified herein as a formal "impact." These projects could not proceed without complying with this already required process.

Impact LU-1 **Many of the ferry terminal locations are proposed in developed urban areas that do not currently have ferry terminal facilities. The development of new ferry terminals in urban locations could result in the displacement of existing residential, commercial, or industrial buildings.**

Water transit facilities in areas without existing operational ferry terminals that are already developed may result in the displacement of residences, offices, or industrial facilities. The possible expansion of existing terminal facilities as a result of the proposed enhancement could also result in displacement impacts; however, it is anticipated that this would occur in limited circumstances. As discussed below, planning for terminals would be performed in conjunction with local planning to minimize these effects. It is also noted that the area needed for new or expanded transit terminals is not a substantial amount at a regional level. For example, the maximum total affected shoreline for Alternative 1, if fully implemented, is less than 1 percent of the Bay Area shoreline area.

Because the specific size, type, and location of each proposed new terminal proposed is unknown, the significance of displacement impacts that occur as a result of the proposed project cannot be determined. In other words, the conceptual nature of the ferry expansion plan prevents the assessment of the significance of potential displacement impacts at a regional scale. However, it is important to note how displacement impacts might occur generally, and clearly identify the considerations that the WTA and local agencies will need to incorporate into site-specific environmental review under CEQA.

Significant displacement impacts to people or businesses can be minimized by locating new terminals in areas that are already identified by a local redevelopment agency, or need to be removed for safety reasons (e.g., that are known to be structurally deficient or contain hazardous materials that need to be removed). The installation of water transit facilities could also take advantage of the older, derelict industrial areas that occur in some locations throughout Bay shoreline communities to avoid impacting residential areas and minimize the number of business relocations. Note that planning for facilities in industrial areas, or for any location, will be performed with evaluations of each site for potential existing soil or water contamination. The presence of these site conditions can be addressed through avoidance, construction methods, or site remediation.

Some ferry terminals could be developed as an amenity to or in conjunction with other developments that have displacement impacts, such as a Specific Plan or Redevelopment Plan. If the construction of a ferry terminal is adopted as part of a larger development, it will be the responsibility of the local city or county to consider displacement impacts for that entire project including the terminal. The potential impacts associated with these larger development projects may require partial analysis as part of an environmental review process. Specific displacement impacts would be considered at that time.

Although property acquisition impacts could occur for ferry services, they could also occur as an indirect or cumulative impact due to street widening or reconfiguration to provide better access to a terminal.

If people and businesses do not own the property or unit they live or work in (i.e., renters), they may not be able to obtain the benefits afforded to displaced property owners. When required to move out of a rental property as a result of a redevelopment project, relocation can be made difficult by the high cost of living in the Bay Area or an increase in time spent traveling to and

from a job. When considering a terminal location, specific project proponents would have to take into account the potential impacts to renters that can result from displacing homes and businesses, especially in low-income neighborhoods.

Summary of Impact LU-1

- Alternatives 1, 2, and 3 could involve acquisition of property necessary to expand or create ferry passenger terminals or other facilities. This action could potentially include residential or business properties. Although the significance of displacement impacts cannot be quantified at the regional due to a lack of site-specific information, it remains a potentially significant impact.
- The decision to displace homes or businesses must be made in participation with local city and county governments.
- Displacement impacts most often result from redevelopment or property acquisition requirements.

Mitigation LU-1.1: Site-specific projects should consider project alternatives that avoid displacement of homes or businesses. Displacement impacts to homes and businesses should be addressed as part of the terminal site selection process and avoided through design measures to the extent feasible. Proposals for terminals with potentially significant impacts due to the displacement of homes and/or businesses will likely not be approved without proper mitigation.

If a displacement is unavoidable, project proponents will be required to prepare and execute mitigation in the form of a relocation assistance plan or equivalent. If federal transportation funds will be used for a ferry terminal project, compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, shall be required. Relocation plans typically consider:

- Criteria for replacement housing
- Reimbursement criteria for moving costs and/or differential housing costs (including rents)
- Reimbursement criteria for businesses, including costs associated with searching for a new space, and business (i.e., patronage) lost due to the relocation

Impacts After Mitigation: Relocation of a resident or business can be a significant impact to those affected, and sometimes to the community. Required relocation assistance and compensation has typically offset this impact. It is not significant at a regional level due to the expected low number of people and businesses likely affected. However, it is identified here as a potentially remaining significant effect until site-specific locations are identified and conceptually defined.

Impact LU-2 **Installation of new ferry terminals could disrupt or divide already established neighborhoods. This impact has the potential to be significantly negative or positive, depending on how much the community supports or opposes the location of the terminal.**

The construction and operation of a ferry terminal where one does not currently exist could, in some cases, result in potentially significant impacts as a result of disrupting or dividing an already established neighborhood. It is unlikely that Alternative 3 would have regionally

significant impacts due to a permanent disruption or division of an established neighborhood because the ferry terminals are already integrated into the community. An expansion of ferry service or terminal facilities could have significant impacts on the neighborhoods adjacent to the existing terminals, however this would not be a significant impact at the regional level.

Construction-related impacts could disrupt existing neighborhoods due to construction noise, dust, and traffic. Examples of these impacts include trucks driving through neighborhoods on the way to a construction site, noise increases related to pile driving or other noisy construction activity, or particulate matter blowing into neighborhoods from a project site. These potentially disruptive impacts will be analyzed on a project-by-project basis as part of the environmental review under CEQA. Although potentially significant, these impacts are most often minimized to less-than-significant level through project design features or best management practices. Furthermore, construction-related impacts are temporary and would not result in permanent change in an established community.

Operational impacts that could permanently disrupt or divide existing neighborhoods are potentially significant. Alternatives 1 and 2 have the greatest potential to permanently alter already established neighborhoods in communities around the Bay, especially in terminal locations proposed in urban or suburban settings where terminals do not currently exist. Divisions could occur primarily due to potential roadway expansion that may be required in order to accommodate anticipated changes in traffic patterns to and from a new terminal. Disruption could occur as a result of changes in land use and development adjacent to a new ferry terminal in a neighborhood where this growth would not have otherwise occurred (see discussion under Impact LU-2 for potential growth inducement impacts). The project could also disrupt an established community by displacing a community center, place of worship, or other gathering place, however this impact is unlikely to occur nor would it be regional significant. Because most of the ferry terminals will be "origin" terminals (they will be places where trips originate), people from around the Bay Area will need access to and from the terminals by vehicle, bus, or other from of transit.

For purposes of this analysis, new terminal locations were identified that would potentially require vehicles to utilize roads through established residential areas to access the site. The following locations were identified:

Facility	Nearest Highways	Approx. Driving Distance to Nearest Highway (mi)	Approx. % of Driving Distance in Residential Area
Antioch	SR 4	1.5	50
Benicia	I-780	> 1	75
Crockett	I-80	> 1	75
East Palo Alto	US 101; SR 84	1.5; 1.5	75; 50
Half Moon Bay	SR 1	> 1	50
Hercules/Rodeo	I-80	1 – 1.5	100
Hunters Point	US 101	2	75
Mare Island	I-80, SR29; SR 37	3.5; 3; 3	50; 50; 50
Martinez	SR 4; I-680	3; 2.5	100; 25
Mission Bay	I-280; US 101	> 1	75
Pittsburg	SR 4	1.5	50
Richmond	I-580	1	50
San Leandro	I-880	1.5	75
Sausalito/Bay Model	US 101/SR 1	1.5	75

These locations could result in significant community impacts if it is determined that existing roadways must be widened to accommodate an increase in traffic due to the installation of a ferry terminal. Roadway widening could result in the relocation of homes or businesses. The result of larger roadways with more traffic could potentially impact community cohesion by increasing noise, light, glare, and aesthetic impacts in the community; could make it less desirable to live there; and may adversely affect property values. Due to the speculative nature of these impacts, adequate analysis cannot be conducted at this time. Therefore, as stated above, it is important that local planning agencies consider implementing new ferry service only after environmental review under CEQA and/or some comprehensive planning has been conducted to analyze these potential impacts.

Localized impacts that result in the disruption or division of established neighborhoods due to the implementation of Alternatives 1 or 2 could cumulatively result in a potentially significant impact at the regional level. It is possible that many terminals could be constructed simultaneously. Also, the permanent changes that occur as a result of implementing Alternative 1 or 2 could be considered potentially significant at the regional level if many of the adopted plans result in changes that are considered disruptive or divisive of an established neighborhood.

Summary of Impact LU-2

- Impacts that disrupt or divide established communities could take place during the construction and operation of a ferry terminal.
- Cumulatively, local projects that result from the implementation of Alternatives 1 or 2 could result in potentially significant impacts at the regional level.
- Implementation of Alternative 3 may potentially disrupt or divide an established neighborhood; however, these impacts would be less-than-significant at the regional level.
- As with Impact LU-1, community impacts must be considered at the local level when a city of county adopts plans to construct and operate a ferry terminal.

Mitigation LU-2.1: Local agencies desiring ferry service should identify parcels along their waterfronts that would facilitate a ferry terminal through a waterfront planning process or other type terminal location study. Any potential terminal site must be identified using some level of analysis with consideration to the surrounding land uses in order to adequately ensure the terminal will be a compatible use and will minimize land use impacts, as is required under CEQA. Site-specific projects should consider project design elements that improve terminal accessibility while maintaining community cohesion.

Impacts After Mitigation: Although the implementation of Mitigation LU-2.1 would reduce Impact LU-2 to a less-than-significant level, until further study at the local level is conducted to identify site-specific criteria or standards for identifying and mitigating disruptive or divisive community impacts, Impact LU-2 remains a potentially significant impact.

Impact LU-3 **The implementation of the program alternatives could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities or substantial disruption of established low-income or minority neighborhoods.**

As the regional transportation agency, MTC identified low-income and minority neighborhoods (referred to as Disadvantaged Communities) in the Bay Area to determine if funding for the 2001 RTP would result in an inequitable allocation of funds to non-disadvantaged communities. MTC's Equity Analysis found that the 2001 RTP would increase spending in disadvantaged communities as compared to the previous plan. Like MTC, the WTA analyzed the potential for the proposed project to result in disproportionate adverse impacts to low-income and minority neighborhoods in the Bay Area.

Community impacts that result from implementing the WTA Initiative could result in negative or positive impacts. Positive impacts could potentially occur in every community, where a new terminal is proposed, as a result of increased transit opportunities. More specifically, site-specific terminal projects, if constructed and operated carefully, could greatly benefit low-income and minority communities by providing economic opportunity locally as well as greater access to the region. By integrating with other forms of transportation at new and existing terminal locations, the proposed program could improve the mobility of low-income and minority communities.

These positive impacts could be offset by adverse impacts that disproportionately affect low-income and minority communities. Although displacement of homes and businesses or community disruption by a site-specific ferry project may be a significant impact to any community, such impacts could potentially have a greater adverse impact on low-income and minority communities. As MTC points out in their 2001 RTP EIR, "[P]ersons in these communities may be more constrained in finding appropriate new living situations, paying for the costs of relocation, getting to businesses that are relocated, or establishing new businesses" (MTC 2001).

Alternatives 1 and 2 could result in disproportionate adverse impacts to low-income and minority communities if discretion is not taken to avoid the displacement of homes and businesses or substantial disruption of these communities. Disproportionate adverse impacts could occur if a large portion of an alternative's total displacement impacts occurred in low-income or minority neighborhoods. This is also true if a disproportionate number of the total community disruption impacts occur in these communities. As discussed under Impacts LU-2 and LU-3, there is a potential for these community impacts to be significant, regardless of income or race/ethnicity. Alternative 3 would not cause disproportionate adverse impacts to low-income or minority communities because it would only enhance existing terminals.

The following shows those census tracts considered to be minority and/or low-income communities that could be potentially affected by the proposed project either directly by the terminal or indirectly by the growth that could occur as a result of installing a terminal. "Yes" means that the census tract data indicated that the community met or exceeded the criteria for defining a low-income and/or minority community. "No" means that the community did not meet the criteria.

As shown in Table 5.7.3, the proposed project would not disproportionately impact low-income or minority communities. Because it cannot be determined at this time where physical impacts would occur as a result of implementing the project, disproportionate adverse impacts cannot be assessed at this time. However, the following proposed terminal locations should be recognized not only for their potential to adversely impact low-income or minority neighborhoods, but for their potential to positively impact the local community by creating a new form of accessible regional transportation:

Alameda/Main Street	Oakland (Ninth Ave)
Antioch	Oakland (Jack London Square)
Berkeley/Albany	PacBell/China Basin
Candlestick	Pittsburg
East Palo Alto	Presidio
Ferry Building	Redwood City
Hercules/Rodeo	Richmond
Hunters Point	San Francisco (Pier 41-43)
Martinez	San Rafael
Mission Bay	Sausalito
Moffett Field	Vallejo

Summary of Impact LU-3

- Impacts to low-income and minority communities could be positive or adverse.
- The physical displacement of homes and/or businesses or the substantial disruption of an established neighborhood could have a greater adverse effect when it occurs in a low-income or minority neighborhood.
- Implementing Alternatives 1, 2, or 3 could potentially result in a locally significant impact to low-income and minority neighborhoods. However, impacts to low-income and/or minority communities would be considered adverse only if they would result in a physical adverse impact such as the displacement of a home or business, or the division of an established community.

Mitigation LU-3.1: The terminal site selection process should consider project alternatives to avoid adverse physical impacts to the low-income and minority neighborhoods identified in this EIR.

If federal money will be used for the construction of a ferry terminal, compliance with NEPA will be required, and the federal lead agency's guidelines for addressing Environmental Justice shall be adhered to. If required, the federal Environmental Justice process will supersede the requirement to comply with adopted WTA criteria.

Mitigation LU-3.2: Implement Mitigations LU-1.1 and LU-2.1.

Impacts After Mitigation: Although the implementation of Mitigations LU-1.1, LU-2.1, and LU-3.1 would reduce Impact LU-3 to a less-than-significant level, until further study at the local level is conducted to identify site-specific criteria or standards for identifying and mitigating impacts to low-income and minority communities, Impact LU-2 remains a potentially significant impact.

References

Metropolitan Transportation Commission (MTC). 2001. Draft Environmental Impact Report for the 2001 Regional Transportation Plan.

Table 5.7.1
Land Use and Community Matrix – Alternatives 1 Through 4

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Alameda	Alameda Planning and Building Department	Alameda	Public Institutional	Expansion of the ferry is proposed in the Transportation Plan, including relocation to the Seaplane Lagoon at Alameda Point to avoid Estuary marine traffic and provide a better connection with the Mission Bay development area	M-2 Manufacturing	Y	Y	Y	Parking; Maritime uses; small manufacturing buildings	This location is adjacent to the Alameda Point redevelopment area, and significant changes are expected here as a result. Tentative plans include a business park, residential, community and mixed-use land uses	None Identified
Alameda Harbor Bay Isle	Alameda Planning and Building Department	Alameda	Residential; Commercial Retail	Ferry service required for business park	R-1-PD Residential, Planned Development	Y	Y	Y	Harbor Bay Business Park; Residential; Commercial	There are still vacant areas where new office buildings could be built	All new developments have to adhere to Harbor Bay Business Park Association's guidelines for signage, height, size, etc.
Alameda Point	Alameda Planning and Building Department	Alameda	Public Institutional	1996 NAS Reuse Plan identifies a number of priorities for land use, employment, economic development, housing, public use, and social service.	M-2-G Manufacturing and special government district	Y	N	Y	Decommissioned naval station. Currently, little activity on site. Least tern colony on runway portion of site.	Under redevelopment as mixed-use, residential, and commercial neighborhood. A golf course, hotel, and convention center are being considered.	Most of the older Navy buildings are in the art-deco style, so this theme/core would be preserved. Keep historically significant buildings, keep old runway as a wildlife refuge
Alcatraz Island	GGNRA	San Francisco	Park and Open Space	Maintain as public open space for rec. use. Preserve historic structures. Protect bird and marine wildlife habitats.	Park/Public Land	Y	Y	N	Tourist Attraction	None Identified.	None Identified.
Angel Island	California State Parks	San Francisco	Park and Open Space	Data not available	Park/Public Land	Y	Y	Y	Tourist Attraction/ Recreation	None Identified.	
Antioch	Antioch Community Development Department	Antioch	Rivertown	Upgrade the Marina area for better connection between people and commercial areas	M2 – Industrial District (in the process of trying to change zoning in the City)	Y	N	Y	Parking lot, boat slips, restaurants, commercial uses at the Marina. Adjacent downtown with commercial, office, and residential land uses	Focus Policy Area in the General Plan to bring more commercial uses to the area. An application for a 2-story office building in downtown was approved.	Design Review Board reviews all new buildings. General Plan design guidelines are very generic. Design requirements are site dependent, usually takes in elements from the surrounding area.
Benicia	Benicia Planning Department	Benicia	Residential	See the General Plan	E - Light Industrial; Residential	Y	N	Y	Light Industrial area is vacant. Wastewater treatment plant on 5th/G Streets. Along the waterfront is Rancho Benicia Mobile Home Park and Portside Village (condos)	Proposed 10-acre development east of wastewater treatment plant, but no applications yet.	Many policies regarding conformance with existing architectural characteristics.
Berkeley/ Albany	Berkeley Planning and Development Department	Berkeley	Waterfront/ Marina	Policy 9 – ferry service	SP – Specific Plan (from 1986 Waterfront Specific Plan)	Y	N	Y	Golden Gate Fields Parking	None Identified	None Identified
Candlestick	San Francisco Planning Department	San Francisco	Parks and Open Space; Public Facilities	Enhance wildlife habitat and develop water-oriented and recreational uses.	M-2 Industrial	N	N	Y	Stadium, previously for baseball, now for football. Large parking lot.	Natural marsh to be restored near the mudflat. Indigenous vegetation will be recreated by planting native trees, shrubs, and ground cover. Construction of an interpretive center to promote environmental education. A marina complex is planned with space for ferry landing and concessions.	Preserve wildlife habitat and waterfront environment.
Coyote Point	City of San Mateo Planning Department	San Mateo	Parks and Open Space	None Identified specific to Coyote Point. Bay shoreline policy goals are to enhance wildlife habitats and promote public awareness of the environment with on-site programs and presentations.	S - Shoreline District (allows for parks facility)	Y	N	Y	A marina, open space park, public museum, and golf course. Residential units to the south of E. Poplar Ave.	No plans	City design review guidelines.
Crockett	Contra Costa County, Community Development Agency	Contra Costa County	Heavy Industrial, Commercial Recreation, Low-Density Residential	New development cannot encourage cars to use downtown. Mixed uses encourged along Loring Ave.	Data not available.	Y	N	Y	Railroad tracks run along the entire shoreline. Waterfront has mixed uses; residential, industrial and commercial	Mixed uses encouraged along Loring Ave (near shoreline).	Many Victorian structures in downtown.

Table 5.7.1 - Continued
Land Use and Community Matrix – Alternatives 1 Through 4

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
East Palo Alto	East Palo Alto Community Development Department, Planning Division	East Palo Alto	Industrial	Currently, there are no marinas in EPA. Cooley Landing is being considered for one, with extensive redevelopment in the surrounding area.	Will require rezoning to allow for residential, commercial, office land uses	N	N	Y	Junkyard, scrap yard, wetlands	Urban Design Plan has been adopted and will be going through an EIR process. Redevelopment in the area will include residential, retail, commercial and office land uses.	City has design review policies.
Ferry Building (SF)	San Francisco Planning Department	San Francisco	General Commercial/ Public Trust	Reinforce recreational use of this area as terminus of Market St. and terminal for commuter and recreational ferries. Improve physical access to the waterfront.	C2 – Community Business District	Y	Y	Y	Facilities for ferry service; Golden Gate Transit operates from north of the BART ventilation structure behind the Ferry Building. Adjacent is Pier One, a commercial development that also houses the Port of SF office. Across the Embarcadero is Justin Herman Plaza, a major public gathering spot and open space.	Currently undergoing renovations and redevelopments to include major retail/ commercial uses. New facilities for ferry passengers will include covered and accessible landing facilities and newly designed structures. Also, new promenades for public access and new terminals for increased commuter ferry service capacity are planned.	Create a plaza with a strong urban design setting for the Ferry Building.
Fort Baker	GGNRA	Sausalito	Public Institutional	Promote the continued recreational and educational uses and preservation of existing facilities in East Fort Baker within the GGNRA area	Park/Public Land	Y	N	Y	Public, commercial, and some historical buildings	Limited redevelopment plans	Majority of lands are to remain open space; preservation of the environment
Fort Mason	GGNRA	San Francisco	Public Open Space	Protect natural vegetation and marine wildlife habitat. Encourage continued programming of special events and activities.	Public	N	N	Y	Public, residential, some historical buildings	Large redevelopment unlikely, however Lucas Company's commercial development is to the west of the Fort.	None Identified.
Foster City	Foster City Community Development Department	Foster City	General Commercial, Office Park	None Identified	None Identified	Y	N	Y	Park facilities currently closed; used as staging area for work on the San Mateo Bridge. Mostly residential area across Beach Park Blvd, with office uses to the west	None Identified	None Identified
Gnoss Field/Port Sonoma	Sonoma County Permit & Resource Management Department	Sonoma County	Data not available.	Environmental and ecological importance of this area makes it difficult for any kind of development in this area.	Data not available.	Y	N	N	Agricultural use that supports a large wildlife habitat. Adjacent to Route 37 and the Northwestern Pacific Railroad.	None Identified.	None Identified.
Half Moon Bay	Half Moon Bay Planning Department	Half Moon Bay	Data not available.	Data not available	Data not available	Y	N	Y	Data not available	Data not available	Data not available
Hercules/ Rodeo	Contra Costa County, Community Development Agency	Contra Costa County	Mixed-Use (downtown), Commercial Recreation, Parks and Recreation, Industrial, Commercial	Rodeo: Establish mixed uses along waterfront and downtown to make it a community "focal point"	Data not available	N	N	Y	Railroad tracks run along the entire shoreline. Waterfront has mixed uses; residential, industrial and commercial.	Hercules: New Town Center, Rodeo: redevelopment of the mixed-use area downtown.	Development along the shoreline must improve access. Shoreline is Rodeo's most prominent natural resource.
Hunters Point (Shipyard)	San Francisco Planning Department	San Francisco	Industrial/ Support Facilities, Naval Shipyard	Environmental remediation req'd (in progress)	Not yet determined	N	N	Y	Abandoned residential and industrial buildings.	Convert from naval to civilian uses	Increase public access to the shipyard without interfering with maritime use.
Larkspur	Larkspur Planning Department	Larkspur	Ferry Terminal; Public Facilities; Commercial; Shoreline/Marsh conservation	None Identified	Terminal; Study District; PD – Planned Development	Y	Y	Y	Commercial, office buildings	Mixed-use redevelopment proposal for hotel, offices, residential unit, and corporation yard for the City Sanitary District	None Identified

Table 5.7.1 - Continued
Land Use and Community Matrix – Alternatives 1 Through 4

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Mare Island	Vallejo City Hall Planning Department	Vallejo	Reuse Plan – Planned District	Will be built out according to the Reuse Plan; emphasis on making Mare Island primarily a job center, an economic engine for the City of Vallejo.	Planned District	N	N	Y	Currently there are many old military buildings, some of which are occupied by businesses. Some buildings vacant, or closed.	Reuse Plan focuses on creating a job center with mixed land uses (i.e. industrial and office uses). The Plan also calls for development of a regional park, expansion of the golf course to 18 holes, relocation of the rifle range, reactivation of the dredge pond, and the construction of a bridge at the southern end of the island. New residential development and marina built nearby.	Focus is on making this an economic center, not a bedroom community of Vallejo. Preserve waterfront areas.
Martinez	Martinez Community Development Department	Martinez	Park and Recreation, Special Study Area	General Plan 30.721: Contains policies pertaining to the waterfront. Highest priority placed on conservation, park, and recreational uses along the waterfront.	M-OS/RF Mix Use Open Space and Rec. Facilities. Surrounding area is Light Industrial, Institutional, Single-Family Residential, Medium Density Residential, and Central Commercial	Y	N	Y	Martinez Waterfront Park and the Martinez Regional Shoreline Park form a 0.5-mile buffer between downtown Martinez and the Yacht Harbor. Nearby urban land use is mostly commercial and some residential with some light industrial parcels to the southwest of the possible terminal site.	A Marina Development Area is being contemplated (i.e., the Special Study Area land use designation), but no redevelopment plans have been adopted.	Any waterfront development must be consistent with the recreational and park land uses promoted within the Waterfront Park and Marina area.
Mission Bay	San Francisco Planning Department	San Francisco	Residential/ Commercial	This site must incorporate walkable, bikeable, and transit-friendly elements.	Low-, medium- and high-density residential, office, commercial-industrial, neighborhood shopping, and open space.	Y	N	Y	Currently in transition from an industrial area and former rail yard into a mix-use community with housing, jobs, retail, open space, parks, and a school	First of the development blocks currently under construction, including housing units, corporate science and technical campus, health science campus for UCSF, retail space, hotel, and a public school.	Public access to the shoreline and adequate parks and public open space.
Moffett Field	Federal Military Property	Moffet Field	Data not available.	Data not available	Data not available		N		Data not available	Data not available	Data not available
Oakland Airport/ Coliseum	City of Oakland Community and Economic Development Agency	Oakland	Business Mix and General Industrial/ Transportation (for airport)	Busi ness Mix – Broad mix of commercial, light industrial, R&D, office, air & rail transportation services. General Industrial/ Transportation: industrial and manufacturing, transportation, warehousing	Most of area is regulated by the Port of Oakland, with no zoning regulations imposed by the city; ;some development along Hegenberger Road is within city's zoning jurisdiction	N	N	Y	Oakland International Airport, business park, and travel-related commercial land uses along Hegenberger Rd.	Continued airport and business development with improved public access along the Estuary. The Proposed BART Coliseum-Airport connector with 2 interim stations near Hegenberger will increase intermodal access in area.	City and Port design review policies for new development. Airport proximity issues (i.e. height).
Oakland Army Base	City of Oakland Community and Economic Development Agency	Oakland	General Industrial / Transportation	The Oakland Army Base is subject to a Re-Use Plan that is not yet finalized. The Oakland Base Reuse Authority (OBRA) maintains authority over future redevelopment of the base	M-40 General/Heavy Industrial (redevelopment as per the Re-Use Plan may require rezoning)	Y	N	Y	Currently a mix of maritime, industrial, and former army base facilities. Future plans for redevelopment are not finalized.	Subject to Oakland Army Base Re-Use Plan, under authority of OBRA. Re-Use Plan not yet finalized.	Subject to Army Base Re-Use Plan, and potential historic preservation issues with certain base structures.
Oakland/ 9th Avenue	City of Oakland Community and Economic Development Agency	Oakland	Planned Waterfront Development	The Estuary Policy Plan calls for the transformation of this area from maritime and marine industrial uses to a public-oriented waterfront district with significant open space	M-40 General/Heavy Industrial (redevelopment will require rezoing to mixed use district)	Y	N	Y	Currently, this area is dominated by the Ninth Ave. Terminal, a break-bulk maritime facility. Other uses include light industrial land uses, furniture sales, and trucking companies.	A specific plan will be prepared within the next 12-18 months for the Oak to Ninth District	The Ninth Ave. Terminal is a potentially designated historic property. Water views and significant public access to the waterfront is required with new development
Oakland/ Jack London Square (Alice St.)	City of Oakland Community and Economic Development Agency	Oakland	Waterfront Commercial Recreation	Public-oriented waterfront activities are encouraged, including retail, restaurant, hotel, and commercial recreation uses, with significant public access and open space along the estuary.	R-80 High Density Residential (may be changed to a mixed-use/commercial district as part of the Jack London Sq. II development)	Y	Y	Y	Previously Jack London Village – now demolished; future commercial and hotel uses as part of Jack London Square II development; nearby are several restaurants, Barnes & Noble bookstore, other retail and hotels	Future redevelopment as part of Jack London Square II includes approx 300,000 sq. ft. office space; 119,000 sq.ft. retail and a 240-room hotel w/ conference facilities; Port of Oakland owns this land	The Estuary Policy Plan requires preservation and enhancement of view corridors to the estuary; and sensitive treatment along the water's edge
Oyster Point	South San Francisco Planning Department	South San Francisco	Coastal Commercial	The City would like new developments to include uses that generate high revenues (i.e., hotels) that can help pay for maintenance of the Marina area and its debts. The City is supportive of introducing ferry service to this area.	Surrounding area is Coastal Commercial.	Y	N	Y	Shoreline park, small hotel, restaurants, office park, R&D buildings, and some parking lots	Part of the City's "East of 101" planning area, where significant potential growth is expected. Permit has been approved for 2 small office buildings, and plan underway for full service hotel. New developments will require adequate parking, especially if water transit services are introduced.	Policies allude to enhancement of waterfront shoreline and its accessibility. The City does not have specific details about design guidelines such as waterfront view preservation.
PacBell Park/China Basin	San Francisco Planning Department	San Francisco	Ballpark, Heavy Industrial/ Public Trust	Create a new public park and small boat marina east of the Embarcadero Roadway. Include a public boat launching ramp if possible.	Public	Y	Y	Y	Recreational, commercial, residential, light industrial.	Mission Bay redevelopment plans	Provide broad lawn areas and landscaped grounds. Provision for bike trail and pedestrian promenade linking open space along the waterfront.

Table 5.7.1 - Continued
Land Use and Community Matrix – Alternatives 1 Through 4

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Pier 41 - 43 (SF)	San Francisco Planning Department	San Francisco	General Commercial/ Public Trust	Develop a new fishing harbor in the vicinity of Hyde St, create a cenral open space, and maintain/create opportunities for new water-oriented commercial recreational development.	M-1 Light Industrial, 40- foot height limit	Y	Y	Y	Mixed tourist uses including retail, restaurants, and other attractions	None Identified	Public Plaza
Pittsburg	Pittsburg Community Development Department	Pittsburg	Marine Commercial; Residential	5-P-13 to 16 of the General Plan: Undertake efforts to develop a waterfront activity center featuring a cluster of Marine Commercial uses with pedestrian amenities, focus on visitor attractions and traditional marine services, and provide access to the waterfront and open space at the center of the new Marine Commercial center	Downtown Medium and High Density Residential; Marine Commercial facilities	Y	N	Y	Mainly residential at the harbor, waterfront downtown is mostly commercial, office, residential. Across the slough from the waterfront area is Brown's Island Regional Shoreline Preserve.	A proposed marine/waterfront commercial village may feature marine-oriented repair and sales, restaurants, professional offices, industrial incubators, and specialty retail activities	Development standards (Floor Area Ratios, max building heights, etc.) in Table 5-2 of General Plan; Preservation and enhancement of historic structures unique to downtown
Point Molate	Richmond Planning Department	Richmond	Open Space Recreation	None.	CRR - Community Regional Recreation	N	N	N	Vacant, with some shoreline recreational uses	This is a closed down Navy brown field. City's redevelopment office may have some plans, but viable implemention of any plans is unlikely. Very narrow one-lane road makes access difficult and redevelopment would require great financial resources. There are also issues with accessibility to public services.	None Identified.
Presidio	GGNRA	San Francisco	Public Open Space	Attractively maintain the significant open space. Permit more intensive recreational uses without significantly altering the character of its open landscape (e.g. Crissy Field)	Park/Public Land	N	N	Y	Public open space, residential, some historic buildings		Preserve open space and natural historic, scenic and recreational features of the Presidio. No new structures with adverse effects on natural characteristics of the Presidio; limited new construction
Redwood City	Redwood City Planning and Redevelopment Agency	Redwood City	R&D office uses; light and heavy industrial	A future Waterfront Plan is under consideration	IP – Industrial Park, GI – General Industrial	Y	N	Y	Seaport Conference Center, wetlands, salt evaporation beds, delivery of bulk construction materials and bulk recycling for the Port of Redwood City	Waterfront Plan is the only redevelopment plan under consideration.	None Identified
Richmond	Richmond Planning Department	Richmond	Industrial; Commercial, Residential; Recreation	Richmond Redevelopment Agency will consider new direction for waterfront land use, will likely recommend denser development than has been considered previously	None Identified	Y	N	Y	Vacant parking lot, debilitated historical industrial factory. Nearby, Port of Richmond shipping yard, small park, and R&D office facilities in the 0.25 mi radius, but isolated from waterfront.	Focus of extensive revitalization and planning effort by the City. Plan includes significant increase of R&D/office, residential and mixed-use land uses, as well as parks, promenades, open spaces, a Westshore business park, and historical preservation.	Focus of waterfront amenities
San Francisco Int'l Airport (SFO)	San Francisco Planning Department	San Francisco	Airport	Various FAA regulations, safety	Self- Permitting	N	N	Y	Airport uses	Considering runway expansion or other means of expanding services at the airport.	Airport-related issues and regulations
San Leandro Marina/ East Bay	San Leandro Planning Division	San Leandro	General Commercial (Marina); Parks and Recreation and Garden Density Residential in the surrounding areas	Policy 15.09 of General Plan: Support continued study of the feasibility of ferry service from SL to other destinations around SF Bay. Policy 9.01-09 of General Plan: enhance the Marina area and support water-oriented development.	CR - Commercial Recreation	Y	N	Y	Mix of active recreational and commercial uses, including a 466-slip public marina, two yacht clubs, a hotel, and two large restaurants. Nearby, two golf courses and the 30-acre Marina Park.	No formal applications for redevelopment. City is supportive of new developments in this area that include full service hotel, conference center, and more commercial uses that will encourage more people to use the Marina.	Due to the Marina's unique status in the City's park system, high design standards will be required for future developments; new building and landscape design will tie together the commercial and recreational uses and reinforce the sense of the Marina.
San Rafael (Loch Lomond Marina)	San Rafael Community Development Department	San Rafael	Marina	New General Plan coming out in the next 1-2 years. No current pertinent policies.	Marina. Nearby is Neighborhood Commercial.	Y	N	Y	Marina uses (boat slips, etc.), supermarket, neighborhood shopping/ commercial area, surrounded by residential units across the streets.	No plans	City design review guideline criteria, and conformance with neighborhood plans.

Table 5.7.1 - Continued
Land Use and Community Matrix – Alternatives 1 Through 4

Facility	Local Agency	Location	G.P. Designation(s)	Pertinent Policies	Zoning	Existing Port? (Y/N)	Existing Ferry Service? (Y/N)	Mixed Uses? (Y/N)	Predominant Use(s)	Redevelopment Plan?	Pertinent Visual/Aesthetic Policies
Sausalito	Sausalito Community Development Department	Sausalito	Public Institutional	CP-3.2.1-2 of General Plan: Promote increase patronage of ferries while protecting the area from overuse, support ferry providers for better service and efficient loading area, increase ferry information provided to passengers as alternatives to automobiles	Public	Y	Y	Y	Small park/plaza (open space) on either side of the ferry terminal, parking lot, commercial downtown across the street. Residential units beyond commercial downtown.	Possible proposal for building restroom facilities near the ferry terminal/downtown, but no applications yet.	Any new development will have to go through the design review; generally preserve waterfront views; and fit with existing architectural characteristics.
Sausalito/ Bay Model	Sausalito Community Development Department	Sausalito	Public Institutional	Part of Marine Ships Specific Plan Area (1983). Major policy of Specific Plan is to preserve water-oriented areas. Any development here has to be done in parcels (no large developments).	Public	N	N	Y	Location is a public museum of Bay Area Ecosystem. Industrial uses in the area.	None Identified	Similar to Sausalito
Tiburon	Tiburon Planning and Building Department	Tiburon	VC (Village Commercial) and P (Public/ Quasi-Public)	Office use not allowed on ground floor of Main Street in this area	VC – typical comm. uses w/ a conditional use permit; P- allows public parks and open space	Y	Y	Y	Restaurants and retail stores (small); Public park		Downtown Design Handbook provides specific guidelines for all private and public improvements in the downtown area. A ferry access project was constructed in Spring 2002. The project improved pedestrian and bike access to the existing ferry landing.
Treasure Island	San Francisco Planning Department	San Francisco	Public/Marina	1996 Draft Reuse Plan emphasizes publicly oriented recreational, entertainment, retail, and hospitality uses that can take advantage of the island's location. Goal is to make island accessible to urban residents by ferry	Marina	Y	N	Y	Closed Naval Station, some historic buildings	New ferry terminal, waterfront promenades, bike and pedestrian paths, recreational and entertainment facilities, and residential community.	Preserve historic structures and island's waterfront views; public promenade and open area around the entire island with parks and plazas to help connect the island to the bay setting
Vallejo	Vallejo City Hall Planning Department	Vallejo	Waterfront Commercial	Waterfront Downtown Plan (under EIR process) would increase the intensity of development, connect waterfront area with downtown, and make the waterfront area more accessible to the walking public	CW – Waterfront shopping and service. If Waterfront Downtown Plan is approved, rezoning to Planned Development Zoning.	Y	Y	Y	Surface parking for ferry passengers; Public facilities; commercial; high- density residential	The Waterfront Downtown Plan would result in a multi-level parking structure, 1,400 residential units, commercial uses, hotel, office space, new open space, emphasis on new walkable business district. Georgia St. would go from downtown to waterfront.	Reopening old grid of streets (e.g., opening Georgia St.) and establishing new street corridors; keeping waterfront view open for hill residents; make sure new developments (e.g., large parking structure) are visually attractive

Notes: 1) A new terminal would be located at Pittsburg or Antioch.

Table 5.7.2
Race/Ethnicity Analysis for Alternatives 1 Through 4

Facility	Census Tract No. [1]	Top Four Ethnicities (%)[1]				Minority Community?[3]
		African American	Asian[2]	Caucasian	Hispanic	
Alameda Point	4277.00	0.00	29.30	54.00	9.20	No.
Alameda Point	4286.00	0.00	34.70	49.00	8.30	No.
Alameda/Harbor Bay Isle	4283.01	0.00	32.00	52.00	6.50	No.
Alameda/Harbor Bay Isle	4283.02	0.00	40.00	51.00	3.80	No.
Alameda/Main St.	4274.00	10.00	0.00	66.70	14.20	No.
Alameda/Main St.	4275.00	4.70	0.00	67.50	12.20	No.
Alameda/Main St.	4276.00	30.60	33.40	20.80	0.00	Yes.
Alcatraz Island	No Data	0.00	0.00	0.00	0.00	No.
Angel Island	No Data	0.00	0.00	0.00	0.00	No.
Antioch	3050.00	6.00	0.00	63.00	35.00	No.
Antioch	3060.01	5.30	0.00	76.60	20.80	No.
Antioch	3060.02	4.10	0.00	73.70	20.60	No.
Benicia	2520.00	0.00	0.00	85.70	8.00	No.
Benicia	2521.02	4.80	0.00	81.10	11.70	No.
Benicia	2521.07	5.50	0.00	81.90	8.30	No.
Berkeley/Albany	4204.00	0.00	47.80	27.30	13.80	Yes.
Berkeley/Albany	4219.00	13.20	15.00	61.50	0.00	No.
Berkeley/Albany	4220.00	26.80	0.00	46.80	13.50	No.
Berkeley/Albany	4221.00	25.60	0.00	42.40	25.20	No.
Berkeley/Albany	4222.00	16.60	15.20	55.50	0.00	No.
Candlestick	610.00	19.00	54.20	15.70	9.00	Yes.
Coyote Point	6054.00	0.00	10.40	65.50	16.40	No.
Coyote Point	6061.00	0.00	12.00	53.10	33.30	No.
Crockett	3570.00	2.90	0.00	85.70	11.90	No.
East Palo Alto	6018.00	0.00	20.30	58.70	23.70	No.
East Palo Alto	6019.00	0.00	26.00	45.30	30.90	No.
East Palo Alto	6119.00	29.30	0.00	24.10	54.60	Yes.
Ferry Building	105.00	0.00	17.10	77.90	3.20	No.
Ferry Building	106.00	0.00	62.20	33.50	3.00	No.
Ferry Building	115.00	0.00	69.40	21.70	3.40	Yes.
Ferry Building	179.01	8.20	16.30	67.30	0.00	No.
Fort Baker	1310.00	0.00	3.00	89.80	6.10	No.
Fort Mason	126.00	8.80	0.00	87.50	3.30	No.
Fort Mason	127.00	0.00	9.40	87.20	3.50	No.
Fort Mason	129.00	0.00	10.90	84.10	4.80	No.

Table 5.7.2 - Continued
Race/Ethnicity Analysis for Alternatives 1 Through 4

Foster City	6081.00	0.00	29.30	61.00	6.90	No.
Foster City	6082.00	0.00	28.40	61.60	5.90	No.
Foster City	6083.00	0.00	34.60	56.80	5.20	No.
Foster City	6103.03	0.00	35.30	58.30	4.30	No.
Gnoss Field/Point Sonoma	1011.00	0.00	3.10	91.60	3.40	No.
Gnoss Field/Point Sonoma	1330.00	0.00	1.00	87.90	14.40	No.
Gnoss Field/Point Sonoma	1506.06	0.00	5.40	84.60	13.10	No.
Half Moon Bay	6135.01	0.00	8.00	69.00	29.00	No.
Hercules/Rodeo	3580.00	0.00	14.60	62.50	17.00	No.
Hercules/Rodeo	3591.01	17.70	27.70	43.00	0.00	No.
Hercules/Rodeo	3592.03	20.20	38.60	29.20	0.00	Yes.
Hercules/Rodeo	3592.04	15.60	53.70	21.60	0.00	Yes.
Hunters Point	231.01	46.80	23.70	0.00	20.50	Yes.
Hunters Point	231.02	73.60	0.00	8.90	11.60	Yes.
Hunters Point	232.00	58.20	10.90	0.00	22.50	Yes.
Hunters Point	234.00	46.10	14.00	0.00	25.30	Yes.
Hunters Point	606.00	59.60	20.10	0.00	12.60	Yes.
Larkspur	1192.00	0.00	4.00	92.00	2.90	No.
Larkspur	1200.00	0.00	2.90	93.10	3.70	No.
Larkspur	1211.00	0.00	4.30	89.00	5.40	No.
Larkspur	1212.00	0.00	7.10	85.70	5.50	No.
Mare Island	2508.00	20.10	20.10	42.20	0.00	No.
Martinez	3160.00	22.50	0.00	56.70	15.60	No.
Martinez	3170.00	0.00	2.40	83.40	11.10	No.
Martinez	3200.01	0.00	2.30	76.10	2.40	No.
Mission Bay	226.00	11.50	9.60	71.80	0.00	No.
Mission Bay	607.00	10.60	24.20	56.30	0.00	No.
Moffett Field	5046.01	0.00	10.10	66.20	15.40	No.
Moffett Field	5046.02	0.00	11.30	60.60	16.00	No.
Moffett Field	5047.00	0.00	3.30	41.70	75.30	No.
Oakland (9th Ave)	4060.00	0.00	44.00	19.70	30.20	Yes.
Oakland (Airport)	No Data	0.00	0.00	0.00	0.00	No.
Oakland (Army Base)	No Data	0.00	0.00	0.00	0.00	No.
Oakland (Jack London Square)	4020.00	25.00	0.00	25.00	35.70	Yes.
Oakland (Jack London Square)	4032.00	15.80	19.00	47.60	0.00	No.
Oakland (Jack London Square)	4033.00	8.40	77.40	8.70	0.00	Yes.
Oyster Point	6023.00	0.00	16.90	46.60	43.50	No.

Table 5.7.2 - Continued
Race/Ethnicity Analysis for Alternatives 1 Through 4

PacBell/China Basin	180.00	29.30	0.00	45.70	18.40	No.
Pittsburg	3090.00	32.70	0.00	42.10	19.20	No.
Pittsburg	3100.00	15.90	0.00	38.60	59.00	No.
Point Molate	No Data	0.00	0.00	0.00	0.00	No.
Presidio	601.00	0.00	7.50	76.40	9.40	No.
Redwood City	6102.00	0.00	0.00	0.00	0.00	No.
Redwood City	6102.02	14.00	0.00	51.00	40.00	No.
Redwood City	6103.02	5.00	0.00	71.00	24.00	No.
Richmond	3780.00	8.10	0.00	80.60	9.10	No.
Richmond	3790.00	68.00	0.00	11.00	23.00	Yes.
Richmond	3800.00	31.80	0.00	35.50	18.90	No.
Richmond	3820.00	68.00	0.00	11.60	10.90	Yes.
San Francisco (Airport)	6043.00	0.00	0.00	0.00	0.00	No.
San Francisco (Pier 41-43)	101.00	0.00	26.00	57.00	7.00	No.
San Francisco (Pier 41-43)	102.00	0.00	9.00	83.00	3.00	No.
San Francisco (Pier 41-43)	103.00	0.00	35.00	58.00	3.00	No.
San Leandro (Marina)	4324.00	0.00	20.40	37.00	29.60	No.
San Leandro (Marina)	4333.00	0.00	26.70	45.60	20.60	No.
San Leandro (Marina)	4334.00	0.00	46.00	32.90	9.10	No.
San Rafael	1101.00	0.00	1.50	87.30	6.30	No.
San Rafael	1102.00	0.00	4.10	91.90	3.50	No.
San Rafael	1122.00	0.00	8.30	16.40	70.10	Yes.
Sausalito	1290.00	45.90	0.00	36.40	8.20	No.
Sausalito (Bay Model)	1302.00	0.00	3.90	91.70	3.30	No.
Tiburon	1230.00	0.00	1.80	94.90	2.10	No.
Tiburon	1242.00	0.00	3.20	89.50	4.00	No.
Treasure Island	No Data	0.00	0.00	0.00	0.00	No.
Vallejo	2507.01	33.20	0.00	30.90	32.30	No.
Vallejo	2509.00	35.50	0.00	31.20	19.90	No.
Vallejo	2515.00	25.20	0.00	41.30	25.70	No.
Vallejo	2516.00	23.20	0.00	42.60	27.50	No.
Vallejo	2517.01	23.70	0.00	40.70	18.10	No.
Total Average:		**10.89**	**13.07**	**50.23**	**13.44**	

Notes:
1) 2000 US Census Data
2) Includes Pacific Islander and Other
3) Based on MTC Equity Analysis. A minority community is defined as a having at least 70 percent of the population share be one or more minority group (as compared to a 50 percent average for the Bay Area as a whole). (MTC 2001).

Table 5.7.3
Low Income Analysis – Alternatives 1 Through 4

Facility	County	Census Tract No.	Median Household Income ($)[1]	County Low Income Limit ($)[2]	Potentially Low Income?
Alameda Point	Alameda	4277.00	77,047	52,200	No
Alameda Point	Alameda	4286.00	82,873	52,200	No
Alameda/Harbor Bay Isle	Alameda	4283.01*	121,754	52,200	No
Alameda/Harbor Bay Isle	Alameda	4283.02*	121,754	52,200	No
Alameda/Main St.	Alameda	4274.00	42,804	52,200	Yes
Alameda/Main St.	Alameda	4275.00	52,197	52,200	Yes
Alameda/Main St.	Alameda	4276.00	43,993	52,200	Yes
Alcatraz Island	San Francisco	No Data	No Data	No Data	No Data
Angel Island	San Francisco	No Data	No Data	No Data	No Data
Antioch	Contra Costa	3050.00	47,798	52,200	Yes
Antioch	Contra Costa	3060.01	58,974	52,200	No
Antioch	Contra Costa	3060.02	88,818	52,200	No
Benicia	Solano	2520.00	90,245	41,200	No
Benicia	Solano	2521.02	63,255	41,200	No
Benicia	Solano	2521.07&	63,255	41,200	No
Berkeley/Albany	Alameda	4204.00	36,383	52,200	Yes
Berkeley/Albany	Alameda	4219.00	69,081	52,200	No
Berkeley/Albany	Alameda	4220.00	44,588	52,200	Yes
Berkeley/Albany	Alameda	4221.00	49,106	52,200	Yes
Berkeley/Albany	Alameda	4222.00	56,359	52,200	No
Candlestick	San Francisco	610.00	66,703	73,300	Yes
Coyote Point	San Mateo	6054.00	76,572	73,300	No
Coyote Point	San Mateo	6061.00	76,928	73,300	No
Crockett	Contra Costa	3570.00	69,675	52,200	No
East Palo Alto	San Mateo	6018.00	78,593	73,300	No
East Palo Alto	San Mateo	6019.00	73,718	73,300	No
East Palo Alto	San Mateo	6119.00	71,935	73,300	Yes
Ferry Building	San Francisco	105.00	160,753	73,300	No
Ferry Building	San Francisco	106.00	52,554	73,300	Yes
Ferry Building	San Francisco	115.00	32,698	73,300	Yes
Ferry Building	San Francisco	179.01	86,916	73,300	No
Fort Baker	San Francisco	1310.00	121,873	73,300	No
Fort Mason	San Francisco	126.00	108,199	73,300	No
Fort Mason	San Francisco	127.00	101,541	73,300	No
Fort Mason	San Francisco	129.00	82,873	73,300	No
Foster City	San Mateo	6081.00	103,681	73,300	No
Foster City	San Mateo	6082.00	129,720	73,300	No
Foster City	San Mateo	6083.00	120,446	73,300	No
Foster City	San Mateo	6103.03&	143,631	73,300	No

Table 5.7.3 – Continued
Low Income Analysis – Alternatives 1 Through 4

Gnoss Field/Point Sonoma	Marin	1011.00	148,387	73,300	No
Gnoss Field/Point Sonoma	Marin	1330.00	92,029	73,300	No
Gnoss Field/Point Sonoma	Sonoma	1506.06[&]	83,706	73,300	No
Half Moon Bay	San Mateo	6135.01[&]	107,248	73,300	No
Hercules/Rodeo	Contra Costa	3580.00	53,981	52,200	No
Hercules/Rodeo	Contra Costa	3591.01	81,565	52,200	No
Hercules/Rodeo	Contra Costa	3592.03	91,553	52,200	No
Hercules/Rodeo	Contra Costa	3592.04	93,337	52,200	No
Hunters Point	San Francisco	231.01[*]	41,258	73,300	Yes
Hunters Point	San Francisco	231.02[*]	41,258	73,300	Yes
Hunters Point	San Francisco	232.00	58,618	73,300	Yes
Hunters Point	San Francisco	234.00	48,868	73,300	Yes
Hunters Point	San Francisco	606.00	62,660	73,300	Yes
Larkspur	Marin	1192.00	133,049	73,300	No
Larkspur	Marin	1200.00	118,068	73,300	No
Larkspur	Marin	1211.00	101,422	73,300	No
Larkspur	Marin	1212.00	89,056	73,300	No
Mare Island	Solano	2508.00	48,273	41,200	No
Martinez	Contra Costa	3160.00	41,972	52,200	Yes
Martinez	Contra Costa	3170.00	46,728	52,200	Yes
Martinez	Contra Costa	3200.01	76,096	52,200	No
Mission Bay	San Francisco	226.00	67,179	73,300	Yes
Mission Bay	San Francisco	607.00	55,526	73,300	Yes
Moffett Field	Santa Clara	5046.01	59,688	66,800	Yes
Moffett Field	Santa Clara	5046.02	61,234	66,800	Yes
Moffett Field	Santa Clara	5047.00	84,776	66,800	No
Oakland (9th Ave)	Alameda	4060.00	41,021	52,200	Yes
Oakland (Airport)	Alameda	No Data	No Data	No Data	No Data
Oakland (Army Base)	Alameda	No Data	No Data	No Data	No Data
Oakland (Jack London Square)	Alameda	4020.00	80,852	52,200	No
Oakland (Jack London Square)	Alameda	4032.00	50,651	52,200	Yes
Oakland (Jack London Square)	Alameda	4033.00	50,889	52,200	Yes
Oyster Point	San Mateo	6023.00	76,334	73,300	No
PacBell/China Basin	San Francisco	180.00	36,621	73,300	Yes
Pittsburg	Contra Costa	3090.00	60,639	52,200	No
Pittsburg	Contra Costa	3100.00	48,155	52,200	Yes
Point Molate	Contra Costa	No Data	No Data	No Data	No Data
Presidio	San Francisco	601.00	66,822	73,300	Yes
Redwood City	San Mateo	6102.00	57,191	73,300	Yes
Redwood City	San Mateo	6102.02[&]	57,191	73,300	Yes
Redwood City	San Mateo	6103.02	64,682	73,300	Yes

Table 5.7.3 – Continued
Low Income Analysis – Alternatives 1 Through 4

Richmond	Contra Costa	3780.00	108,199	52,200	No
Richmond	Contra Costa	3790.00	38,880	52,200	Yes
Richmond	Contra Costa	3800.00	64,325	52,200	No
Richmond	Contra Costa	3820.00	57,904	52,200	Yes
San Francisco (Airport)	San Francisco	6043.00	No Data	No Data	No Data
San Francisco (Pier 41-43)	San Francisco	101.00	71,459	73,300	Yes
San Francisco (Pier 41-43)	San Francisco	102.00	147,079	73,300	No
San Francisco (Pier 41-43)	San Francisco	103.00	111,766	73,300	No
San Leandro (Marina)	Alameda	4324.00	63,374	52,200	No
San Leandro (Marina)	Alameda	4333.00	74,194	52,200	No
San Leandro (Marina)	Alameda	4334.00	80,139	52,200	No
San Rafael	Marin	1101.00	127,104	73,300	No
San Rafael	Marin	1102.00	171,097	73,300	No
San Rafael	Marin	1122.00	60,758	73,300	Yes
Sausalito	Marin	1290.00	60,758	73,300	Yes
Sausalito (Bay Model)	Marin	1302.00	148,625	73,300	No
Tiburon	Marin	1230.00	280,842	73,300	No
Tiburon	Marin	1242.00	218,657	73,300	No
Treasure Island	San Francisco	No Data	No Data	No Data	No Data
Vallejo	Solano	2507.01	51,959	41,200	No
Vallejo	Solano	2509.00	26,515	41,200	Yes
Vallejo	Solano	2515.00	46,847	41,200	No
Vallejo	Solano	2516.00	44,706	41,200	No
Vallejo	Solano	2517.01	92,504	41,200	No

Notes:
ABAG data. Median Income based on 1995 dollars. Projection to 2000 dollars was made using a 1.189 multiplier. Low Income Limit for a 3-person household published February 2002 by the California Department of Housing and Community Development. Since the average persons per household in every county potentially affected by the project was between 2 and 3 persons, a 3-person household low income limit was used. HUD bases their low income limits on a 4-person household, and uses a factor of 0.9 to determine low income limits for 3-person households.
* Census tracts that were split up into two tracts for the 2000 US Census from one 1990 US Census tract.
& Partial census tracts. Data presented is from larger tract from the 1990 US Census.

5.8 AESTHETICS

This programmatic assessment of visual and aesthetic impacts due to proposed WTA water transit service expansion is a qualitative analysis. It is broad-based and regional in nature and does not provide detailed local visual and aesthetic impact assessment. Broad types of visual and aesthetic impacts were assessed because they could occur at any location throughout San Francisco Bay due to increased ferry services.

The issues considered in the analysis include views to and from the Bay, the visual quality of new or enhanced structures, light and glare, and the aesthetic quality of construction or ferry activity along the shoreline. The assumption was made that visual and aesthetic impacts of increased ferry services would be most prominent at the existing and potential terminal locations. Therefore the assessment focused more heavily on these areas.

5.8.1 Significance Criteria

Impacts would be considered significant if they:

- Would have a substantial adverse effect on a scenic vista or degrade the existing visual character or quality of the site and its surroundings;
- Would substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway; or
- Would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

5.8.2 Impacts and Mitigation

Impact V-1 **The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay.**

The types of impacts that could occur through construction of terminals, enhancement of existing terminals, and expansion of ferry service are summarized below. These impacts would be localized; regionwide, these structures would affect a relatively small portion of the 1,000 miles of Bay shoreline. For example, even if new terminals under Alternative 1 were implemented, they would represent less than 1 percent of the existing shoreline. Most of these terminals would be at already developed shoreline areas. Localized site-specific visual impact analysis of potential terminal locations was not performed for this program-level EIR.

- Block Bay views: New shoreline development could result in new structures or docked vessels. It is possible that in some instances these structures could be visible or even block or restrict existing views of the Bay.
- Construct unsightly buildings: Without careful planning and design, new terminals could result in unattractive development that negatively affects shoreline views.
- Create light and glare: Safety lighting for facilities, walkways, and parking lots could create a new source of light and glare that negatively affects the surrounding community.

- Construct a building that is inappropriate to a waterfront location: Inappropriate terminal designs could result in parking areas or other inappropriate structures along the waterfront.

Proposed ferry service expansion may also result in positive impacts to visual resources and the aesthetics of the Bay:

- Enhance Bay views: New terminal designs could provide new or enhanced opportunities to view the Bay from piers, platforms, and the ferries themselves.
- Improve the aesthetics of shoreline development: New terminal development could revitalize areas of the shoreline that currently do not take advantage of the Bay setting. Improving areas that currently have debris, contamination, or inappropriate development through the construction of terminals designed to visually complement the Bay and provide public access to the waterfront could result in an enhancement of public views to and from the Bay.

Planning of any development or change in or near the shoreline of the San Francisco Bay is subject to considerable regulatory review by local, state, and federal resource and permitting agencies. Site and terminal planning and its associated regulatory review process for all proposed ferry terminal projects would follow the San Francisco Bay Conservation and Development Commission (BCDC) San Francisco Bay Plan (Bay Plan) policies on appearance, design, and scenic views (BCDC 2002). The policies provide guidelines for enhancing the visual quality of development around the Bay while preserving views of the Bay and shoreline. In addition, the BCDC Design Review Board would review all proposed development that affect the appearance of the Bay in accordance with the Bay Plan. Local city and county ordinances, regulations, and policies would also apply on a project-by-project basis.

Summary of Impact V-1

- Alternatives 1 and 2 could result in the construction of new terminals and/or the improvement of existing terminals, which could have potentially significant impacts to views of the Bay or the visual character of waterfront areas.
- Alternative 3 could require enhancements to existing terminals, which would not result in significant impacts to views of the Bay or the visual character of waterfront areas.
- Alternative 4 would not require new construction or expansion of service. No impact would occur.

Mitigation V-1.1: The WTA established Intermodal and Architectural Design Guidelines that should be considered in the planning and design of new and enhanced ferry terminals (WTA 2002). The design objectives may include, but are not limited to, making the ferry system more attractive, integrating terminals with the local urban context, and taking advantage of waterfront views. The ideal terminal facility will serve as a catalyst to ferry service expansion in the Bay Area.

The physical design objectives focus on terminal layouts that prioritize use by pedestrians, bicycles, and other transit modes rather than individual vehicles. A seamless and efficient transfer between modes of transport will be emphasized through a logical progression of facilities, signs, and boarding points as well as a pedestrian network connecting adjacent amenities such as businesses, transit stops, and public spaces. The specific design of each

terminal facility should be developed at a local level to ensure compatibility with the surrounding visual environment.

Impact After Mitigation: The WTA design guidelines will promote aesthetic planning criteria that guide the initial development of projects in a manner consistent with preservation of views and scenic resources. In addition, future development of projects will not proceed without the prospect of meeting BCDC and local planning requirements. Impact V-1 could still be potentially significant after implementation of Mitigation V-1.1.

Impact V-2 An increase in the number of ferryboats operating on San Francisco Bay could impact views of the Bay or degrade the visual character of the Bay.

The current ferry services use 15 boats systemwide, with over 80,000 trips annually. Ferries share the Bay with commercial, military, and recreational boats making their way to and from the eight ports and 21 marine terminals throughout the Bay. Views of the Bay therefore include many types of shipping vessels.

The proposed expansion of ferry service under Alternative 1 could result in 160 ferryboats operating on the Bay if all routes and frequencies of service are provided. Ferry activity on the Bay would more than double to potentially 243,440 annual trips if Alternative 3 is implemented. If the most comprehensive service were provided, it would potentially increase the current activity level by more than 10 times, resulting in up to 1,182,980 trips annually.

The potential visual impact of additional ferryboats making trips across the Bay is subjective in nature. It could be seen as an enhancement of the maritime atmosphere and Bay views similar to existing views, which include ferry services, shipping activity, and recreational boating. It could also be seen as a detriment to views of the Bay. There are no established significance criteria that provide a framework to determine if increased ferry vessels on the Bay would be considered a significantly detrimental impact. Increases in service may be relatively unnoticeable to most Bay Area residents and travelers. However, full implementation of service, such as for Alternative 1, could compromise some existing views.

Summary of Impact V-2

- Alternatives 1 and 2 would result in an increase in the number of vessels operating on San Francisco Bay. This could have an adverse impact on scenic views of the Bay. Under full implementation of service routes and frequency of service, this could represent a significant impact to views of the Bay or the visual quality of waterfront areas.
- Alternative 3 would result in a minor increase in the number of vessels operating on San Francisco Bay. The minor increase in the number of boats and the lack of new terminal facilities would not represent a significant impact to views of the Bay or the visual quality of waterfront areas.
- Alternative 4 would not require additional boats or increased services. No impact would occur.

Mitigation V-2.1: This impact is partially minimized by the concentration of routes along some common alignments. It would be further reduced by implementation of other mitigation measures for air quality and energy that describe route and ferry vessel trip reductions. These

measures would reduce services considerably from those described for full implementation of Alternatives 1 and 2. No mitigation is required.

Impact After Mitigation: This impact would be mitigated to less-than-significant levels through implementation of mitigation measures for air quality. Mitigation A-1 describes a reduction of route service. No further mitigation is proposed.

Impact V-3 Visible exhaust from current or modern ferries is minimal or nonexistent due to improvements in engine propulsion and operation. Visible exhaust plumes would not occur under normal ferry operation.

Visible smoke plumes exhausting from an engine are a result of various conditions, but can indicate that an engine is not completely burning the fuel. Incomplete combustion results in unwanted pollutant emissions. These emissions can include particulates that may be visible in the exhaust, resulting in darkened plumes. Internal combustion engine emissions also include a large proportion of water vapor, a normal product of combustion, which may also be visible under certain conditions (such as very cold temperatures or an engine that is not completely warmed up).

Expansion of ferry service on existing or new routes would be based on engine and fuel technology that is current or state-of-the-art. Visible exhaust plumes would not occur. Modern ferry vessels on current routes are well maintained on a regular basis and would continue to be maintained with expansion of service.

Summary of Impact V-3

- Alternatives 1, 2, and 3 would increase the number of ferryboats and trips on the Bay, but all boats would continue to be maintained on a regular basis and would not result in visible exhaust plumes. No impact would occur.
- Alternative 4 would not require additional ferryboats or increased services and existing vessels would continue to be maintained on a regular basis. No impact would occur.

Impact V-4 Expanded and enhanced ferry services, including terminals and additional ferry boats, would not impact scenic resources within a State Scenic Highway.

Sections of Bay Area Highways 280, 580, and 680 have been designated as scenic corridors under the State Scenic Highway program but do not provide motorists with expansive or continuous views of the Bay. Therefore, these corridors would not be affected by an increase in visible ferries on the Bay or the construction of new terminals along the shoreline.

Summary of Impact V-4

- Alternatives 1 and 2 would result in additional terminals and an increase in the number of vessels operating on San Francisco Bay. This development and boating activity would not be highly visible to motorists and it does not represent a visual impact to scenic resources within a State Scenic Highway.

- Alternative 3 would increase ferry trips on the Bay, but would not result in the development of new terminals. This boating activity would not be highly visible to motorists and it does not represent a visual impact to scenic resources within a State Scenic Highway.
- Alternative 4 would not require new ferry vessels or increased services. No impact would occur to scenic resources within a State Scenic Highway.

Impact V-5 Expanded and enhanced ferry terminals and services throughout San Francisco Bay could result in light and glare impacts.

Ferry terminal facilities could include structures, parking lots, roadways, and pedestrian and bicycle facilities that would be lit for public safety. Terminals proposed within or adjacent to existing marinas, ports, or shoreline development would add to existing light and glare, but may not necessarily create a substantial new source. Potential terminal facilities in parkland or less developed areas would be more likely to create a new source of light and glare, and this impact could be adverse and significant. New light sources may represent a potentially significant impact to light-sensitive land uses such as nearby residential areas.

Increased ferry trips on the Bay would add to the existing vessels that already cross Bay waters. Early morning or late day/evening vessel trips would show navigation as well as cabin and deck lighting. The increase in frequency of trips and new routes to terminals not currently serviced would increase and introduce these sources of light on the Bay and at terminals, but it would be transitory and the lighting would not be a substantial source of glare to light-sensitive land uses. Therefore, this vessel lighting would not be considered adverse or significant.

Summary of Impact V-5

- Alternatives 1 and 2 could result in the construction of new terminals and/or the improvement of existing terminals, which would result in potentially significant light and glare impacts.
- Alternative 3 could require enhancements to existing terminals. This would not create new sources of light or glare and does not represent a significant impact.
- Alternative 4 would not require new construction or expansion of services. No light or glare impacts would occur.

Mitigation V-5.1: Ferry terminal designs will be required to develop site-specific lighting plans. Outdoor lighting should be focused and directed to the specific location (e.g., roads, walkways), be shielded to avoid the production of glare, and minimize up-light and light spill. Fixtures should be located, aimed or shielded to minimize stray light to or across property boundaries. Light design should use down-cast, low glare, shields, or equivalent design to minimize light and glare on surrounding land uses.

Impact After Mitigation: Impact V-5.1 would be minimized through application of Mitigation V-5.1, but the potential remains for significant impacts depending on site-specific locations and settings. This impact remains potentially significant.

References

San Francisco Bay Conservation and Development Commission (BCDC). 2002. San Francisco Bay Plan. October.

5.9 CULTURAL RESOURCES

5.9.1 Significance Criteria

5.9.1.1 Federal and State Evaluation Criteria

The criteria for eligibility for the California Register of Historic Resources (CRHR) are very similar to those that qualify a property for the National Register of Historic Properties (NRHP), which is the significance assessment tool used under the National Historic Preservation Act (NHPA). The criteria of the NRHP apply when a project has federal involvement. The development and adaptation of a ferry expansion plan by the WTA falls under the California Environmental Quality Act (CEQA). Federal cultural resources significance criteria would apply when resources or project actions fall under the jurisdiction of a federal agency. This could apply when actions:

- Occur inside the Monterey Bay National Marine Sanctuary or Gulf of the Farallones National Marine Sanctuary;
- Occur on the outer continental shelf (i.e., deep water dredge disposal sites);
- Require a U.S. Army Corps of Engineers (USACE) 404 permit;
- Occur on lands administered by the U.S. Navy, U.S. Coast Guard (USCG) (other federal agency); or
- Require nation-to-nation consultation between a federally recognized Native American tribe or individual and the federal government.

A property that is eligible for the NRHP is also eligible to the CRHR. All potential impacts to significant resources under a federal agency must be assessed and addressed under the procedures of Section 106 of the NHPA, set forth at 36 CFR 800. All resources encountered when implementing a specific ferry expansion project, with the exception of isolate artifacts and isolate features that appear to lack integrity or data potential, will have to be evaluated for significance vis-à-vis Section 106.

Federal Significance Criteria

The four evaluation criteria to determine a resource's eligibility to the NRHP, in accordance with the regulations outlined in 36 CFR 800, are identified at 36 CFR 60.4. These evaluation criteria, listed below, are used to help determine what properties should be considered for protection from destruction or impairment resulting from project-related activities (36 CFR 60.2).

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- Resources that are associated with events that have made a significant contribution to the broad patterns of our history; or
- Resources that are associated with the lives of persons significant in our past; or

- Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

State Significance Criteria

In considering impact significance under CEQA, the significance of the resource itself must first be determined. At the state level, consideration of significance as an "important archaeological resource" is measured by cultural resource provisions considered under CEQA Sections 15064.5 and 15126.4, and the draft criteria regarding resource eligibility to the CRHR.

Generally under CEQA, a historical resource (these include built-environment historic and prehistoric archaeological resources) is considered significant if it meets the criteria for listing on the CRHR. These criteria are set forth in CEQA Section 15064.5 and defined as any resource that:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

Section 15064.5 of CEQA also assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed under PRC Section 5097.98.

Impacts to "unique archaeological resources" and "unique paleontological resources" are also considered under CEQA, as described under PRC Section 21083.2. A unique archaeological resource implies an archaeological artifact, object, or site about which it can be clearly demonstrated that—without merely adding to the current body of knowledge—there is a high probability that it meets one of the following criteria:

- The archaeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information; or
- The archaeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- The archaeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A non-unique archaeological resource indicates an archaeological artifact, object, or site that does not meet the above criteria. Impacts to non-unique archaeological resources and resources which do not qualify for listing on the CRHR receive no further consideration under CEQA.

Under CEQA Section 15064.5, a project potentially would have significant impacts if it caused substantial adverse change in the significance of one of the following:

- A historical resource (i.e., a cultural resource eligible for the CRHR);
- An archaeological resource (defined as a unique archaeological resource which does not meet CRHR criteria);
- A unique paleontological resource or unique geologic feature (i.e., where the project would directly or indirectly destroy a site or resources);
- Human remains (i.e., where the project would disturb or destroy burials).

A non-unique archaeological or paleontological resource is given no further consideration, other than the simple recording of its existence by the lead agency.

5.9.2 Impacts and Mitigation

As previously noted, the proposed project actions are primarily located in onshore, Bay shoreline, and offshore environments. As detailed in Appendix CUL-A, cultural resources have been recorded in these settings or have the potential to be located in these geographic locations.

As specific projects move forward for evaluation, detailed record searches, archival reviews, field reconnaissance, and consultation with Native American groups/individuals and local historical societies will be conducted, as appropriate. These tasks, in conjunction with related research and consultations, will further establish the cultural resources data baseline and facilitate assessments of potential impacts to significant cultural resources. It will be the responsibility of the project proponent to direct these activities in a manner consistent with Section 106 and CEQA guidelines, as applicable.

5.9.2.1 Construction and Operation (Dredging)

Impact CUL-1 **Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related activities for buoy placement could impact submerged and sub-bottom cultural resources in San Francisco Bay.**

Submerged and sub-bottom resources are known within the San Francisco Bay and California coastal submarine environments. Prehistoric resources, such as submerged shellmounds, settlement sites, ceremonial artifacts, and possibly watercraft, are known to exist in these settings. Known historic resources in these environs could include maritime vessels, wharf or pier remnants, shrimp farm remnants, refuse dumps, ammunition dumps, airplane fuselages, and materials related to these or other historical activities. Previously unknown resources could also be encountered.

Summary of Impact CUL-1

- Alternatives 1 and 2 involve expansion of ferry service to new terminals. If all routes that are considered in those alternatives were implemented, considerable dredging would be required, for both channels and ancillary project components. The chances of encountering and adversely disturbing buried sites could inadvertently destroy the cultural value of the

resource. Other dredging and construction activities are already underway, or will occur, within the San Francisco Bay environs, such as construction of the east span of the Bay Bridge and construction related to the runway reconfiguration at San Francisco International Airport. These project actions, combined with dredging and related constructions for new ferry terminals, could have potentially significant impacts to cultural resources if they are eligible for, or listed on, either the NRHP/CRHR, or resources that qualify as a "unique archaeological resource" under CEQA. This is a potentially significant impact.

- Alternative 3 would not require dredging of new ferry channels. This alternative would use existing channels that are already maintained. However, Alternative 3 might require minor dredging near the existing ferry terminal to retrofit, expand, or otherwise improve a facility. The resulting impacts could be cumulative and potentially significant for cultural resources eligible for, or listed on, either the NRHP/CRHR, or resources that qualify as a "unique archaeological resource" under CEQA.
- Alternative 4 would not require dredging of new ferry channels. This alternative would utilize existing channels that are already maintained. No impacts are anticipated under the alternative.

Mitigation CUL-1.1: To avoid or mitigate impacts to cultural resources, they must be evaluated against the federal and state significant criteria previously described. Prior to project construction, a focused literature search should be conducted to identify any known resources for sites that cannot be adequately characterized by existing literature or available site history information, marine archaeological surveys may be necessary to detect any previously unknown submerged or sub-bottom resources. Depending on the proposed project undertaking and the geographic or bathymetric setting, appropriate remote sensing field survey could include deployment of a side scan sonar, sub-bottom profiler, and magnetometer to help detect these resources. Follow-up diver survey, high-resolution sidescan sonar, sub-bottom profiler, magnetometer survey, or Remote Operated Vehicle (ROV) investigations might be required to positively identify the targets.

If resources are detected, they should be identified and evaluated against the NRHP/CRHR significance criteria, and as a "unique archaeological resource" under CEQA. If the resources are not eligible for—or already on—the NRHP/CRHR and do not qualify as a "unique archaeological resource" under CEQA, then no further consideration of these resources is required. If the resources are eligible for—or currently on—the NRHP/CRHR or qualify as a "unique archaeological resource" under CEQA, then impacts would occur to those resources. If a resource is found significant, then the resource will be avoided through alterations in project design, when feasible.

Under CEQA, preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place for archaeological resources may be accomplished by, but not necessarily limited to, a suite of approaches such as:

- Planning construction activities to avoid archaeological sites;
- Incorporation of sites within parks or other open spaces;
- Covering the site with a layer of chemically stable soil before building facilities on top of the archaeological site;

- Deeding the site into a permanent conservation easement.

In the event that avoidance of cultural resources is not possible via project design modifications, appropriate mitigation, which could include a record of the wharf, pier, building or structure in a Historic American Building Survey/Historic American Engineering Record (HABS/HAER) at a level compatible with National Park Service standards. Adequate recordation of a built environment resource would include the following:

- The development of site-specific history and appropriate contextual information regarding the particular resource, in addition to archival research and comparative studies;
- Accurate mapping of the noted resources, scaled to indicated size and proportion of the structures;
- Architectural descriptions of the structures;
- Photo documentation of designated resources;
- Recordation utilizing measured architectural drawings.

Mitigation of a built environment resource may also take place in the form of preservation or reuse of a wharf, pier, building or structure. It should be anticipated that the preservation and/or reuse of an eligible structure would include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. If the building is considered a historic resource under CEQA, the local building inspector must grant code alternatives under the State Historic Building Code.

In some cases, HABS/HAER documentation might not provide an adequate mitigation measure to reduce impacts to a less-than-significant level and might not be an appropriate mitigation measure for some resources. Mitigation should capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the pier/building/structure cannot physically be retained, then it is incumbent on the lead agency to pursue ways that the memory of the resource is retained and made easily available. To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. Often, it might be possible to incorporate the resource into the project as one means of resource mitigation.

The lead CEQA agency will be responsible for coordinating all necessary mitigation measures. This might include coordination with a lead federal agency, where federal permitting, land ownership, or other federal-level issues prevail over a specific project action.

Mitigation CUL-1.2: In the event that avoidance of cultural resources is not possible via project design modifications, appropriate mitigation, which could include further recordation and/or data recovery, in accordance with Section 106 of the NHPA, will be conducted.

Under CEQA, preservation in place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place may be accomplished by, but not necessarily limited to:

- Planning construction activities to avoid archaeological sites
- Incorporation of sites within parks or other open spaces

- Covering the archaeological site with a layer of chemically stable soil before building facilities on top of the site
- Deeding the site into a permanent conservation easement

For built environment resources, mitigation may take place in the form of preservation or reuse of a wharf, pier, building, or structure. It should be anticipated that the preservation and/or reuse of an eligible structure would include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. If the building is considered a historic resource under CEQA, the local building inspector must grant code alternatives under the State Historic Building Code.

In some cases, HABS/HAER documentation might not provide an adequate mitigation measure to reduce impacts to a less-than-significant level and might not be an appropriate mitigation measure for some resources. Mitigation should capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the building/structure cannot physically be retained, then it is incumbent on the lead agency to pursue ways that the memory of the resource is retained and made easily available. To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. Often, it might be possible to incorporate the resource into the project as one means of resource mitigation.

As the lead CEQA agency, the WTA will be responsible for coordinating all necessary mitigation measures. This might include coordination with a lead federal agency, where federal permitting, land ownership, or other federal-level issues prevail over a specific project action.

Impact After Mitigation: According to CEQA Section 15126.4(b)(1), in certain cases with built environment resources, the mitigation steps outlined in CUL 1.1 and CUL 1.2 might not reduce the impacts on a resource to less than significant. In some circumstances, documentation of a historical resource by way of historic narrative, photographs, or architectural drawings—as mitigation for demolition of the resource—might not mitigate the effects to a point where no significant effect on the environment would occur. In these cases, there could be potentially significant impacts to the resource after mitigation.

Impact CUL-2 Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.

Dredging would result in spoils that would have to be deposited in various locations. Only finer-grained materials (Bay Mud and sand) are suitable for aquatic disposal or upland reuse. Rock, coarse gravel, or materials such as concrete, steel, and other construction debris found in the submarine environment are not suitable for aquatic disposal/upland wetland reuse and must be taken to appropriate locations for disposal or recycling. Depending on volume and suitability of dredged materials, dredging projects may consider a range of options including in-Bay disposal, ocean disposal, upland reuse, wetland restoration, upland landfill disposal, and reuse as fill material for construction projects. It is assumed that deep-ocean disposal would be done at a previously designated disposal site, in-Bay disposal would not be allowed for new dredging projects, and upland disposal would be done at an existing landfill. Therefore, only upland reuse or wetland restoration activities could impact terrestrial and marine cultural resources.

Summary of Impact CUL-2

The impact for CUL-2 is the same as for CUL-1.

Mitigation CUL-2.1: The mitigation for CUL-2.1 is the same as for CUL-1.1.

Mitigation CUL-2.2: The mitigation for CUL-2.2 is the same as for CUL-1.2.

Impact After Mitigation: Impact CUL-2 would be less than significant after implementation of Mitigations CUL-2.1 or 2.2.

Impact CUL-3 **Project actions such as retrofitting, expansion, or improvement on existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources and historic built environment resources.**

On-shore project constructions could include expansion of existing ferry terminals or construction of new facilities. Some of these existing structures, or components thereof, are more than 50 years in age. Project actions have the potential to impact historic built environment structures and districts (including historic terminal structures), and prehistoric and historic (nonbuilt) archaeological sites.

Summary of Impact CUL-3

The impact for CUL-3 is the same as for CUL-1.

Mitigation CUL-3.1: The mitigation for CUL-3.1 is the same as for CUL-1.1.

Mitigation CUL-3.2: The mitigation for CUL-3.2 is the same as for CUL-1.2.

Impact After Mitigation: Impact CUL-3 would be less than significant after implementation of Mitigations CUL-3.1 or 3.2.

Impact CUL-4 **Project actions such as construction and related activities could impact previously unknown resources.**

During project construction and related activities, the potential always exists to encounter previously unknown cultural resources. This would include prehistoric and historic submarine and terrestrial resources.

Summary of Impact CUL-4

- Alternatives 1 and 2 would require construction in numerous areas. These alternatives could have the potential to significantly impact previously unknown resources during construction.
- Alternative 3 could require expansion and retrofitting of existing ferry terminals. This alternative is unlikely to impact previously unknown resources during construction. Therefore, impacts are considered less than significant.
- Alternative 4 would not require expansion of new ferry terminals. No impacts are anticipated under the alternative.

Mitigation CUL-4.1: Same as CUL-1.1. As the lead CEQA agency, the WTA will be responsible for coordinating all necessary mitigation measures. This might include coordination with a lead federal agency, where federal permitting, land ownership, or other federal-level issues prevail over a specific project action.

Impact after Mitigation: Impact CUL-4 would be less than significant after implementation of Mitigation CUL-4.1.

5.10 GEOLOGY

5.10.1 Significance Criteria

Impacts would be considered significant if they:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving surface fault rupture, earthquake ground shaking, liquefaction, subsidence, uplift, expansive soils, mass wasting, erosion and tsunami or seiche;
- Situate terminals on a geologic unit or soil that is unstable, or that could become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse; or
- Prevent future access to geologic features and resources of economic or scientific value.

The following section discusses potential impacts to the geologic environment from the proposed WTA alternatives. Geologic hazards considered include surface fault rupture, earthquake ground shaking, liquefaction and lateral spreading, uplift and subsidence, expansive soils, mass wasting, erosion, and tsunamis. Major active faults in the Bay Area are summarized in Table 3.10.1. The potential exposure of transit terminals to geologic hazards is summarized in Table 3.10.2. Mitigation measures required to overcome the various geologic hazards are also presented. Lastly, the impacts of the program on the geologic environment are discussed.

5.10.2 Impacts and Mitigation

Impact G-1 **Potential new terminals and facilities could be exposed to surface faulting. There is a potential for substantial damage and risk of injury or loss of life at facilities located on or near active faults.**

The state of California delineates zones around active faults under the AP Earthquake Fault Zone Act (Hart 1994) to mitigate for the effects of surface faulting. Any development within an AP Zone requires detailed geologic investigation to accurately delineate active fault strands such that they can be avoided. Fault rupture beneath engineered structures can, if the fault displacement is large enough, lead to damage and in extreme conditions catastrophic collapse. Even minor fault displacements can cause significant structural damage.

With the exception of the potential for a Half Moon Bay terminal location (Alternative 1), none of the potential shore-based facilities are located within an AP Zone. Therefore, the potential for surface faulting is low for all other terminals (Table 3.10.2). The San Gregorio fault comes onshore at Pillar Point, near the potential Half Moon Bay transit terminal location. The San Gregorio fault poses a potential surface faulting hazard, therefore the potential for surface faulting at Half Moon Bay is considered high (Table 3.10.2).

Summary of Impact G-1

- For Alternative 1, the Half Moon Bay terminal could be within or near the AP Zone for the San Gregorio fault and could be exposed to potential surface fault rupture effects. Other

terminal locations have a low likelihood of exposure. This is a potentially significant impact for Half Moon Bay.

- Alternative 2 has no new terminal locations within AP Zones. The potential for this impact is low and considered not significant.
- Alternatives 3 and 4 would not include new terminals. No impact would occur.

Mitigation G-1.1: Significant risk of exposure to surface faulting for Alternative 1 can be avoided if the Half Moon Bay terminal location is dropped from further consideration.

Mitigation G-1.2: Any potential development at Half Moon Bay would have to be carried out in accordance with the regulations detailed in the Alquist-Priolo Act. This will involve detailed, site-specific subsurface geologic investigations to accurately locate the active trace(s) of the fault and adoption of a suitable setback distance in order to mitigate for the effects of potential future fault rupture.

Based on the information above and the generalized locations of WTA facilities presented in this EIR, the hazard from surface faulting rupture is negligible at all potential transit terminal localities except for Half Moon Bay. Therefore, no mitigation measures are recommended for other locations. The proximity of terminals to active fault zones should, however, be verified when specific terminals and routes are proposed.

Impact After Mitigation: The impact from surface faulting after mitigation is low and considered not significant.

Impact G-2 **Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.**

The Bay Area is seismically active and all sites have a reasonably high potential of experiencing significant strong earthquake shaking in the future (Working Group on California Earthquake Probabilities 1999).

A number of attenuation relationships have been developed from recordings of earthquake shaking that relate earthquake size, distance from the earthquake source, and geologic conditions to the amount of shaking that can be expected at a site. The amount of shaking is expressed in terms of "Peak Horizontal Acceleration" measured in percent of acceleration of gravity (g) (approximately 9.81 feet per second per second or 10 m/s^2). However, because no specific projects are proposed at this time, no site-specific ground motions were calculated for any sites during this study. Rather, relative levels of earthquake shaking were estimated based on the proximity of each terminal site to known active faults (Table 5.10.1). Sites located less than 5 km from an active fault could experience "very high" shaking. Sites located 5 to 10 km from an active fault could experience "high" levels of shaking. Sites located 10 to 20 km from active faults could experience "moderate" shaking. In cases where ground conditions are likely to amplify the effects of earthquake shaking (deep, soft sediment), there is an increase in the likely shaking hazard ranking (i.e., a site on soft Bay Mud located 7 km from an active fault would likely experience "very high" levels of earthquake shaking).

The levels of earthquake shaking expected from a large earthquake on any of the Bay Area faults would likely result in structural damage and possible injury or loss of life at poorly constructed structures. Areas where foundation conditions have not been sufficiently engineered could experience a loss of bearing capacity, leading to significant structural damage and even collapse.

Summary of Impact G-2

- Alternatives 1 and 2 include new terminals. If the new structures and facilities are not properly designed or constructed for site-specific conditions, they could suffer substantial damage from seismic activity and pose potential risk of injury or loss of life to occupants.
- Alternative 3 could involve expansion of existing terminals. If the expansion was not properly designed, substantial damage could occur from seismic activity.
- Alternative 4 does not include new structures. No impacts would occur.

Mitigation G-2.1: Terminal facilities should be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 4. Additionally, to satisfy the provisions of the 1998 California Building Code, these facilities must be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedence in 50 years). For design purposes, site-specific ground motions will have to be calculated for all project sites.

Impact After Mitigation: Impact G-2 would be less than significant with implementation of Mitigation G-2.1.

Impact G-3 Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.

A map of liquefaction susceptibility in the seven-county Bay Area, prepared by Knudsen et al. (2000), was used to assess risk for the potential ferry terminal locations (Table 5.10.1). The majority of the terminal locations around the Bay Area are in areas of soft, potentially liquefiable soils (Knudsen et al. 2000). Liquefaction is likely to be triggered by strong shaking from an earthquake on one of the Bay Area's active faults. When liquefaction occurs, the strength of the soil decreases and, the ability of soil to support building foundations is reduced. Liquefied soil also exerts higher pressure on retaining walls, which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface. Increased water pressure can also trigger landslides. Liquefaction can be minimized or even prevented by adopting appropriate ground improvement techniques, such as soil densification and dewatering, or designing foundations that will accommodate differential ground movement during liquefaction.

Summary of Impact G-3

- Alternatives 1 and 2 would involve potential new terminals located within areas ranked with high to very high susceptibility to liquefaction. The only terminal that might not include soils with these conditions is Fort Baker (Table 5.10.1). This is a potentially significant impact.

- Alternative 3 could involve expansion of existing facilities. This is a potentially significant impact only if building foundations are not designed correctly for potentially liquefiable conditions.
- Alternative 4 involves existing terminals and service. Therefore, there would be no impacts.

Mitigation G-3.1: A program of site-specific exploratory borings and accompanying laboratory testing will be required to delineate any potentially liquefiable materials underneath potential terminal sites. These geotechnical investigations will also be required for consideration prior to foundation design. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction potential.

Impact After Mitigation: Impact G-3 would be reduced to less than significant with implementation of Mitigation G-3.1 for potential new terminals.

Impact G-4 Subsidence is ongoing in portions of the Bay Area. The potential geohazard presented by subsidence to potential new terminals is likely low to moderate.

Although subsidence is ongoing in areas of the Bay (Ogden Beeman and Associates 1992), it does not appear to pose a significant hazard during the lifetime of the project. Significant land level changes generally occur on geologic time scales ($>10^3$ years). There may be some localized settlement associated with liquefaction (Impact G-3), however, this can be avoided if appropriate mitigation measures (Mitigation G-3.1) are implemented.

Summary of Impact G-4

- Alternatives 1 and 2 would involve potential new terminals located in areas of low to moderate potential for subsidence. The potential for this impact is low and not considered significant.
- Alternatives 3 and 4 involve only existing terminals. Therefore, there would be no impacts from these alternatives.

Mitigation G-4.1: Based on the information above, the hazard from subsidence is likely negligible at potential transit terminal localities. Verification of this condition should be verified when site-specific exploratory investigations are performed.

Impact After Mitigation: Impact G-4 can be avoided or reduced to less-than-significant levels with implementation of Mitigation G-3.1, above.

Impact G-5 Expansive soil behavior is associated with wetting and drying of soils containing mixed-layer clays. Expansive soils can lead to structural damage.

The high groundwater table along the margins of the Bay and along the coast at Half Moon Bay indicate that soils at these localities are permanently saturated, therefore there is a very low risk of expansive soil behavior.

Summary of Impact G-5

- Alternatives 1 and 2 would involve potential new terminals located along the shore, where soils are permanently saturated. Alternative 3 could involve expansion of existing facilities. The hazard of expansive soils is considered negligible, and no mitigation is required.
- Alternative 4 involves an existing terminal, and no changes would occur under the WTA program. Therefore, there would be no impacts.

Based on the information above, the hazard from expansive soils is negligible at potential transit terminal localities and, therefore, no mitigation measures are identified.

Impact G-6 **Slope movements have the potential to cause a range of impacts from minor structural damage (building impacts from rock fall) to major damage and injury/loss of life from building collapse.**

Project sites located adjacent to any areas of steep topography are potentially prone to slope instability, depending on source materials, when subject to a triggering mechanism such as heavy rainfall or seismic shaking. Slope instability ranging from rock falls to block sliding is possible on any steep slope around the Bay Area. Particularly prone areas are underlain by rocks of the Great Valley Group or the Franciscan Complex (Table 5.10.1).

Summary of Impact G-6

- Alternatives 1 and 2 include terminals that are not on relatively flat topography (Sausalito, Angel Island, and Fort Baker). These three terminal locations could present potential impacts depending on the actual siting of terminal facilities with regard to slope and source materials.
- Alternative 3 includes Sausalito, which is not on relatively flat topography. Any expansion of the terminal could present potential impacts.
- Alternative 4 does not include new or expanded terminals. Therefore, no impacts would occur.

Mitigation G-6.1: The hazard from mass wasting can be reduced by siting facilities away from steep and unstable slopes. For sites located adjacent to areas of steep topography, site-specific geologic and geotechnical investigations and laboratory testing will determine the stability of slopes and their parent material. Using these data, appropriate slope strengthening and stabilizing designs can be developed.

Impact After Mitigation: Impact G-6 would be considered less than significant after implementation of Mitigation G-6.1.

Impact G-7 **Erosion due to wind and water action could lead to the deterioration of terminal structures.**

Wind and water are the primary agents of erosion, leading to the weathering and subsequent transportation of rock and soils. In coastal and shoreline environments, both agents work in conjunction, often augmented by tidal and current action, to cause removal and/or redeposition

of sediments and soft, easily erodable rock. In addition, erosion of soils and soft rock along the margins of river channels can be significant due to high velocity flows.

Comparison of pre-1900 and post-1900/pre-fill topographic maps of San Francisco Bay indicates that the greatest amount of erosion has occurred along the East Bay shoreline in the area south of the Bay Bridge (http://anchor.ncd.noaa.gov/states/ca.htm). This erosion is the result of wave action, driven by the prevailing winds that cross the Bay from the west. The western shoreline, in the lee of the Peninsula Hills and San Bruno Mountain, has remained essentially unchanged during this period. Thus, potential terminal facilities located along the eastern shoreline of the South Bay at San Leandro Marina may be subject to some degree of erosion.

Other areas that may be subject to erosion are located along the banks of rivers, including Pittsburg, Antioch, Martinez, and Benicia along the main channel of the Sacramento River through Suisun Bay, where relatively high velocity flows are achieved during flood stage.

Coastal localities, including those at the entrance to San Francisco Bay, may be subject to tidal and wave erosion. The amount of erosion at these, or any other sites, is essentially unknown at this time. Erosion potential will have to be calculated from detailed site-specific sedimentologic and hydrodynamic studies.

Significant erosion could result in undermining of seawalls, foundations, and other constructed facilities located adjacent to the affected coast or river channel.

Summary of Impact G-7

- Alternatives 1 and 2 would involve potential new terminals. Alternative 3 could involve expansion of existing terminals. Some of these terminals, particularly those located in the East Bay shoreline of the South Bay, could be subjected to a high degree of erosion, which could affect terminal structures. This is a potentially significant impact.
- Alternative 4 involves existing terminals, and no changes would occur under the WTA program. Therefore, there would be no impacts.

Mitigation G-7.1: As stated above, the erosion potential of each site will have to be determined by detailed, site-specific studies. Once this has been determined, appropriate mitigation measures can be adopted.

In general terms, erosion can be prevented by armoring the coastline with rip-rap or concrete seawalls. Defensive measures such as groins that modify or deflect flow and circulation patterns are not desirable as they merely transfer the erosion problem elsewhere.

Impact After Mitigation: Impact G-7 would be less than significant after implementation of Mitigation G-7.1.

Impact G-8 **Tsunami- and seiche-generated waves have the potential to inundate shoreline sites and damage terminal facilities. This potential impact would range from potentially significant at oceanside terminals (Half Moon Bay) to low and or not significant at most of the Bay terminals.**

Ritter and Dupre (1972) show that for a tsunami originating outside San Francisco Bay, the amount of inundation based on tsunami run-up decreases to 50 percent of its maximum at the

Golden Gate by the time it passes the Bay Bridge to the south and the Richmond-San Rafael Bridge to the north. By the time the tsunami reaches the Carquinez Strait to the north or Alviso in the south, the run-up would only be approximately 10 percent of its maximum at the Golden Gate. This model was used to assess hazards related to tsunamis and seiche in San Francisco Bay.

Tsunami-generated waves have the potential to inundate low-lying coastal areas and cause extensive erosion and/or deposition of sediment. Poorly constructed facilities can also be damaged by both the incoming and outgoing waves. As stated above, by the time a tsunami enters the Bay, its impacts will be dramatically reduced compared to those on the open coast. Therefore, the impact of a tsunami to facilities along the Bay shoreline would be minimal, possibly involving a meter or so of potential inundation. The terminal site at Half Moon Bay could be subject to larger tsunami waves from distant sources, including subduction zones surrounding the northern Pacific. Such tsunamis have inundated coastal California on numerous occasions. Most notably, the tsunami generated by the 1964 Alaska earthquake caused damage along the coast of northern California.

Summary of Impact G-8

- Alternative 1 would involve a potential new terminal in Half Moon Bay. This impact would be potentially significant.
- Alternatives 2, 3, and 4 do not involve oceanside terminals. No impact is anticipated.

Mitigation G-8.1: The impacts of future tsunamis can be lessened or mitigated completely by the application of appropriate engineering design. Detailed hydrodynamic modeling may be necessary for coastal locations in order to determine the likely extent of potential inundation. The behavior of tsunami waves is dependent on local bathymetry. Optimal siting of shoreline facilities and breakwaters would lessen the impact of incoming waves. The placement of concrete seawalls and rip-rap will assist in minimizing erosion during wave incursion and withdrawal.

Impact After Mitigation: Impact G-8 would be reduced to a less-than-significant level after implementation of Mitigation G-8.1.

Impact G-9 **The WTA ferry expansion program could potentially impact the geologic environment, including energy or mineral resources. At a program level of review, none of these issues present any potentially significant impacts.**

Hydrocarbon Resources. There are no known hydrocarbon (oil and gas) resources within the immediate area of the project with the exception of a gas field located adjacent to the Antioch Ferry Terminal location (DOGG 2001). However, the WTA project is not expected to have an impact on this resource.

Geothermal Resources. There are no known geothermal resources within the immediate area of the program expansion (DOGG 2001). The WTA project would have no impact on geothermal resources.

Crushed Rock Aggregate Resources. The majority of the terminal locations are classified by California Division of Mines and Geology (now California Geological Survey) as being Mineral

Resource Zone (MRZ)-1 or MRZ-4 areas (Stinson et al. 1987). MRZ-1 describes "areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence." MRZ-4 describes "areas where available information is inadequate for assignment to any other MRZ zone." Based on this information, the majority of potential terminal locations would have no impact on economic mineral resources. However, Rodeo and Crockett were classified as MRZ-3 areas containing crushed aggregate resources. MRZ-3 describes "areas containing mineral deposits, the significance of which cannot be evaluated from available data." Therefore, there is a possibility that the Rodeo and Crockett sites may impact future use of these crushed aggregate resources.

Activities involved in the ferry terminal construction would likely require crushed rock aggregate for the manufacture of concrete elements (e.g., piles, retaining wall structures, surface facilities). Considerations of transportation cost mean that this material will have to come from local sources. This will result in increased production of crushed rock aggregate at local source sites, but this has not been a major constraint for other Bay Area projects.

Sand and Gravel Resources. Half Moon Bay and Antioch are classified as MRZ-3 areas containing sand and gravel resources. This indicates that the siting of shore facilities at these locations could restrict future development of these sand and gravel resources. The Bay Area has other available sources for these materials.

Unique or Outstanding Geologic and Geomorphic Features. The area of San Francisco Bay surrounding potential terminal sites does not contain any unique geological formations, geological features, or geomorphological features that would be adversely impacted by the various WTA project alternatives.

Summary of Impact G-9

- Alternatives 1 and 2 would not have regionwide significant impacts to other mineral or energy resources. There is potential for terminal locations, once selected or determined, to potentially affect these resources.
- Alternative 3 does not include new terminals. No impact would occur.
- Alternative 4 would not impact these resources or features.

Mitigation G-9.1: The presence of geologic, energy, or mineral resources would be identified in the course of site investigations performed for selected terminal or facility features. Avoidance or design measures can mitigate these impacts and can be defined at that time.

Impact After Mitigation: These impacts are not considered significant on a regionwide basis. They can also be avoided during specific terminal planning and design.

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Table 5.10.1
Geohazard Exposure for Potential WTA Terminal Sites

Terminal Site	Alt. 1	Alt. 2	Alt. 3	Potential Geohazards							
				Earthquake Shaking[1]	Fault Rupture[2]	Liquefaction[3]	Subsidence / Uplift[4]	Landsliding[5]	Erosion[6]	Expansive Soils[7]	Seiche / Tsunami[8]
Vallejo	X	X	X	Very High	Low	High – Very High	Low	Low	Moderate	Low	Low
Larkspur	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low
Tiburon	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low
Sausalito	X	X	X	High	Low	Very High	Low	Moderate	Low	Low	Low
Pier 41/43	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low – Moderate
Ferry Building	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low – Moderate
Jack London Square	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low
Alameda	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low
Harbor Bay Isle	X	X	X	High	Low	Very High	Low	Low	Low	Low	Low
Pittsburg	X	X		High	Low	High	Low	Low	Moderate	Low	Low
Martinez	X	X		High	Low	Very High	Low	Low	Moderate	Low	Low
Benicia	X	X		High	Low	Very Low	Low	Low	Moderate	Low	Low
Port Sonoma / Gnoss Field / North Bay	X	X		Very High	Low	High	Moderate	Low	Moderate	Low	Low
Richmond	X	X		High or Very High**	Low	Very Low or Very High**	Low	Low	Low	Low	Low
Berkeley / Albany	X	X		Very High	Low	Very High	Low	Low	Low	Low	Low
Angel Island	X	X		Moderate	Low	Very Low	Low	Low or Moderate**	Low	Low	Low
Treasure Island	X	X		High	Low	Very High	Low	Low	Low	Low	Low - Moderate
Ft. Baker	X	X		High	Low	Moderate or Very Low**	Low	Moderate	Low	Low	Moderate
Alameda Point	X	X		Very High	Low	Very High	Low	Low	Low	Low	Low
Oakland International / Coliseum	X	X		Very High	Low	Very High	Low	Low	Low	Low	Low
East Bay / San Leandro Marina	X	X		Very High	Low	Very High	Low	Low	Moderate	Low	Low
Moffett Field	X	X		Very High	Low	High – Very High	Moderate	Low	Low	Low	Low
Redwood City	X	X		High	Low	High	Low	Low	Low	Low	Low
San Francisco Airport	X	X		Very High	Low	Very High	Low	Low	Low	Low	Low
Oyster Point	X	X		Very High	Low	Very High	Low	Low	Low	Low	Low
Mission Bay	X	X		High	Low	Very High	Low	Low	Low	Low	Low
China Basin / PacBell Park	X	X		High	Low	Very High	Low	Low	Low	Low	Low
Ft. Mason	X	X		Moderate or High**	Low	Very High or Very Low**	Low	Low	Low	Low	Moderate
Antioch	X			High	Low	Moderate – Very High	Low	Low	Moderate	Low	Low
Mare Island	X			Very High	Low – Moderate	High – Very High	Low to Moderate	Low	Moderate	Low	Moderate
Crockett	X			Very High	Low	Very High	Low	Low	Low	Low	Moderate
Rodeo	X			High	Low	High	Low	Low	Low	Low	Moderate
San Rafael	X			High	Low	High – Very High	Low	Low	Low	Low	Low
Bay Model	X			Very High	Low	Very High	Low	Low	Low	Low	Low
Point Molate	X			High or Very High**	Low	Very Low or Very High**	Low	Low or Moderate**	Low	Low	Low
Oakland Army Base	X			Very High	Low	Very High	Low	Low	Low	Low	Low
East Palo Alto	X			High	Low	High or Very High**	Low	Low	Low	Low	Low
Foster City	X			High	Low	High or Very High**	Low	Low	Low	Low	Low
Coyote Point	X			Very High or High**	Low	Very High or Very Low**	Low	Low	Low	Low	Low
Candlestick Park	X			Very High	Low	Very High	Low	Low	Low	Low	Low
Hunters Point	X			High	Low	Very High	Low	Low	Low	Low	Low
Pier 43	X			High	Low	Very High	Low	Low	Low	Low	Moderate
Presidio	X			Very High	Low	Very High	Low	Low	Low	Low	Moderate
Half Moon Bay	X			Very High	High to Moderate	Low to Very High**	Moderate	Low	Moderate	Low	High

[1]Earthquake Shaking: Site-specific earthquake ground motions were not calculated. Ranking is based on proximity to major active faults. Very High – located 5 km or less from active fault; High – located 5-10 km from from active fault; Moderate – located 10-20 km from an active fault.
[2]Fault Rupture: High – located within and Alquist-Priolo (AP) Earthquake Fault Zone; Moderate – Located adjacent to an AP Zone; Low – Located away from known AP Zones.
[3]Liquefaction: Hazards designations based on ranking of Knudsen *et al.* (2000).
[4]Subsidence/Uplift: Ranking relates to potential for tectonic uplift/subsidence during lifetime of the project. Subsidence due to liquefaction and/or lateral spreading is not considered. High – Area of known ongoing subsidence/uplift; Moderate – Area of historical uplift/subsidence; Low – Area with no history of geologically recent uplift/subsidence.
[5]Landsliding: High – History of landsliding/debris flows; Moderate – Area of steep slopes with landslide-prone materials; Low – Flat or relatively flat topography.
[6]Erosion: High – Are of significant active erosion; Moderate - Site located adjacent to river channel, open ocean, or coastline exposed to wind/wave fetch; Low – Site sheltered from agents of erosion.
[7]Expansive Soils: the expansive soil hazard at all localities is considered low as the coastal location of these sites ensures that the soils will almost always be saturated and, therefore, not subject to shrink/swell wetting and drying.
[8]Seiche/Tsunami: High – exposed to open ocean tsunami waves; Moderate – exposed to reduced height tsunami waves or smaller local tsunamis; Low – sheltered from potential tsunami waves.
** Actual hazard ranking is dependent on the exact location of the shore based facility.

5.11 NOISE

5.11.1 Significance Criteria

The CEQA Guidelines environmental checklist includes the following criteria for determining potentially significant impacts:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinances, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- Exposure of people residing or working in the project area to excessive noise levels for a project located within an airport land use plan, or where such a plan has not been adopted, within 2 miles of a public airport or public use airport, or for a project within the vicinity of a private airstrip.

Based on these guidelines and relevant local, state, and federal standards, this EIR applies the following thresholds of significance. A noise impact is considered significant if it would:

- Expose ferry passengers and crew to noise levels greater than OSHA standards,
- Expose noise-sensitive (to humans) land use to "impacts" as defined by FTA,
- Expose terrestrial wildlife to 60 dBA CNEL (or greater) per the USFWS, and
- Expose aquatic wildlife to underwater sound pressure levels at or above 160 dB (re: 1 uPa) per the NMFS.

5.11.2 Impacts and Mitigation

Four impact topics have been identified and are discussed in this section.

Impact NOI-1 **Passengers and crew would be exposed to shipboard noise from proposed enroute ferry operations.**

Most existing fast ferries have large, powerful diesel engines and complex systems that produce high volumes of noise. Because of the relatively short time that passengers spend onboard the ferries (e.g., 20 to 40 minutes), they are unlikely to be at risk for hearing damage. However, these noise levels can damage crew hearing if not controlled. Compliance with Cal/OSHA regulations will ensure that ferry crews are adequately protected from potential noise hazards. The time-averaged noise exposure level to protect hearing of workers is regulated at 90 dBA over an 8-hour work shift. Areas above 85 dBA will be posted as high-noise level areas, and hearing protection will be required. The ferry operators would have to implement a hearing conservation program for applicable employees as outlined in Cal/OSHA regulations.

Summary of Impact NOI-1

- Alternative 1 would result in ferry passenger and crew exposure to engine noise. It is expected to be at acceptable levels for passengers due to limited time exposure and existing regulations that control noise level exposure. Existing and proposed ferries have to incorporate necessary noise and vibration controls to comply with USCG guidelines and Cal/OSHA limits to avoid adverse noise effects to crew members.
- Alternatives 2 and 3 would also have a potential for impact but the number of people exposed (and thus the degree of potential impact) would be lower for each alternative.
- Alternative 4 does not include expansion. Therefore, no impacts over existing conditions would occur.

Impact After Mitigation: Compliance with existing guidelines already mandates noise exposure controls for crew members. Impacts to passengers are not expected to be significant.

Impact NOI-2 Exposure of human noise-sensitive land use to significant noise from proposed enroute ferry operations.

Noise impacts would be considered significant if the project resulted in a determination of "impact" per the FTA guidelines described in Section 3.11.1.4. The use of the FTA's "sliding scale" is appropriate because where ambient/background levels are low, an increase of up to 10 dB would not cause annoyance or activity interference. In contrast, if the ambient/background noise levels were high (above 65 dBA in residential areas), any perceptible increase in noise could cause an increase in annoyance, nuisance, and inability to have a conversation without raising voices.

At this stage of the environmental impact process, i.e., a programmatic EIR, it is difficult to predict the degree of noise impact from future fast ferry operations. However, limitations on the average SEL, with fairly broad assumptions, can be made to avoid an exceedance of an (FTA) "impact" criteria.

To estimate the average SEL, assumptions regarding receptor type, location and ambient noise environment are required in addition to frequency of operations experienced during daytime (7 a.m. to 7 p.m.), evening (7 p.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) periods. Distance from the ferry to the receptor also is variable due to the regional nature of this assessment. The following bullets contain assumptions that were applied to determine the applicable SEL.

- No FTA Category 1 (e.g., outdoor amphitheaters, concert pavilions, National Historic Landmarks with significant outdoor use) receptors exist along the shoreline.
- Dense urban FTA Category 2 (e.g., residential) receptors exist along the shoreline and have an ambient sound level of 70 dBA (L_{dn} or CNEL). These receptors would experience the noise from 50 percent of all ferry trips.
- Suburban and low-density urban FTA Category 2 (e.g., residential) receptors also exist along the shoreline and have an ambient sound level of 55 dBA (L_{dn} or CNEL). These receptors would experience the noise from 10 percent of all ferry trips.

- The ferries would pass by these receptors at a distance of no less than 1/3 mile (1,760 feet) while operating at typical cruise power and speed, their assumed mode of maximum noise output in terms of SEL.
- The remaining 40 percent of all enroute ferry trips would not influence this evaluation because they were assumed to only be experienced by Category 3 (e.g., institutional) receptors. Category 3 receptors' criterion level of impact is 5 dB higher (not as conservative) than that of Category 2 receptors.
- 85 percent of ferry trips (pass-by events) would occur during the daytime (7 a.m. to 10 p.m.), 10 percent during the evening (7 p.m. to 10 p.m.) period and 5 percent during the nighttime (10 p.m. to 7 a.m.) period.

At a distance of 1/3 mile, the sound equivalent level from ferry operations would have to exceed the thresholds listed in Table 3.11-6 for each alternative to result in a significant noise impact, as defined by the FTA in Figure 3.11-6. These thresholds vary by land use due to their differences in relative sensitivity to noise levels. For dense urban receptors, sound equivalent levels at 1/3 mile distance would have to exceed 79 dBA, 80 dBA, and 86 dBA for Alternatives 1, 2, and 3, respectively. Alternative 1 has the most limiting SEL of the three alternatives because it has the most proposed trips. For suburban receptors, the SEL would have to exceed 78 dBA, 79 dBA, and 85 dBA for Alternatives 1, 2, and 3, respectively.

A calculation of the noise output from existing and proposed ferry vessels shows that maximum noise levels are well under the significance criteria discussed above. The WTA has developed initial draft specifications for new vessels. These include "owner-imposed noise level limits" of 60 dBA (L_{max}) at 1,000 feet. A vessel designed and built to meet this specification is estimated to generate noise levels that would be about 10 dBA below the SEL criteria described above. In addition, noise measurements of an existing Golden Gate Ferry vessel in operation reported a maximum noise level up to 110 dBA on the exterior main aft deck (see Section 3.11.1.2). Comparison of this noise level to the SEL criteria shows that it would be about 15 dBA below the criteria. This indicates that the existing and proposed new vessels can achieve a less than significant noise impact.

Summary of Impact NOI-2

The determination of significant impact of this topic depends on many factors. The primary factor is the pass-by noise level generated by the proposed ferries. Other important factors include numbers of trips experienced by various categories of land use and the period of day in which those trips occur.

For ferries approaching noise-sensitive land uses by no less than 1/3 mile, dense urban residential-type receptors would be impacted if the ferry's average SEL were higher than 79 dBA, 80 dBA and 86 dBA for Alternatives 1, 2 and 3, respectively. Suburban receptors would be impacted if the ferry's average SEL were higher than 78 dBA, 79 dBA and 85 dBA for Alternatives 1, 2 and 3, respectively. If the ferry's point of closest approach was 1 mile from these receptors instead of 1/3 mile, the maximum allowable SELs would increase by 5 dBA. Calculation of vessel noise output, based on existing noise measurements a vessel and a maximum noise level specification discussed above, indicate that noise levels would be well within these criteria.

- Alternatives 1, 2, 3, and 4 could result in proposed ferry operations that result in noise levels at noise-sensitive land uses. Calculated noise levels for an existing vessel and proposed vessel specifications shown above indicates that noise levels would be well within (below) calculated noise levels that would result in "impacts" as defined by FTA, 1/3 mile or greater from a sensitive receptor. At closer distances or with the use of vessels with higher noise output than applied in this calculation, specific analysis would be required to determine if the noise levels are maintained below these criteria. For this reason, this impact is considered potentially significant.

Mitigation NOI-2.1: This study provides an evaluation of noise levels at which the ferry alternatives would exceed the significance criteria summarized earlier. Maintaining the operation of the alternative fleet below the SEL levels calculated above would avoid exceeding the significance thresholds. Mitigation measures to maintain the average noise levels below the threshold could include:

- Reduction of the noise output from the individual vessels through design measures
- Reduction of the number of trips per day (average noise levels would decrease)
- Reduction of trips during the more noise-sensitive evening hours
- Operation restrictions nearest noise-sensitive receptors. This example evaluation specifies average noise output levels at which an exceedance occurs, based on trip frequency and noise output. This methodology can be repeated for site-specific situations to determine rate specific limits.

Impact After Mitigation: This evaluation indicates that existing and proposed vessels should not exceed acceptable noise impact thresholds within 1/3 mile distance, based on the parameters used in this evaluation. The measures listed above can maintain noise levels at acceptable limits depending upon vessel type, operation, and site-specific conditions. Mitigation NOI-2.1, if needed, can provide effective noise control and reduction, but its success depends on site and route conditions and operation. Therefore, this impact remains potentially significant.

Impact NOI-3 Sensitive land uses could be exposed to increases in ambient noise from proposed ferry terminal operations.

Ferry terminals, like terminals of other modes of mass transit, can bustle with activity—arriving and departing ferries, automobile, and bus and truck traffic. Some existing ferry terminals in the Bay Area have Park-and-Ride lots for auto and bus commuters. Proposed ferry terminals may include rail (Amtrak and/or BART) links.

Ferry whistles or horns used in proximity to terminals for safety reasons create impulsive and directional sound. At a distance of 1,000 feet in front of, abeam, and behind a typical ferry horn, a small sample of maximum A-weighted sound levels of approximately 90 dBA, 83 dBA and 77 dBA, respectively, have been measured (BKL Consultants 2002). Horn blowing usually consists of one or two blows, which last less than 10 seconds per event.

A study of noise from ferry terminals in the State of Washington yielded anecdotal daytime hourly L_{eq} values of 55 to 60 dBA at residential locations varying from approximately 500 feet to 2,500 feet from terminal operations. These noise levels occurred during normal scheduled ferry service. Nighttime levels when ferries were not operating yielded hourly L_{eq} near 45 dBA except

at the site that was 2,500 feet away (approximately 35 dBA hourly L_{eq}). The range of DNL derived from these 24-hour measurements resulted in levels from 51 dBA at the farther site to 63 dBA at the closer sites (Magnoni 2002).

Summary of Impact NOI-3

- Alternatives 1 and 2 would introduce new terminals that could create impacts to nearby noise sensitive land use, such as adjacent residential areas. This impact is potentially significant if the exposure and noise levels exceed applicable noise thresholds
- Alternative 3 only involves existing terminal sites. Alternative 3 adds vessels and traffic to existing routes; this impact is potentially significant only if the changes exceed local noise level thresholds.
- Alternative 4 would not have any additional noise impacts to nearby land uses, as no changes would occur.

Mitigation NOI-3.1: Siting and planning of new or expanded ferry terminals should include planning to separate terminal areas away from noise-sensitive land uses. Compliance of existing or proposed ferry terminals with existing zoning ordinances should be sufficient to mitigate any potential impacts of ferry terminal operations.

Impact After Mitigation: After implementation of Mitigation NOI-3.1, no significant impact is expected.

Impact NOI-4 Exposure of wildlife to noise from proposed ferry operations.

The proposed project would generate noise both in air and underwater; therefore, there is a potential impact to wildlife in both media. Potential in-air and underwater environmental impacts to wildlife are addressed separately in the following section.

Mammals. Mammalian hearing varies, although abilities are fairly consistent within families (Fay 1988). In general, mammals can hear in the bandwidth from below 10 Hz to over 150 kHz. Small terrestrial mammals, small odontocetes (toothed whales), and bats hear best at high frequencies; mysticetes (baleen whales) hear best at low frequencies; and most other mammals have similar hearing to humans (20 Hz to 20 kHz). Noise-induced hearing loss usually results from inner ear hair-cell loss, which is typically permanent in mammals.

Airborne sounds as a result of the proposed project would contribute to the ambient noise to which small terrestrial mammals and marine mammals are exposed (when at the surface or when hauled out). However, little data are available on the overall sound level from specific sources. The small terrestrial mammals of particular interest to this project are the salt marsh harvest mouse and the salt marsh wandering shrew (see Section 3.5, Biological Resources). These mammals would be exposed to noise from the ferries as they pass by salt marsh habitat. The auditory sensitivity of these small mammals is at higher frequencies (Fay 1988) and the noise from the ferry would be in the low to mid-frequency range. Therefore, masking of biologically significant sounds is highly unlikely. Due to the transient nature of ferries passing by, the proposed project would likely instigate increased alertness, but not habitat avoidance or hearing loss. Furthermore, small mammals inhabiting the area are already exposed to airborne ship noise

within San Francisco Bay and are presumably habituated. These small mammals would not be impacted by underwater noise generated as a result of the project.

The marine mammals of particular interest to this project are the gray whale, Pacific harbor seal, California sea lion, and sea otter. No research has been conducted on the effects of airborne noise on the behavior of gray whales. The response of gray whales to underwater vessel noise depends on several factors, including location of vessel (i.e., breeding/calving grounds, migration route, and summering grounds), behavior of the vessel, and behavior of the whale. Gray whales are frequently attracted to vessels in the breeding/calving lagoons of Baja California (Dahlheim et al. 1981; Wisdom 2000), but often change course or stay underwater longer in the presence of vessels while migrating (Schulberg et al. 1991). Because gray whales rarely utilize the Bay, no impacts are expected as a result of the project.

Harbor seals utilize haul-out sites throughout the Bay and are of particular concern to the staff at Point Reyes National Seashore (BAC 1998). In California, small boats that approach a haul-out site often displace the seals; less severe disturbances can cause alert reactions without departure (Stewart et al. 1988; Allen 1991). In places with many boats, harbor seals may become habituated to the noise (Johnson et al. 1989). Detailed studies regarding locations of haul-out sites in relation to specific ferry routes would need to be completed in association with the Point Reyes National Seashore staff.

California sea lions also utilize the Bay, but the only known haul-out site is Pier 39. In the water, sea lions tolerate close and frequent approaches by vessels and often congregate around fishing vessels. Sea lions hauled out on land (or piers) are more responsive, but rarely react unless a boat approaches very closely (Bowles and Stewart 1980). The sea lions that utilize Pier 39 are extremely habituated to human presence and would therefore not be affected by the proposed project.

Little data are available on reactions to vessels by sea otters. However, since they rarely utilize habitat within the Bay, no significant impact as a result of the project is expected.

As stated in Section 3.11.1.4, the NMFS currently considers, as a guideline, received underwater sound pressure levels at or above 160 dB (re 1 μPa) as constituting harassment of marine mammals. NMFS has suggested that underwater sound pressure levels above 180 dB (re 1 μPa) could cause temporary hearing impairment in marine mammals.

Birds. Birds have more uniform hearing abilities than mammals and hear best from 100 Hz to 10 kHz. Hearing loss in birds is difficult to characterize because they appear to regenerate inner ear hair cells even after substantial loss (Corwin and Cotanche 1988). Domestic fowl sometimes experience declines in productivity after continuous exposure to noise at high levels, but laying rates did not change in wild waterfowl after exposure to continuous noise from a compressor station (reviewed in Bowles 1994). Persistent human disturbance or harassment by predators causes declines in productivity of colonies of birds (Anderson and Keith 1980). Birds exhibit behavioral responses to noise similar to those of mammals. At the lowest level, they become alert to the noise; at the highest level, they abandon the area. In the long term, nesting birds become more habituated and less responsive in the presence of human disturbance if they are not deliberately harassed (Burger and Gochfeld 1981). After habituation, loss rates are too low to be detected.

Noise impacts on wintering birds in the South Bay will need to be studied on specific routes (BAC 1998). Personnel associated with the Point Reyes Bird Observatory have identified sensitive foraging and breeding habitats for residential and migratory birds, including eelgrass beds. A preliminary list of birds that need further consideration in reference to specific routes has been developed, including Caspian terns (Brooks Island), least terns, phalaropes (salt ponds), cormorants on Alcatraz, and rails (black and clapper) in marshes. Wintering ducks appear to be somewhat tolerant of boat traffic, but its effect has to be assessed and minimized.

The USFWS has determined a significance criterion of 60 dBA CNEL at the line of habitat as an impact. Specific studies of each ferry route would need to determine where this 60 dBA CNEL contour line falls and develop mitigation accordingly. Mitigation would likely be constrained to the moving of ferry routes away from the lines of habitat.

Fish. Fish also use sound to obtain information about their environment and for communication (reviewed in Tavolga et al. 1981). Every species of fish has a different auditory system and therefore different hearing sensitivity. Generally, fish hear sounds at frequencies between 50 Hz and 2,000 Hz. Loud sounds may cause damage to auditory systems of fish, ranging from morphological damage to stunning and even death (Hastings 1991). Intense sound pressure levels may also cause morphological damage to other parts of the body, such as the air bladder, that plays an important role in acoustic detection and production in some fish.

A review of scientific literature and experiments summarized that several species of fish exposed to underwater sound levels of 180 dB re 1 µPa or higher for 2 hours or less were adversely affected (Finneran et. al. 1995). Little or no data exist for fish exposed to sound levels between 149 and 180 dB re 1 µPa. Therefore, it is difficult to determine the potential impacts as a result of the project to fish in the area. Fish may avoid the area while a ferry is in transit, but it is unlikely that it would cause fish to completely abandon the area.

Summary of Impact NOI-4

- Alternatives 1 through 3 would have the following impacts:
  - Small mammals such as the salt marsh harvest mouse would not be impacted by project-generated underwater noise.
  - No noise impacts to gray whales are expected.
  - The potential for significant impact to harbor seals at their haul-out sites and to birds depends on the specific location of ferry routes. Placement or design of specific routes is not within the scope of this document. Although it is unlikely that fish would completely abandon ferry transit areas, available data preclude determination of impact. Wintering birds have a higher potential for disturbance from fast ferries than from conventional ferries but, like harbor seals, their impact depends on choice of specific ferry routes. The potential for significant impacts to fish and birds from noise is considered unlikely.
  - No impact is expected for sea lions and sea otters from ferry operations.
- Alternative 4 would not have increased ferry operations. Therefore, no impacts would occur.

Mitigation NOI-4.1: Existing NMFS requirements require avoidance of marine mammals (see Biology Mitigation B-14.1). For other wildlife (birds and fish), consultation with federal and

state resource agencies will be a part of development of specific routes. If additional mitigation is necessary, it would be identified and applied to specific projects through that process.

Impacts After Mitigation: It is anticipated that impacts would be less than significant with implementation of Mitigation NOI-4.1.

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5.12 TRANSPORTATION

5.12.1 Significance Criteria

According to California Environmental Quality Act (CEQA) guidelines, a project would have a significant impact if it would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system. This assessment was performed at a regional level and impacts are identified in terms of their potential to substantially change traffic volumes, and hence a specific numerical criterion was not applied.

5.12.2 Impacts and Mitigation

The proposed enhancement of the ferry system would expand transportation options for Bay Area commuters. In general, this may result in lower use of the automobile and or nonferry transit as commuters shift to ferries. Table 5.12.1 presents the Vehicle Miles Traveled (VMT) breakdown by county for the different project alternatives. There are very few differences (0.1 percent overall reduction) in VMT, at this regional scale of analysis, between the 2025 No Project Alternative (Alternative 4) and the project alternatives. The largest reductions in VMT occur in counties where ferries are competing with congested highway facilities, such as San Francisco, San Mateo, and Marin. However, an increase in drive access to transit VMT is expected due to increases in drive access to ferry ridership at new terminals (as discussed in Impact T-1). Similarly, there would be small increases in bus VMT associated with access to ferry terminals.

Table 5.12.2 shows the effect of the project alternatives on the vehicle trips by purpose and vehicle type. As expected, only auto trips would be affected because they are the greatest transportation mode affected by commute improvements. Truck trips would remain constant for 2025 regardless of the project alternative. Among the auto trips, the addition of ferry routes and vessels would mostly affect trips to work and for recreation, where ferry travel presents a real option for Bay Area residents. However, as Table 5.12.3 indicates, the percentage change in total vehicle trips from Alternative 4 is minimal for all project alternatives.

Changes in nonferry transit ridership due to expansion of ferry system, both increases and decreases, could result from the different project alternatives. As Table 5.12.3 indicates, these changes would be minimal and insignificant (below 0.1 percent).

Focusing the scale of transportation analysis to the screenline areas mentioned in Section 3.12.1 shows that ferry expansion would facilitate a greater reduction in auto VMT over Alternative 4. Table 5.12.4 presents daily person trips across Bay Area screenlines for the different project alternatives. The table shows that screenlines may experience relatively small increases or decreases in the number of person trips. For example, under Alternative 1, an overall small increase in the number of daily person trips across both the Bay Bridge and Golden Gate Bridge corridors is predicted, while at the same time ferries would divert some passengers from other transit and highways. The introduction of ferry service across screenlines that do not currently have ferry service, such as the San Francisco-San Mateo County Line and the San Mateo Bridge, would have a greater effect of diverting passengers from other modes, primarily from highways.

The screenline analysis included a $2 parking charge at ferry terminals for all alternatives. This reduces overall ridership for the alternatives compared to the 2025 No Project Alternative, which does not include a parking charge at ferry terminals. This effect is on all ferry routes, but improvements in service outweigh this effect, yielding more riders in the alternatives than in the base, except for the Carquinez/Benicia Bridge Corridor screenline, where a slight ridership reduction is observed.

This diversion is more evident when considering daily auto trips across screenlines for the different project alternatives. As shown in Table 5.12.5, while the total number of daily vehicle trips in Bay Area screenlines would experience the greatest reduction (0.8 percent) under Alternative 1, Alternative 2 would result in the largest decreases in vehicular movement along the Bay Bridge and Golden Gate Bridge corridors.

Impact T-1 New and existing ferry terminals would require access by car or transit. This could result in potential localized increases in traffic in the vicinity of the terminals.

Existing and new terminals would be accessed by ferry riders by foot, car and/or transit. Expanded ferry service would require additional access to terminals by car or transit. Table 5.12.6 shows the ridership access mode for the most aggressive ferry expansion alternative (Alternative 1). Of a total daily ridership of 49,210, 66 percent would access the terminals by car, 16 percent by bus or rail, and 18 percent on foot. Ridership would be lower for the other alternatives: 46,295 for Alternative 2, 25,385 for Alternative 3, and 23,238 for Alternative 4 (No Project). Similar percentages of mode of access are expected for these alternatives.

Table 5.12.7 indicates that VMT to access ferry terminals would increase by 155 percent from the 1998 baseline to the 2025 No Project conditions. Implementation of the project alternatives would increase the ridership and, consequently, the daily driving to and from those terminals by commuters, resulting in higher VMT. This increase holds true for all terminals except for some of the existing terminals (i.e., Larkspur, Vallejo, Jack London Square, and Tiburon) where decreases in drive access VMT are expected. Such decreases are the result of a potential introduction of parking fees and additional transit service to terminals (included in the alternatives but not in the No Project calculations) that may coax some commuters into transit.

There is a potential that traffic impacts could be significant on a site-specific level, where access and circulation are not adequate to accommodate riders attracted to the terminal and system.

Summary of Impact T-1

- Alternative 1 could result in increased car and bus traffic to and from existing ferry terminals, depending on local access and traffic conditions. This impact could be potentially significant on a site-specific level.
- Alternative 2 could result in increased car and bus traffic to and from existing ferry terminals, depending on local access and traffic conditions. This impact could be potentially significant on a site-specific level.

- Alternative 3 could result in increased car and bus traffic to and from existing ferry terminals, depending on local access and traffic conditions. This impact could be potentially significant on a site-specific level.
- Alternative 4 would not involve additional ferry terminals and would not require additional car or bus access to new terminals. Therefore, there would be no impact.

Mitigation T-1.1: Traffic mitigation measures would depend on site-specific conditions, including design of vehicular access to terminal, major access routes, parking availability, and traffic patterns. For some cases, where access is problematic or presents serious community concerns, the viability of the terminal would need to be further evaluated.

Impact After Mitigation: Impacts after mitigation must be determined on a case-by-case basis after mitigation measures are considered. Impact T-1 could be potentially significant.

Impact T-2 Additional car drive access to existing and new ferry terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.

Ridership increases would result from new and expanded ferry service. It is expected that more commuters would drive their cars to access ferry terminals. As discussed in Impact T-1, up to 66 percent of the ferry riders, under the most aggressive ferry service enhancement (Alternative 1), are expected to drive to the terminals. While some of the additional cars may be accommodated in terminal parking structures, it is the intention of the WTA to limit parking in an effort to encourage transit use to access existing and new terminals. The demand for parking as a percentage of available parking is listed in Table 5.12.8. Generally, it is expected that parking availability will exceed demand. In some locations, due to lack of sufficient space or desire to avoid paying parking fees, commuters would chose to park off-site, along local streets in the vicinity of the ferry terminals. This can lead to enforcement of restrictions on local street parking, which can inconvenience local residents and businesses.

Summary of Impact T-2

- Alternative 1 would result in increased car traffic to and from new ferry terminals and lead to an increased demand for parking. The WTA would seek to encourage and increase transit access to terminals. The impact would be localized and site-specific, and its significance cannot be determined at the programmatic level. Therefore it is potentially significant.
- Alternative 2 would result in increased car traffic to and from new ferry terminals and lead to an increased demand for parking. Parking demand would exceed parking availability for all project alternatives, as the WTA would seek to encourage and increase transit access to terminals. The impact would be localized and site-specific, and its significance cannot be determined at the programmatic level. Therefore it is potentially significant.
- Alternative 3 would result in increased car traffic to and from new ferry terminals and lead to an increased demand for parking. Parking demand would exceed parking availability for all project alternatives, as the WTA would seek to encourage and increase transit access to terminals. The impact would be localized and site-specific, and its significance cannot be determined at the programmatic level. Therefore it is potentially significant.

- Alternative 4 (No Project) would involve additional ferry terminals or expanded service and would not require additional parking. Therefore, there would be no impact.

Mitigation T-2.1: The WTA and ferry terminal authorities, in conjunction with local and regional transit agencies, should study and develop a terminal-specific plan to ensure that potential driving ferry patrons can be adequately served by transit in locations with limited parking and currently insufficient transit access.

Mitigation T-2.2: Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

Impact After Mitigation: Traffic access impacts can typically be mitigated through design or operational improvements. Mitigation improvements would be defined with each proposed new terminal or terminal improvement. This is a potentially significant impact.

Table 5.12.1
Vehicle Miles Traveled (VMT) Under the WTA Ferry Expansion Project Alternatives

County	1998 Vehicle Miles Traveled	2025 No-Project Vehicle Miles Traveled	2025 Alt 1 Vehicle Miles Traveled	Percentage Change from No Project	2025 Alt 2 Vehicle Miles Traveled	Percentage Change from No Project	2025 Alt 3 Vehicle Miles Traveled	Percentage Change from No Project
San Francisco	8,017,759	9,075,385	9,008,509	-0.007	9,015,828	-0.007	9,066,584	-0.001
San Mateo	18,458,290	20,838,110	20,704,505	-0.006	20,733,300	-0.005	20,793,944	-0.002
Santa Clara	33,671,029	45,696,564	45,675,552	0.000	45,677,089	0.000	45,683,006	0.000
Alameda	30,534,137	40,021,231	39,981,340	-0.001	39,975,671	-0.001	40,013,094	0.000
Contra Costa	17,249,251	23,702,339	23,680,594	-0.001	23,693,740	0.000	23,706,802	0.000
Solano	9,320,419	16,317,037	16,320,101	0.000	16,320,363	0.000	16,322,159	0.000
Napa	3,085,129	5,038,273	5,036,882	0.000	5,038,031	0.000	5,037,252	0.000
Sonoma	7,785,717	11,045,667	11,034,889	-0.001	11,033,789	-0.001	11,050,163	0.000
Marin	7,335,401	8,539,503	8,480,530	-0.007	8,480,453	-0.007	8,535,238	0.000
Intrazonal VMT	1,347,897	2,112,613	2,112,531	0.000	2,112,544	0.000	2,112,558	0.000
Transit Drive Access VMT	984,344	1,892,977	1,966,608	0.039	1,965,901	0.039	1,918,770	0.014
Bus VMT	268,239	323,225	333,497	0.032	333,497	0.032	333,497	0.032
TOTAL BAY AREA	**138,057,611**	**184,602,925**	**184,335,538**	**-0.001**	**184,380,207**	**-0.001**	**184,573,066**	**0.000**

Table 5.12.2
Vehicle Trips by Purpose and Vehicle Type Under the Project Alternatives

Purpose/Vehicle Type	1998 Vehicle Trips	2025 No-Project Vehicle Trips	2025 Alt 1 Vehicle trips	Percent Change from No Project	2025 Alt 2 Vehicle trips	Percent Change from No-Project	2025 Alt 3 Vehicle trips	Percent Change from No Project
Car								
Home Based Work	3,707,297	5,103,132	5,094,566	-0.2%	5,096,452	-0.1%	5,100,121	-0.1%
Home Based Shop	3,277,781	4,030,835	4,030,399	0.0%	4,030,347	0.0%	4,030,072	0.0%
Home Based Social/Recreation	1,302,011	1,607,989	1,605,341	-0.2%	1,605,594	-0.1%	1,607,596	0.0%
Non-Home Based	3,610,424	4,738,388	4,737,265	0.0%	4,737,488	0.0%	4,738,077	0.0%
Internal-External	458,523	913,203	913,203	0.0%	913,203	0.0%	913,203	0.0%
Truck								
Small Truck	192,446	264,732	264,732	0.0%	264,732	0.0%	264,732	0.0%
Medium Trucks	18,633	25,580	25,580	0.0%	25,580	0.0%	25,580	0.0%
Large Trucks	40,851	56,647	56,647	0.0%	56,647	0.0%	56,647	0.0%
TOTAL	12,607,967	16,740,507	16,727,733	-0.1%	16,730,045	-0.1%	16,736,029	0.0%

Source: Cambridge Systematics (2002)

Table 5.12.3

Ridership Changes in Non-Ferry Transit Under the Project Alternatives

Transit Mode	2025 No Project Riders (Alt 4)	2025 Alt 1 Riders	Percentage Change from No Project	2025 Alt 2 Riders	Percentage Change from No Project	2025 Alt 3 Riders	Percentage Change from No Project
Bus	1,728,641	1,628,111	-0.06	1,713,997	-0.01	1,732,195	0.00
Light Rail (Muni, SCVTA)	240,818	235,668	-0.02	240,026	0.00	240,426	0.00
BART	890,084	872,632	-0.02	882,870	-0.01	889,839	0.00
Commuter Rail (Caltrain, ACE, Amtrak)	133,896	135,561	0.01	136,608	0.02	137,918	0.03

Source: Cambridge Systematics (2002)

Note: Cambridge Systematics modified the MTC model to allow for expanded catchment of drive access to commuter rail terminals for the project alternatives. This modification was performed to make drive access to non-ferry transit equivalent to the drive access allowed for ferry transit in the model. This modification has resulted in project alternatives (Alternatives 1 through 3) showing an increase in ridership over the no project alternative (Alternative 4). However, as the ferry ridership expands from Alternative 3 to Alternative 2 and Alternative 1, the commuter rail ridership is shown to decrease.

Table 5.12.4
Daily Person Trips Across a Screenline

Screenline		Screenline 2025 No Project	2025 Alternative 1	Difference from No Project	Percent Change from Total	2025 Alternative 2	Difference from No Project	Percent Change from Total	2025 Alternative 3	Difference from No Project	Percent Change from Total
Bay Bridge	BART	262,671	256,073	-6,598	-0.9%	256,073	-6,598	-0.9%	256,073	-6,598	-0.9%
	AC Transit	3,812	3,682	-130	0.0%	3,682	-130	0.0%	3,682	-130	0.0%
	Ferry Transit	3,058	15,212	12,154	1.7%	15,053	11,995	1.7%	4,367	1,309	0.2%
	Highway	451,521	446,498	-5,023	-0.7%	446,168	-5,353	-0.7%	451,659	137	0.0%
	Subtotal	***721,062***	***721,465***	***403***	***0.1%***	***720,976***	***-86***	***0.0%***	***715,781***	***-5,282***	***-0.7%***
Golden Gate	Golden Gate Transit	14,055	13,471	-584	-0.3%	13,471	-584	-0.3%	13,471	-584	-0.3%
	Ferry Transit	14,247	17,432	3,185	1.6%	17,364	3,117	1.6%	16,083	1,836	0.9%
	Highway	168,637	166,476	-2,162	-1.1%	166,307	-2,331	-1.2%	167,720	-917	-0.5%
	Subtotal	***196,939***	***197,379***	***439***	***0.2%***	***197,142***	***202***	***0.1%***	***197,274***	***335***	***0.2%***
SF/San Mateo County Line	Caltrain, BART and Samtrans	99,129	98,099	-1,030	-0.2%	98,099	-1,030	-0.2%	98,099	-1,030	-0.2%
	Ferry Transit	0	4,544	4,544	0.9%	2,006	2,006	0.4%	-	0	0.0%
	Highway	380,252	375,745	-4,507	-0.9%	377,223	-3,029	-0.6%	379,788	-464	-0.1%
	Subtotal	***479,381***	***478,388***	***-993***	***-0.2%***	***477,328***	***-2,053***	***-0.4%***	***477,887***	***-1,494***	***-0.3%***
San Mateo Bridge	Ferry Transit	0	1,214	1,214	0.0%	617	617	0.0%	-	0	0.0%
	Highway	161,611	161,208	-403	-0.2%	161,271	-340	-0.2%	161,590	-21	0.0%
	Subtotal	***161,611***	***162,422***	***811***	***0.5%***	***161,888***	***277***	***0.2%***	***161,590***	***-21***	***0.0%***
Dumbarton Bridge	Highway	***161,796***	***161,643***	***-153***	***-0.1%***	***161,765***	***-30***	***0.0%***	***161,912***	***117***	***0.1%***
Richmond-San Rafael Bridge	Highway	***90,986***	***90,579***	***-407***	***-0.4%***	***91,103***	***117***	***0.1%***	***90,941***	***-44***	***0.0%***
Carquinez/Benicia Bridges	Ferry Transit	5,933	5,555	-378	-0.2%	4,319	-1,614	-0.9%	4,935	-998	-0.6%
	Highway	*176,634*	176,484	-151	-0.1%	176,471	-163	-0.1%	176,667	33	0.0%
	Subtotal	***182,567***	***182,039***	***-529***	***-0.3%***	***180,790***	***-1,777***	***-1.0%***	***181,602***	***-965***	***-0.5%***
TOTAL		***1,994,342***	***1,992,700***	***-1,642***	***-0.1%***	***1,990,375***	***-3,967***	***-0.2%***	***1,986,987***	***-7,355***	***-0.4%***

Table 5.12.5
2025 Daily Vehicle Trips (Auto Modes only) Across a Screenline

Screenline	2025 No Project	2025 Alternative 1	Difference from No Project	Percent Change from Total	2025 Alternative 2	Difference from No Project	Percent Change from Total	2025 Alternative 3	Difference from No Project	Percent Change from Total
Bay Bridge	383,245	379,296	-3,950	-1.0%	379,009	-4,236	-1.1%	383,430	185	0.0%
Golden Gate	143,510	141,626	-1,884	-1.3%	141,493	-2,017	-1.4%	142,646	-864	-0.6%
SF/SM County line	327,759	324,050	-3,709	-1.1%	325,264	-2,496	-0.8%	327,359	-400	-0.1%
San Mateo Bridge	137,838	137,495	-343	-0.2%	137,547	-291	-0.2%	137,808	-30	0.0%
Dumbarton Bridge	133,989	133,857	-132	-0.1%	133,971	-18	0.0%	134,073	84	0.1%
Richmond-San Rafael Bridge	78,984	78,640	-344	-0.4%	79,101	117	0.1%	78,960	-24	0.0%
Carquinez/Benecia Bridges	157,122	156,994	-129	-0.1%	156,975	-147	-0.1%	157,161	39	0.0%
TOTAL	***1,362,447***	***1,351,958***	***-10,490***	***-0.8%***	***1,353,359***	***-9,088***	***-0.7%***	***1,361,438***	***-1,010***	***-0.1%***

Table 5.12.6

Daily Ridership According To Access Mode To Terminals By Ferry Corridor For Alternative 1

Corridor	Ferry Route	Walk Access	Drive Access	Transit Access
Solano	Vallejo to San Francisco	327	3,589	367
Solano	Benicia/Martinez to San Francisco	98	1,131	43
Contra Costa	Antioch/Pittsburg to San Francisco	19	976	5
Contra Costa	Hercules/Rodeo to San Francisco	177	613	104
Contra Costa	Richmond-San Francisco	263	1,449	133
Alameda	Berkeley-SF-Mission Bay	57	2,048	645
Alameda	Alameda Point-Mission Bay-SF	543	904	733
Alameda	Oakland to San Francisco	126	1,467	681
Alameda	Harbor Bay to San Francisco	487	903	34
Alameda	San Leandro to San Francisco	98	1,185	66
Alameda	Oakland Army Base to San Francisco	10	296	68
Peninsula	Harbor Bay to So. San Francisco	23	418	22
Peninsula	Harbor Bay to Redwood City	5	70	3
Peninsula	Harbor Bay to Moffett Field	4	31	3
Peninsula	Harbor Bay to Hunters Pt	48	339	13
Peninsula	Harbor Bay to Coyote Pt	6	37	6
Peninsula	Harbor Bay to Foster City	8	64	1
Peninsula	Harbor Bay to East Palo Alto	15	95	3
Marin	Sausalito to San Francisco	2,651	2,442	241
Marin	Tiburon to San Francisco	1,402	1,092	328
Marin	Larkspur to San Francisco	845	5,453	1,523
Sonoma	Port Sonoma to San Francisco	5	1,382	68
San Mateo	South San Francisco to San Francisco	91	1,449	123
San Mateo	Redwood City to San Francisco	74	973	47
San Mateo	Coyote Point to San Francisco	1	1,484	19
San Mateo	Foster City to San Francisco	28	712	58
Santa Clara	Moffett Field to San Francisco	15	475	15
Santa Clara	East Palo Alto to San Francisco	16	569	58
Treasure Island	Berkeley to Treasure Island	19	378	148
Treasure Island	Oakland to Treasure Island	73	293	212
Treasure Island	San Francisco to Treasure Island	1,467	0	2,123
	TOTAL	**9,000**	**32,317**	**7,893**

Source: Cambridge Systematics (2002)

Table 5.12.7

Drive Access VMT for Project Alternatives

Terminal	1998	2025 No Project	2025 Alternative 1	2025 Alternative 2	2025 Alternative 3
Berkeley			3,814	3,817	
Martinez			2,009	2,009	
Benicia			1,502	1,457	
Redwood City			3,878	5,361	
Moffett Field			1,540	1,599	
Port Sonoma			8,519	7,972	
San Leandro			3,451	3,522	
South SF			5,048	8,651	
Alameda Point			864	836	
Pittsburg			5,366	5,366	
Hercules			1,500	1,511	
Richmond			4,038	4,070	
Larkspur	12,458	25,943	23,000	23,003	22,975
Sausalito	5,098	10,385	13,469	13,469	13,479
Alameda	278	413	-	-	411
JLS	1,114	1,980	2,535	2,859	1,675
Vallejo	12,851	42,518	33,483	33,057	35,982
Tiburon	483	1,472	1,378	1,378	1,384
Harbor Bay	409	638	2,470	2,510	2,605
Oakland Army Base			390	-	
Coyote Point			3,979	-	
Foster City			1,580	-	
East Palo Alto			1,540	-	
San Leandro for South SF routes			-	-	
Harbor Bay for South SF Routes			5,353	2,935	
Alameda Point for South SF Routes			-	-	
Berkeley for TI routes			1,930	1,512	
Oakland for TI routes			900	901	
Grand Total	32,691	83,349	133,536	127,795	78,511

Table 5.12.8
Potential Parking Availability and Parking Demand for Project Alternatives

Corridor	Route	Potential Available Parking	Alternative 1 Parking Demand Percentage	Alternative 2 Parking Demand Percentage	Alternative 3 Parking Demand Percentage
Transbay	Vallejo - SF	1,600	64%	63%	75%
	Benicia/Martinez - SF	500	64%	64%	
	Antioch/Pittsburg SF	300	93%	93%	
	Hercules/Rodeo - SF	500	35%	35%	
	Richmond-San Francisco	1,000	41%	42%	
	Berkeley-SF-Mission Bay	1,000	58%	59%	
	Alameda Point-Mission Bay-SF	1,000	32%	31%	
	Oakland Army Base -SF	1,000	9%		
	Oakland - SF	500	88%	102%	80%
	Harbor Bay - SF	400	80%	82%	85%
	Harbor Bay - Hunters Point	100	60%		
	San Leandro to San Francisco	250	96%	99%	
	Harbor Bay to So. San Francisco	250	59%	59%	
	East Bay (San Leandro) to Coyote Point	200	7%		
	East Bay (San Leandro) to Foster City	200	11%		
	East Bay (San Leandro) to Redwood City	200	12%	15%	
	East Bay (San Leandro) to East Palo Alto	200	17%		
	East Bay (San Leandro) to Moffett Field	200	5%		
	Subtotal Transbay Corridor	***9,350***			
Golden Gate	Sausalito-San Francisco	100	287%	287%	
	Tiburon-San Francisco	100	158%	158%	158%
	Larkspur-San Francisco	2,000	80%	80%	80%
	Port Sonoma-San Francisco	300	136%	129%	
	Subtotal Golden Gate Corridor	***2,500***			
Peninsula	South San Francisco to San Francisco	300	69%	94%	
	Coyote Point to San Francisco	200	211%		
	Foster City to San Francisco	300	68%		
	Redwood City to San Francisco	500	55%	77%	
	East Palo Alto to San Francisco	300	54%		
	Moffett Field to San Francisco	500	27%	29%	
	Subtotal Peninsula Corridor	***2,100***			
Treasure Island	Berkeley to Treasure Island	*300*	*36%*	31%	
	Oakland to Treasure Island	*100*	*88%*	86%	
	San Francisco to Treasure Island				
	Subtotal Treasure Island Service	***400***			

Source: Cambridge 2002

5.13 ENERGY

5.13.1 Significance Criteria

According to Appendix F of the CEQA Guidelines, project "alternatives should be compared in terms of overall energy consumption and in terms of reducing wasteful, inefficient, and unnecessary consumption of energy." For the purposes of this EIR, an impact would be considered significant if:

- A proposed alternative results in a substantial increase in energy consumption per passenger miles traveled; or
- A proposed alternative would result in a wasteful, inefficient, or unnecessary consumption of energy.

5.13.2 Method of Analysis

This energy analysis addresses the changes in energy consumption by the transportation sector in the nine-county Bay Area for the year 2025 between the four project alternatives. Forecasted energy consumption per PMT was calculated for automobiles, trucks, public buses, transit rail vehicles, and ferries. Ferry energy consumption was calculated using the projected schedule of routes, types of ferries to be used, and passenger volumes. Energy calculations for all other transportation modes were calculated using vehicle miles traveled (VMT) and passenger volume forecasts based on the transportation modeling performed for this project (Outwater 2002).

Comparisons of energy consumption were made between Alternative 4 (No Project) and the other project alternatives to determine the change in total Bay Area-wide transportation energy use with Alternatives 1, 2, and 3. Appendix ENRG-B presents details on the energy consumption per PMT value calculation methodology used for this report.

For this analysis, consumption of energy by ferry vessels was estimated based on engine power output. Engine power output is generally referred to in kilowatts (kW). Power is converted to energy, in the unit of kilowatt-hours (kW-hrs), by applying a factor of engine running time. The energy unit of kW-hrs can directly be converted to a Btu value.

For the no project alternative, average power outputs were assumed for each route, based on the current ferries in use on these routes[1]. Characteristics of the current ferries are available in the working document, *New Technologies and Alternative Fuels*, prepared for Water Transit Authority by JJMA (JJMA 2002). For Alternatives 1, 2, and 3, two ferry fleets were assumed. One fleet would consist of 400-passenger ferries with a maximum power output of 5,966 kW. The other fleet would have 149-passenger ferries with a maximum power output of 2,163 kW (Hutchison 2002). Daily energy consumption per PMT was calculated by dividing the average daily energy consumption by the average daily PMT.

[1] For the Larkspur ferry route, only the newer catamaran vessels used on this route were assumed to be used for the no project alternative. The monohull boats used on this route were constructed in the 1970's and will be taken out of commission by 2025.

5.13.3 Impacts and Mitigation

The following section addresses energy consumption for all transit modes in the Bay Area for all project alternatives and potential mitigation measures.

Impact E-1 **Enhancing or expanding ferry service in the Bay Area would result in more energy consumed per passenger mile traveled for all transit modes in the Bay Area. This increase is relatively small on the regional scale.**

Compared to Alternative 4 (No Project), total daily energy consumption and energy consumption per PMT for all transit modes in the Bay Area would increase for Alternatives 1, 2, and 3. This increase can be summarized as follows:

	Total Energy Consumption (Btu)	Percent Increase in Energy Over Alternative 4	Energy/PMT (Btu/PMT)	Percent Increase in Energy/PMT over Alternative 4
Alternative 1	1,209,281,802,398	0.43%	4,385	0.97
Alternative 2	1,202,356,703,160	0.32%	4,362	0.45
Alternative 3	1,203,393,344,245	0.10%	4,342	0
Alternative 4	1,203,428,264,995	NA	4,342	NA

Alternative 1 would have the largest increase in total transit energy consumption and energy consumption per PMT in comparison to Alternative 4. For all project alternatives, the totals for energy consumption and energy consumption per PMT values are primarily determined by automobiles. Automobiles consume 92 percent of the total energy consumed by the transportation sector in 2025 and 75 percent of the total PMT. Ferries would consume between 0.6 percent and 0.05 percent (depending on the alternative) of the total energy consumed by the transportation sector and between 0.4 percent and 0.09 percent of the total PMT. Although there is an increase in energy use, it is not a substantial or significant increase regionally, as shown above.

Summary of Impact E-1

- Alternative 1 would result in a 0.97 percent increase over Alternative 4 in energy consumption per passenger mile traveled for all transit modes in the Bay Area. This would be a less-than-significant impact.
- Alternative 2 would result in a 0.45 percent increase over Alternative 4 in energy consumption per passenger mile traveled for all transit modes in the Bay Area. This would be a less-than-significant impact.
- Alternative 3 would result in no increase over Alternative 4 in energy consumption per passenger mile traveled for all transit modes in the Bay Area. This would be a less-than-significant impact.
- Alternative 4 would have no impacts.

Mitigation E-1.1: Energy consumption by the ferries under Alternatives 1, 2, and 3 would be further reduced by elimination of routes with low ridership, such that the following routes would remain:

Alameda to San Francisco
Oakland to San Francisco
Tiburon to San Francisco
Richmond to San Francisco
Martinez to San Francisco
Hercules to San Francisco
Harbor Bay to San Francisco
Sausalito to San Francisco
Berkeley to San Francisco
Larkspur to San Francisco
Vallejo to San Francisco
Pittsburg to San Francisco

The table below shows the energy consumption for a ferry service using the above routes:

Total Energy Consumption (Btu)	Percent Increase In Energy Over Alternative 4	Energy/PMT (Btu/PMT)	Percent Increase In Energy/PMT over Alternative 4
1,209,865,172,223	0.53	4,353	0.25

As shown above, this mitigated Alternative 2 ferry service would still result in an increase in energy consumption per PMT over Alternatives 3 and 4, but this mitigated alternative would result in improved passenger service over these two alternatives and improved energy consumption per PMT value over Alternative 1 and an unmitigated Alternative 2. This mitigated alternative demonstrates an improved efficiency in energy use based by focusing proposed new ferry service on routes predicted to have the most passenger demand.

Impact After Mitigation: Energy consumption per PMT values would be improved but remain slightly greater under the above-described mitigated alternative than with Alternative 4. This impact is less than significant as the difference in energy use is not measurably different between Alternative 4 (4,343 Btu/PMT) and Alternative 2 as mitigated above (4,353 Btu/PMT).

Impact E-2 The proposed enhancement or expansion of ferry service in the Bay Area could result in a wasteful, inefficient, and unnecessary consumption of energy without mitigation.

The design and purpose of enhancing or expanding the ferry services in the Bay Area is to increase and improve transportation mobility, service, and choice in the Bay Area, provide a service to regional commuters, and provide an additional mode of regional transit in the Bay Area. As discussed in Section 3.12 of this report (Transportation), the major areas of traffic congestion are at the transbay crossings. Alternatives 1, 2, and 3 would result in decreases in daily trips across all the transbay routes for all modes of transbay transit (i.e., BART, AC Transit, highways, etc.). However, ridership at full service is projected to be fairly low in comparison to the potential numbers of people that could be utilizing the ferries (i.e., filling every ferry run at or near the capacity of each ferry). Low average ridership volumes per ferry run would contribute to a high rate of energy consumption per PMT. Comparison of the forecasted average passengers per run and daily PMT values for the ferries to other modes of mass transit in the Bay Area (see Table 5.13.1) shows that Alternatives 1, 2, and 3 would result in a slightly less energy-efficient mode of mass transit.

Summary of Impact E-2

- Alternatives 1, 2, and 3 could result in low passengers per run and PMT values when compared to other forms of regional mass transit in the Bay Area and compared to Alternative 4 (No Project). As shown in Table 5.13.1, the passengers per run and the PMT values are lower for ferries than for the other four modes of mass transit analyzed. Comparison of the passengers per run and PMT values for Alternatives 1, 2, and 3 are lower than Alternative 4. These low passenger per run values are a primary factor for the high energy consumption per PMT values for Alternatives 1, 2, and 3. Therefore, these alternatives could result in potentially significant impacts.
- Alternative 4 would result in vessels averaging approximately 42 percent of their maximum capacity. This alternative represents current conditions. No impact would occur.

Mitigation E-2.1: Energy consumption for the alternatives can be improved by focusing service on the routes with greatest demand, as shown in Mitigation E-1.1.

Mitigation E-2.2: The WTA would continue to investigate the feasibility and applicability of using energy sources other than fossil fuels. The WTA has investigated the use of alternative fuels for ferries in the working document, *New Technologies and Alternative Fuels Working Document*, (JJMA 2002), which is available on the WTA website, www.watertransit.org.. Alternative energy sources would become incorporated and used by the WTA as they become feasible for use with the WTA ferries.

Impact After Mitigation: Consumption of energy is a factor of achieving high-speed ferry service. This transit mode has the potential to approximately match energy consumption per PMT values as other mass transit modes. By implementing Mitigations E-2.1 and E-2.2, this impact would be a less-than-significant impact and would avoid the potential for wasteful or inefficient consumption of energy.

References

Hutchison, B. 2002. Personal communication between Bruce Hutchison of Glosten, Inc. with URS. June.

John J. McMullen Associates, Inc. (JJMA). 2002. New Technologies and Alternative Fuels. Prepared for Water Transit Authority. May 2.

Outwater, Maren. 2002. Personal Communication between Maren Outwater of Cambridge Systematics and URS. June and July.

Table 5.13.1
Comparison of Passenger Data for Mass Transit Modes – Alternatives 1 Through 4

		Passengers/Run	PMT
Alternative 1	Buses	53	17,671,965
	Light Rail	108	2,087,013
	BART	1,041	32,668,803
	Commuter Rail	964	8,199,995
	Ferries	17	984,023
Alternative 2	Buses	56	18,604,195
	Light Rail	110	2,125,606
	BART	1,053	33,052,084
	Commuter Rail	971	8,263,327
	Ferries	21	630,431
Alternative 3	Buses	58	18,927,393
	Light Rail	111	2,129,149
	BART	1,061	33,312,983
	Commuter Rail	981	8,342,568
	Ferries	38	430,074
Alternative 4	Buses	59	18,974,168
	Light Rail	111	2,132,620
	BART	1,062	33,322,155
	Commuter Rail	952	8,099,280
	Ferries	164	236,461

Source: JJMA 2002; Outwater 2002

5.14 GROWTH INDUCEMENT

The San Francisco Bay Area is attractive not only for its geographic setting, but also for its relatively strong and diverse economy. The Association of Bay Area Governments (ABAG) estimates that the population of the nine-county Bay Area region will increase by 1.4 million people in the next 25 years, from approximately 6.8 million in the year 2000 to 8.2 million in the year 2025. During the same time period, 252,800 acres would be available for development (residential and commercial/industrial), which is about 5.7 percent of the region's total area. This population growth rate is not as dramatic as in the late 1990s and early 2000s (ABAG 2001).

According to the General Plans of the nine counties, only San Francisco and Marin counties are not projected to have a housing shortage over the next 25 years. Over the same time period, these two counties are also projected to have the smallest increase in population and number of households. Based on general plan projections at the city and county level, the other seven counties will experience housing shortages. Those shortages will range from 5,450 housing units in Alameda County to 26,480 housing units in Santa Clara County in the year 2025. The average number of persons per household is expected to remain at approximately 2.7 for the Bay Area as a whole. The mean household income for the Bay Area is expected to rise from $93,800 in the year 2000 to $116,400 by the year 2025 (ABAG 2001).

The housing crisis in the Bay Area is negatively affecting the regional transportation system because the centers of population growth (i.e., where people are living or moving to) are not located where the most economic activity is occurring (i.e., where the employment opportunities are). Between the years 2000 and 2025, the projected increase in jobs will exceed the number of employed residents by approximately 149,000 people (ABAG 2001). This trend is expected to continue because Bay Area cities and counties seek to maximize job production without commensurate emphasis on housing production (ABAG 2001).

Impact GRO-1 **The expansion of ferry service and the placement of new ferry terminals in communities around the Bay Area could induce growth in the region.**

Alternatives 1, 2, and 3 all have the potential to induce growth that is not currently planned for at the local level. Individually, local growth impacts may not be significant on the regional level. However, if a number of terminals are found to be growth inducing, the combined impact may be potentially significant. Furthermore, when growth inducement impacts are considered in conjunction with the impacts of other planned development in the area, cumulative impacts could be significant. Given that Alternative 3 would not establish new terminals, the unplanned growth that could occur as a result of terminal enhancement would be minimal at the regional level, and is therefore not considered to be significant.

New Development

According to Table 5.7.1, Alternatives 1 and 2 propose to build new terminals in the following locations that are currently undeveloped:

Facility	Land Use Designation	Local Planning Agency
Candlestick Park	Parks and Open Space; Public Facilities	San Francisco Planning Department
Coyote Point	Parks and Open Space	City of San Mateo Planning Department
Fort Baker	Public Institutional	Golden Gate National Recreation Area (GGNRA)
Fort Mason	Public Open Space	GGNRA
Gnoss Field / Port Sonoma	Data not available	Sonoma County Permit & Resource Management Department
Point Molate	Open Space Recreation	Richmond Planning Department
Presidio	Public Open Space	GGNRA

In the case of Candlestick Park, Coyote Point, Gnoss Field/Port Sonoma, and Point Molate, the placement of ferry terminals would require compliance with local planning policies as contained in the applicable local general plan, which usually has specific policies to protect open space land uses. It is likely that a proposed ferry terminal within GGNRA jurisdiction would need to be located in accordance with the findings of GGNRA's independent ferry terminal location analysis.

Of the proposed terminal locations above, Coyote Point, Gnoss Field/Port Sonoma, and Point Molate are the three locations where no identified local planning efforts are currently underway to establish ferry terminals. Unlike the other potential sites listed above, the lack of current planning at these three locations would result in Alternative 1 or 2 proposing ferry terminals that could induce unplanned growth. Candlestick Park, Fort Baker, Fort Mason, and the Presidio are all being analyzed independent of the Water Transit Initiative by their local agencies.

Coyote Point is composed mostly of open space park, Bay shoreline wetlands and wildlife habitat, a marina, public museum, and a golf course (City of San Mateo 2002). Gnoss Field/Port Sonoma is a large agricultural area with a lot of ecological importance, which makes any form of development difficult (Sonoma County 2002). Point Molate is a closed Navy brownfield with limited shoreline development, and the City of Richmond's redevelopment agency is tentative to approve any development there due to difficult access to the site, minimal public services/infrastructure, and the high cost of site cleanup (City of Richmond 2002).

Out of all the proposed terminal locations in Alternatives 1 and 2, these three locations represent the areas where there is little or no urban development, and the local planning agencies are not planning for new development. As discussed above, land use designations and zoning ordinances dictate the type and location of development to ensure compatibility of adjoining land uses. However, it is possible that through a general plan amendment or a Conditional Use Permit (or other form of local variance), a local jurisdiction could place a ferry terminal in an area where current policy says it is incompatible. A general plan amendment would require review under the California Environmental Quality Act (CEQA) at a site-specific level, at which time the significance of a conversion of agricultural land, parkland, recreational land, or other open space would need to be addressed. However, a Conditional Use Permit may or may not, in which case the conversion of an open space, agriculture, recreation, or parkland use designation may not receive adequate environmental review. In other words, by proposing ferry terminals in open space locations where no ferry terminal planning is currently occurring, Alternatives 1 and 2 may induce growth in undeveloped or otherwise protected areas. This would constitute a significant impact.

Public Services

Most of the new ferry terminals identified in Alternatives 1 and 2 would be located in an urban setting. By proposing to build the majority of ferry terminals in already built-up areas, the proposed project would minimize impacts to open space resources and limit the expansion of the urban environment. However, redevelopment of an urban area can carry its own set of environmental impacts, such as creating a demand for additional public services and infrastructure, causing the displacement of people or businesses, or physically dividing a community or neighborhood. For community impacts related to the displacement of people or businesses and the division of community, refer to the discussions of Impacts LU-1 and LU-2 in Section 3.7 (Land Use).

A new ferry terminal or a major expansion of an existing terminal in an urban area can have a significant adverse affect on local public services such as police, fire, sewer, and water if the demand is great enough to require the expansion of those services. Likewise, the increase of ferries on the Bay could result in impacts to regional public services provided by the U.S. Coast Guard (see the Navigation Report for a discussion on impacts to U.S. Coast Guard operations). Typically, all public services are designed to provide adequate services for the growth planned in the local general plan or management plan. However, the exact size and nature of future planned development is not always known, so the capacity of public services is often determined by the maximum development allowed by the local zoning ordinance. Therefore, although many of the proposed ferry terminal locations are not identified in local planning documents, new terminals may not adversely impact public services.

Each terminal location will have a different set of impacts on the existing public services and infrastructure of a city or county, depending on the current capacity of local sewer and water infrastructure and the capabilities of the existing public safety workforce. Therefore, it is important that each potential ferry terminal site be considered in light of the local conditions. This is especially true of ferry terminals that are being considered by local agencies as part of a larger project to provide amenities adjacent to the terminal, such as retail or commercial centers (see Cumulative Growth Inducement Impacts, below, for more discussion on adjacent land uses).

Population/Employment

If implemented, the proposed project could cause an unanticipated increase in population in the Bay Area that could result in an increased demand for public services, housing, and other services that could induce growth. Specifically, people may move into the areas due to a perceived increase in the regional quality of life here or job opportunities afforded by the proposed increase in ferry services. However, a population increase as a result of either of these would not be significant relative to the number of people projected to move to the Bay Area in the next 25 years overall (see Section 3.7.1.1).

In regard to population increases in Bay Area communities due to quality of life, the number of people that actually move here because of the proposed project is unpredictable. In reality, people moving into communities from outside the Bay Area to improve their quality of life would require more than just a regional ferry service, such as availability of affordable housing, climate, and cultural amenities beyond the scope of the project.

With regard to an unplanned population increase due to new jobs created by the project, Alternatives 1, 2, and 3 would all create new employment opportunities in the ferry industry to

some degree. Alternative 1 would create the most jobs out of all the alternatives considered, with Alternatives 2 and 3 increasing job opportunities to a lesser degree. On a regional scale, the increase in job opportunities related to Alternatives 1 and 2 is potentially significant, considering the number of new terminals and ferries proposed. However, while the actual number of employment positions is unknown, it is reasonable to assume that most if not all of the positions would be filled by people currently residing in the Bay Area. Furthermore, job opportunities that are created as a result of the project would occur incrementally, as opposed to all at once, which would make any immigration to the Bay Area as a result of jobs in the ferry industry insignificant. Therefore, the potential impacts due to creating employment opportunities would be less than significant.

Cumulative Growth Inducement Impacts

Cumulative growth inducement impacts would involve the implementation of other projects adjacent to a ferry terminal that are not associated with the proposed WTA initiative. Cumulative growth inducement impacts due to unplanned development may occur in communities where ferry terminals are proposed because: (1) terminals function as transportation hubs where the transit riders condense, creating a potential real estate market; or (2) ferry service would increase accessibility to communities.

As a transportation nexus, a ferry terminal attracts people using a variety of transportation modes, including cars, buses, bicycles, walking, and potentially rail. The placement of a new terminal facility or the enhancement of an existing terminal could change the local transportation patterns in a community, resulting in a potentially significant impact. Furthermore, ferry terminals can also become destinations for tourists or Bay Area residents, given their accessibility and location along the shoreline. This concentration of transit-users as well as destination-seekers represents a potential market for real estate development or redevelopment that could result in a potentially significant impact on the existing community beyond the presence of the terminal itself.

Changes at the local level as a result of providing new or enhanced ferry service could also occur as a result of making local communities more accessible. The benefits of ferry service may be perceived by many as an improvement to their current quality of life, making these communities attractive for commuters to live in. This could have more significant impacts in more suburban or rural areas, such as Gnoss Field/Port Sonoma, where undeveloped land could be put at risk as a result of a demand for more adjacent services (see discussion above under New Development). Conversely, increased accessibility to a suburban community, such as San Leandro or Benicia, may benefit the people already living there due to increased economic activity from tourists and commuters.

Although it is quite possible that a ferry terminal would operate independent of services provided by adjacent development indefinitely, the potential for a terminal to lead to additional development may cause cumulative growth inducement impacts. Therefore, as discussed above, it is important that each potential ferry terminal site be considered in light of the local conditions and the potential for additional growth to occur. Without proper planning, cumulative growth associated with the proposed project and other currently unplanned development could lead to significant environmental impacts on communities, public services, or open space resources, depending on the location.

Summary of Impact GRO-1

- Alternative 3 would not result in significant growth inducing impacts.
- Alternatives 1 and 2 may result in potentially significant impacts due to development in areas where growth is unplanned. Specifically, by proposing ferry terminals at Coyote Point, Gnoss Field/Port Sonoma, and Point Molate, the proposed project would encourage growth where there is little urban development and the local planning agencies are not planning to develop there.

Depending on the capacity of local infrastructure and public safety services, some ferry terminals may increase the demand for services, which would result in a significant impact.

The increase in population due to a perceived increase in quality of life or employment opportunities provided by the expanded ferry services of Alternatives 1, 2, or 3 would not result in a significant impact.

Unplanned development beyond the scope of the proposed project could, in conjunction with the implementation of Alternatives 1, 2, or 3, result in cumulative growth inducement impacts.

Mitigation GRO-1.1: Implement Mitigation LU-1.1.

Mitigation GRO-1.2: The California Legislature has given local governments the primary responsibility to make land use decisions. As such, growth inducement impacts should be considered by planning staffs at the local level because growth can be considered a negative or positive impact depending on the objectives of the local government and the community. If growth is an objective of an applicant for new or expanded ferry service, then the applicant must clearly demonstrate to WTA how the growth has been addressed and planned for. Appropriate documentation includes but is not limited to an adopted Specific Plan, Master Plan, or other local plan, or an adopted amendment of a land use designation in a general plan. If a ferry terminal is proposed independently of any other growth, then the applicant must clearly demonstrate to WTA how unplanned growth will be prohibited.

WTA shall be responsible for ensuring the adopted alternative does not induce unplanned growth. To do so, adequate CEQA environmental review or other comprehensive planning process for the waterfront must be prepared by or presented to WTA on a project-by-project basis that clearly defines how planned growth will be managed or how unplanned growth will be avoided.

Mitigation GRO-1.3: Without the implementation of Mitigations LU-1.1 and GRO-1.2, Alternatives 1 or 2 shall not be implemented with ferry terminals proposed for Coyote Point, Gnoss Field/Port Sonoma, or Point Molate, so as to not encourage growth in areas where there is little urban development and to protect open space resources.

Impact After Mitigation: Impact GRO-1 would be less than significant after implementation of Mitigations GRO-1.1, GRO-1.2, and GRO-1.3.

References

Association of Bay Area Governments (ABAG). 2001. Projections 2002. Oakland, California. December.

City of Richmond. 2002. Personal Correspondence between M. Kim of URS Corporation and Richmond Planning Department. May.

County of San Mateo. 2002. Personal Correspondence between M. Kim of URS Corporation and San Mateo County Environmental Services Agency, Planning and Building Division. May.

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5.15 SIGNIFICANT IRREVERSIBLE CHANGES

Significant irreversible changes are considered to involve the use of nonrenewable resources, which from implementation of the WTA program could create an irreversible commitment of resources or irreversible damage to the environment. These impacts can fall within three categories:

- The irretrievable commitment of resources, such as energy and construction materials, expended from the expansion of ferry service
- The irreversible loss of resources due to a direct or indirect impact
- An increase in the use of natural resources because of growth

5.15.1 Irretrievable Commitment of Resources

Natural resources such as fossil fuel energy will be used for the construction of new or expanded facilities as well as for the operation of an expanded fleet of vessels. This EIR evaluates the use of energy for the alternatives, based on the use of diesel fuel. This EIR also identifies and evaluates possible alternative means of minimizing the use of this fuel. However, expansion of ferry service would likely result in an increase in the use of fossil fuels in comparison to nonferry travel. WTA has investigated the feasibility and application of alternative propulsion systems and fuel that can be considered as ferry transit service is expanded.

Construction of new or expanded facilities would require natural resources such as gravel, sand, asphalt, etc. These materials are generally not retrievable, but they are also generally available and not in limited supply.

5.15.2 Loss of Resources from Direct or Indirect Impacts

The implementation of the program may lead to impacts that adversely affect natural resources. The potential for these impacts is addressed in each of the appropriate sections in this EIR. It is not envisioned that new terminal sites or other facilities that have substantial impacts to areas such as sensitive habitat, aquatic, or community resources would advance very far in the planning process. Specific projects that go forward for consideration will undergo additional review, and avoidance and mitigation measures will have to be applied.

5.15.3 Increase in the Use of Resources from Growth

The potential for growth inducement is addressed earlier in this section. The implementation of the WTA program would affect shifts in commuting patterns, but growth changes are not expected at a regional scale. If growth occurred, it would likely be limited to localized areas around some potential terminals. Although some changes in the regional use of natural resources could take place, they are not expected to be substantial.

This section summarizes the public involvement process and the list of preparers of this document. In general, this section describes the public and agency outreach activities that have taken place since the release of the Draft EIR in August 2002.

6.1 PUBLIC INVOLVEMENT AND SCOPING

6.1.1 Public Involvement

In addition to the preparation of this Program EIR, WTA developed a parallel public involvement strategy and process that includes coordination with many other organizations, project stakeholders, and government agencies. Working under the direction of the WTA's enabling legislation, the project team structure was created to allow for continuous and substantive input from the various interests and stakeholders. The structure includes:

- **WTA** – WTA Board of Directors and supporting staff serve as the Lead Agency under CEQA and the sponsors of this project. The WTA Board of Directors has held regularly scheduled meetings that are open to the public.
- **Technical Advisory Committee (TAC)** – Technical review group including various interest groups such as affected public agencies, recreational, environmental, business, ferry vessel operators, organized labor, and the public at large. The group discusses technical issues related to the environmental review. The following subcommittees provided input to the IOP and EIR development process:
  - The **Agency Ad-Hoc Committee** was created as a TAC subcommittee to focus specifically on the environmental concerns and regulatory issues of partner and future permitting agencies. This group met several times throughout the environmental process, providing early feedback on the environmental technical studies and resource issues.
  - The **Clean Marine Ad-Hoc Work Group** was created as a TAC subcommittee to examine current and future ferry vessel technologies.
  - The **SOS Ad-Hoc Work Group** was created as a TAC subcommittee to provide a forum for discussion of ferry operations safety methods and technologies.
  - The **Clean Marine Ad-Hoc Committee** was created as a TAC subcommittee to examine current and future ferry vessel technologies.
  - The **Environmental Organizations Ad-Hoc Committee** was created as a TAC subcommittee to provide environmental organizations such as the Bluewater Network and the Sierra Club an opportunity to discuss environmental concerns.
  - The **Intermodal Design Ad-Hoc Committee** was created as a TAC subcommittee with transit providers and current ferry operators to provide input on efficient transit connections to ferry terminals.
  - The **Operators Ad-Hoc Committee** was created as a TAC subcommittee to provide input on efficient terminal/system design and operations.

- **Community Advisory Committee (CAC)** – Forum for representatives appointed by their local governments to raise issues of local concern and learn about the project. Members represent local jurisdictions around San Francisco Bay with potential ferry terminal expansion or new terminal sites. The group, composed primarily of elected officials, serves as a conduit for information to the larger community.

- **Interest Groups, the Public, and Other Public Agencies** – Information channeled through a comprehensive public outreach plan. The TAC and CAC members serve as a conduit of information to their larger constituencies. Input is provided through direct communication, information flyers, project website, public meetings/presentations, and public hearings. Informational project presentations were provided to local/regional governments, civic organizations, and the public at large. A listing of the meetings held through August 2002 was provided in the Draft EIR.

The Public Involvement process aims to keep stakeholders involved through the CAC, TAC, open public forums, and project updates. The following provides a comprehensive list of meetings and other outreach methods convened by the WTA to educate stakeholders throughout the environmental process.

- **TAC Meetings (Metropolitan Transportation Commission, 101 8th Street, Oakland)**

- May 1, 2001
- September 13, 2001
- December 13, 2001
- March 12, 2002
- June 11, 2002
- July 9, 2002

- **Agency Ad-Hoc Meetings – TAC Subcommittee (Bay Conservation and Development Commission, 50 California Street, San Francisco)**

- August 31, 2001
- March 1, 2002
- May 29, 2002

- **Clean Marine Ad-Hoc Work Group – TAC Subcommittee (Port of San Francisco, Pier 1, San Francisco)**

- June 29, 2001
- August 13, 2001
- November 16, 2001
- March 5, 2002
- May 7, 2002

- **SOS Ad-Hoc Work Group – TAC Subcommittee (Port of San Francisco, Pier 1, San Francisco)**

- October 19, 2001
- March 8, 2002
- April 18, 2002
- June 04, 2002
- July 12, 2002

- **Environmental Organizations Ad-Hoc Committee – TAC Subcommittee (WTA, 120 Broadway, San Francisco)**
  - August 16, 2001
- **Intermodal Design Ad-Hoc Committee – TAC Subcommittee (ARUP, 901 Market Street Suite 260, San Francisco)**
  - April 10, 2002
  - May 7, 2002
- **Operators Ad-Hoc Committee – TAC Subcommittee (WTA, 120 Broadway, San Francisco)**
  - January 28, 2002
  - March 25, 2002
  - April 17, 2002
- **CAC Meetings (425 Market Street, 26th Floor, SFSU Extension, San Francisco)**
  - May 2, 2001
  - September 5, 2001
  - December 12, 2001
  - March 27, 2002
  - July 10, 2002
- **Public Information Presentations (Various locations)** – Approximately 60 public information meetings and presentations were conducted by WTA staff with local governments, civic organizations, and interest groups. These presentations were held throughout the Bay Area to educate the public and decision-makers on the environmental process.
- **Project Website** – The project website at **www.watertransit.org** provides detailed and current information on the project. Many draft technical documents and presentations are available on the project website.

- **Project Update** – Distributed to a database of approximately 850 contacts, the project mailer provides stakeholders with a schedule and status report on the overall project. The Project Update is also distributed with information packets for the media and at stakeholder meetings.
- **Project Brochure** – The project brochure was developed to provide stakeholders with an overview of the entire program, including the environmental process. This is a full color, glossy, tri-fold brochure distributed at stakeholder meetings, conferences, presentations, and other public venues.

6.1.2 Public Hearings

The DEIR was released on August 26, 2002 and a public comment period was initially open until October 31, 2002. It was later extended to January 30, 2003. The Draft Implementation and Operations Plan (IOP) was submitted to the Legislature on December 12, 2002. The public comment period was open until October 31, 2002. During the public comment period, two public hearings were held on the DEIR and nine on the IOP. The hearings were a chance for members of the public to learn more about the program and to comment on the two documents. The following provides a comprehensive list of these hearings:

DEIR Hearings

- **September 10, 2002 – Oakland**

  Metropolitan Transportation Commission Auditorium
  101 8th Street, Oakland

- **September 17, 2002 – San Francisco**

  Port of San Francisco
  Bayside Conference Room
  Pier 1, San Francisco

IOP Hearings

- **September 26, 2002 – Contra Costa County**

  Senior Center
  818 Green Street, Martinez

- **October 1, 2002 – San Mateo County**

  The Municipal Services Building
  33 Arroyo Drive, South San Francisco

- **October 3, 2002 – Alameda County**

  Metropolitan Transportation Commission Auditorium
  101 8th Street, Oakland

- **October 8, 2002 – Marin County**

  Council Chambers
  1400 5th Street, San Rafael

- **October 10, 2002 – San Francisco County**

  Port of San Francisco
  Pier 1, San Francisco

- **October 15, 2002 – Sonoma County**

  Community Center
  320 N. McDowell Boulevard, Petaluma

- **October 17, 2002 – Solano County**

  JFK Library
  505 Santa Clara Street, Vallejo

- **October 21, 2002 – Santa Clara County**

  City Hall Council Chamber
  456 W. Olive Avenue, Sunnyvale

- **October 24, 2002 – Napa County**

  County Library
  Coombs Street, Napa

6.1.3 Public Comments

The project's public involvement process included public comment periods for both the DEIR and the Revised DEIR. During the comment periods, project stakeholders and the public had the opportunity to review the documents and provide the WTA with comments.

The WTA then considered and responded to the comments received and developed the FEIR. Comments on both the DEIR and the Revised DEIR are addressed together as a separate volume to this FEIR.

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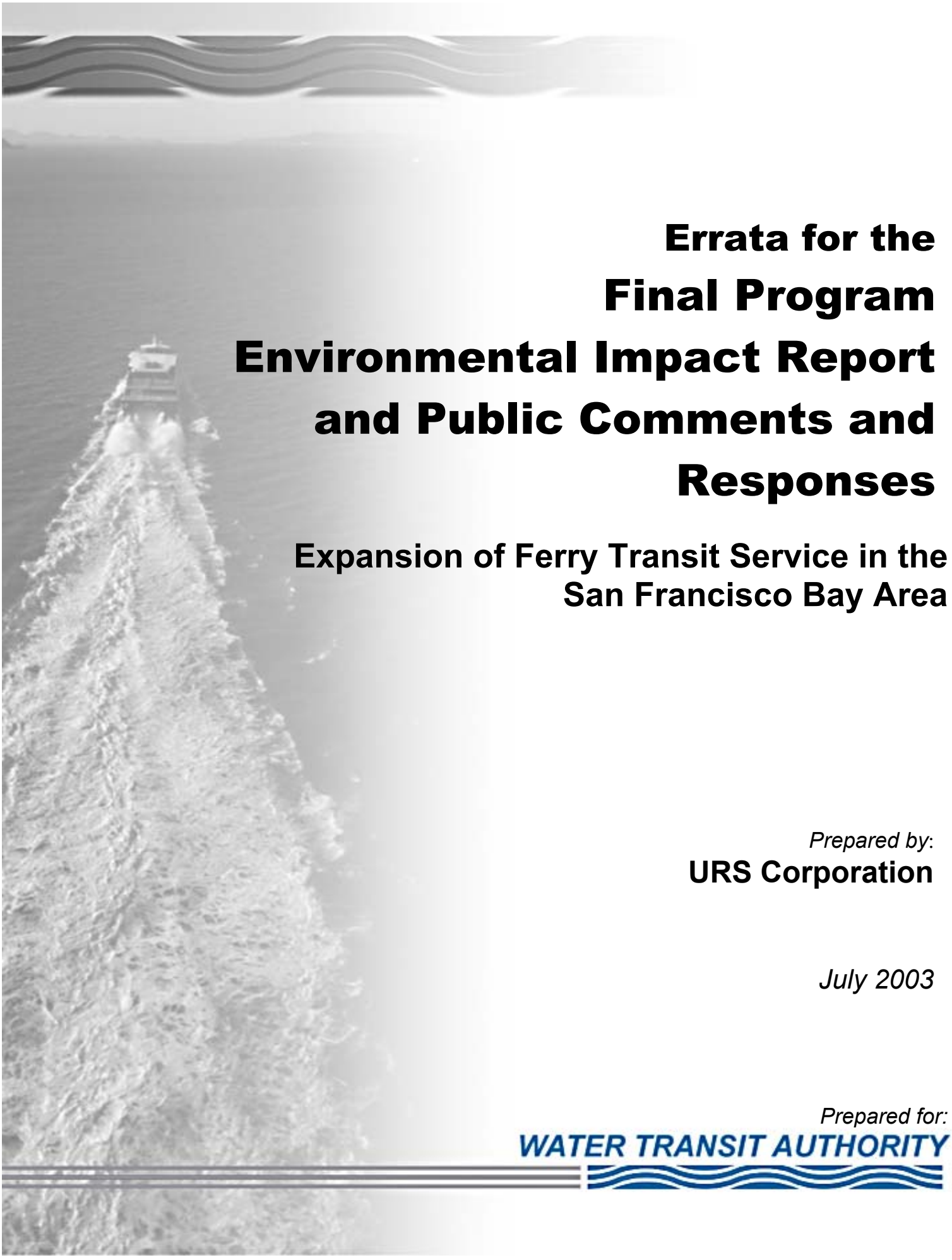
ABAG	Association of Bay Area Governments
ACP	Area Contingency Plan
AP Zone	Alquist-Priolo Earthquake Fault Zone
ARPA	Archaeological Resources Protection Act
BAAQMD	Bay Area Air Quality Management District
BAC	Bay Area Council
BAEF	Bay Area Economic Forum
BART	Bay Area Rapid Transit
Bay Plan	San Francisco Bay Plan
bbl	barrel
BCDC	San Francisco Bay Conservation and Development Commission
BMPs	Best Management Practices
BPTCP	Bay Protection and Toxic Cleanup Program
Btu	British thermal unit
CAC	Community Advisory Committee
CAFE	Corporate Average Fuel Economy program
Cal/OSHA	California Occupational Safety & Health Administration
Cal-EPA	California Environmental Protection Act
Caltrans	Department of Transportation of the State of California
CAP	Clean Air Plan
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHRIS	California Historic Resources Information Service
CNDDB	California Natural Diversity Data Base
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CRHR	California Register of Historic Resources
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act
dB	decibel
dBA	"A"-weighted decibels
DD	doubling of distance
DEIR	Draft Environmental Impact Report
DEM	Digital Elevation Models
DFG	California Department of Fish and Game
DMA	Danish Maritime Authority

DMMO	Dredged Materials Management Office
DNL	Day-Night Average Sound Level
DOGG	California Division of Oil, Gas, and Geothermal Resources
DOT	U.S. Department of Transportation
DWR	California Department of Water Resources
EcoAtlas	GIS Bay Area ecological resources database (SFEI)
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
ERL	Effects Range Low
ERM	Effects Range Median
ESI	Environmental Sensitivity Index (NOAA)
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	U.S. Department of Transportation Federal Highway Administration
FICAN	Federal Interagency Committee on Aviation Noise
FIRM	Flood Insurance Rate Map (FEMA)
FTA	Federal Transit Administration
FVF	Fast Vehicle Ferry
g	acceleration due to gravity
GGBHTD	Golden Gate Bridge Highway and Transportation Department
GGNRA	Golden Gate National Recreation Area
GIS	Geographic Information System
GPG	General Plan Guidelines
HAAF	Hamilton Army Airfield
HABS/HAER	Historic American Building Survey/Historic American Engineering Record
HAP	hazardous air pollutant
HCD	California Department of Housing and Community Development
Headway	the distance or time separating each vessel
HICOMP	Highway Congestion Monitoring Program
hp	horsepower
Hs	significant wave height
HSC	Harbor Safety Committee
HUD	U.S. Department of Housing and Urban Development
HVAC	Heating Ventilation and Air Conditioning
Hz	hertz
IMO	International Marine Organization
IOP	Implementation and Operation Plan
J/m	joules per meter
kHz	kilohertz
KJ/m	kilojoules per meter
km	kilometers
kt	knot
kW	kilowatt

kWh	kilowatt-hour
Ldn	Day-Night Average Sound Level
L_{eq}	equivalent sound level
$L_{eq}(h)$	hourly equivalent sound level
LIUTO	Low Impact Urban Transport Water Omnibus (Italy)
L_{max}	maximum "A"-weighted sound level
LOS	Level of Service
LPG	liquefied petroleum gas
LTMS	Long Term Management Strategy
M	magnitude (seismic)
mcy	million cubic yards
MDC	Marlborough District Council (New Zealand)
mg/m^3	micrograms per cubic meter
MHHW	Mean Higher High Water
MHW	Mean High Water
MJ/m	megajoules per meter
M_L	Richter Local magnitude
MLLW	Mean Lower Low Water
mm	millimeters
uPa	microPascal
MPRSA	Marine Protection, Research, and Sanctuaries Act of 1972
MRZ	Mineral Resource Zone
MSO	Marine Safety Officer
MTC	Metropolitan Transportation Commission
MTL	mean tide level
M_W	moment magnitude
MWP	Montezuma Wetlands Project
NAGPRA	Native American Graves Protection and Repatriation Act
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NOP	Notice of Preparation
NOS	National Ocean Service
NOx	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Properties
NSRP	National Shipbuilding Research Program
NUAD	Not suitable for unconfined aquatic disposal
NVIC	Navigation & Vessel Inspection Circular
NWIC	Northwest Information Center
O_3	ozone
OAK	Oakland International Airport

OARB	Oakland Army Base
OMC	Oakland Municipal Code
OPA	Federal Oil Pollution Act
OPR	California Governor's Office of Planning and Research
ORNL	Oak Ridge National Laboratory
OSHA	Occupational Safety & Health Administration
OSPR	California Office of Spill Prevention and Response
OSPRA	Oil Spill Prevention and Response Act
OSRO	Oil Spill Response Organization
Pa	pascal
PAH	polycyclic aromatic hydrocarbon
pax	passenger
PCB	polychlorinated biphenyl
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PMT	passenger miles traveled
Porter-Cologne Act	California Water Quality Control Act
ppb	parts per billion
ppm	parts per million
ppq	parts per quadrillion
ppt	parts per thousand
pptr	parts per trillion
PRC	Public Resources Code
PT	particulate trap
PTS	permanent threshold shift
RCRA	Resource Conservation and Recovery Act
RMP	Regional Monitoring Program
RNA	Regulated Navigation Area
ROD	Record of Decision
ROG	reactive organic gas
ROV	Remote Operated Vehicle
RPWAST	Rich Passage Wave Action Study
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SCR	selective catalytic reduction
SEL	Sound Exposure Level
SEPA	State Environmental Protection Act (Washington)
SF-DODS	San Francisco Deep Ocean Disposal Site
SFEI	San Francisco Estuary Institute
SFEP	San Francisco Estuary Project
SFMC	San Francisco Municipal Code
SFO	San Francisco International Airport
SIP	State Implementation Plan
SLC	California State Lands Commission
SO_2	sulfur dioxide
SPL	sound pressure level

SPM	Shore Protection Manual
SPRR	Southern Pacific Railroad
SSC	suspended sediment concentration
SUAD	suitable for unconfined aquatic disposal
SWIM	Ships Wash Impact Management (UK)
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TAC	Technical Advisory Committee (WTA)
Tm	mean wave period
TMDL	Total Maximum Daily Load
TRB	Transportation Research Board
TRIM	Tidal Residual Intertidal Mudflat
TTS	temporary threshold shift
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UWR	Upland/Wetland Reuse
VMT	Vehicle Miles Traveled
VTM	Vessel Traffic Management
VTS	Vessel Traffic Service
WHAFIS	Wave Height Analysis for Flood Insurance Studies
WHSRN	Western Hemisphere Shorebird Reserve Network
WSF	Washington State Ferries
WTA	Water Transit Authority
WTI	Water Transit Initiative
YBM	Young Bay Mud
YOY	young-of-the-year



Errata for the Final Program Environmental Impact Report and Public Comments and Responses

Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:
URS Corporation

July 2003

Prepared for:
WATER TRANSIT AUTHORITY

PREFACE

This document includes minor technical changes and additions to the Final Environmental Impact Report (FEIR) and Public Comments and Responses issued by the Water Transit Authority in June 2003. These changes were made as a result of comments received after the close of the formal comment period on May 16, 2003. The changes were made following consultation with the individuals who made the comments, and were considered and reviewed by the WTA Board of Directors prior to their taking action on the Final EIR and Statement of Overriding Considerations in July 2003. The following pages present the text changes in the FEIR as a result of the comments.

CHANGES TO THE FEIR TEXT

EXECUTIVE SUMMARY

Table ES-1, page ES-13, Impact WW-1, Level Of Significance After Mitigation is amended to read:

L (Less Than Significant)

SECTION 3.2 NAVIGATION

Section 3.2.1.4 page 3.2-7, paragraph 2 under "Vessel Incidents" is amended to read:

Baseline statistics for incidents on the Bay were obtained from the VTS website for 1997, 1998, and 1999. The data were evaluated to determine the number of incidents per ~~1,000~~ 100,0000 transits. The total average yearly transits and the incidents per ~~1,000~~ 100,0000 transits were compared to other ports of both larger and smaller size than San Francisco Bay. These ports include Berwick Bay, Houston/Galveston, New York, Sault Sainte Marie, and Los Angeles/Long Beach (Table 3.2.4). This comparison shows that the number of vessel incidents varies widely and independently of the number of vessel transits. On San Francisco Bay, the average number of collisions per ~~1,000~~ 100,0000 transits is 1. Four near misses, 2 groundings, and 5 allisions (an allision occurs when a moving vessel strikes an inanimate object such as a pier) occur on average for every ~~1,000~~ 100,0000 transits on the Bay. Vessel incidents are recorded and reported as "casualties," a broadly applied term that technically includes violations of load lines and discharge of garbage, personal injury, or property damage.

Section 3.2.1.4 page 3.2-7, Footnote 2 is amended to read:

Approximately 31 vessel casualties occur for every ~~1,000~~ 100,0000 transits, Title 46 Code of Federal Regulations (CFR) Part 4 defines a reportable marine casualty as: (1) groundings - whether intentional or not; (2) bridge strikes; (3) loss of main propulsion, steering, or associated components, which resulted in a reduction of a vessel's maneuverability; or (4) occurrences affecting seaworthiness or fitness for service (fire, flooding, lifesaving equip, bilge pumping, etc.); (5) loss of life; (6) injury: (a) beyond first aid or (b) to a crew-member on commercial vessel unfit for routine duties; (7) damage to property greater than $25,000; (8) alleged misconduct or negligence by Coast Guard licensed, certified, or documented members of the Merchant Marine; (9) damage to aids to navigation; (10) certain recreational boating deaths, waterfront facility casualties, and others as directed; (11) reports of load line violations; and (12) marine pollution: discharges of oil, hazardous materials, or garbage into the navigable waters of the United States.

SECTION 3.3 WAKE WASH

Section 3.3.2.2, page 3.3-12, Impact After Mitigation (WW-1) is amended to read:

Impact WW-1 would be less than significant with successful implementation of one or more of the above mitigation measures (or other site-specific mitigations such as shoreline protection). ~~However, if there are situations where it is not possible to implement the mitigation measures, impacts would be potentially significant. The proposed routes with potentially significant erosional wake wash impacts could be removed from consideration or terminal locations could be changed. Until final routes and terminal locations are determined, this impact is considered potentially significant.~~

~~The routes that are most likely to have unmitigable wake wash impacts are those traversing the Carquinez Strait to Pittsburg/Antioch. These routes are within 1,500 meters of the shoreline and adjacent to long stretches of tidal marsh. Site-specific studies of the existing natural wave climate and wake wash from existing vessels would be required to determine whether impacts would be significant. Use of low-wake vessels may be feasible for this route, but site-specific study would be required to make that determination.~~

SECTION 3.5 BIOLOGY

Section 3.5.2.6, page 3.5-40, 1st full paragraph, last 2 sentences are amended to read:

~~This disturbance would not result in a permanent loss of habitat, but rather the area of habitat where disturbance may take place. Waterfowl may use these areas when ferries are not present.~~

This disturbance would result in a permanent abandonment of the disturbance area by waterfowl as long as the ferry service is in existence. This is equivalent to a loss of habitat.

Section 3.5.2.6, page 3.5-40, Mitigation B-11.2 is amended to read:

Response of waterfowl to new ferry routes in shallow North and South Bay roosting, rafting, and foraging habitat shall be evaluated by monitoring. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO). If such evaluation reveals impacts to waterfowl then the following mitigations should be implemented; 1) The CDFG should be consulted to identify possible rerouting so as to avoid the impacts to these roosting, foraging or rafting areas or, 2) If rerouting proves infeasible, then compensatory mitigation should be implemented consisting of the creation of new roosting, rafting or foraging waterfowl habitat. Examples of such compensatory mitigation are the removal of abandoned piles and piers in the Bay or through other means of restoring Bay waters.

CHANGES TO RESPONSES TO PUBLIC COMMENTS

Comment Response ROUTES-6 is amended to read:

~~The Proposed Project does not include at terminal at Berkeley/Gilman.~~ As noted in the DEIR (DEIR at 2-4), Alternatives 1 and 2, which potentially could include a terminal at the Gilman or Buchanan Street sites, have numerous potentially significant impacts beyond those of the proposed project. For this reason, the DEIR found that Alternatives 1 and 2 would not meet CEQA's requirements that alternatives be designed to reduce or avoid project impacts. Further, Alternatives 1 and 2 could not be determined to be feasible without extensive additional study (ibid.) For this reason, the EIR has not fully evaluated the potential impacts of a terminal site at Gilman or Buchanan Street.

If, at some future time, the WTA determined to further consider a Gilman or Buchanan Street terminal, it would be necessary to fully study the impacts related to such a project, including those identified in the comment. Further, it appears that mitigation of the already identified impacts at these sites (e.g., erosion impacts – see DEIR Figure 3.3.3) would require compromises to project service and/or cost that might make such service infeasible. For a Gilman or Buchanan Street terminal to merit further project-level analysis, all these issues would need to first be fully addressed.

Comment Response ROUTES - 29 is amended to read:

The DEIR identified potentially significant impacts of a Gilman Ferry terminal. These included wake wash (Figure 3.3.2), impacts on rafting birds (Figure 3.5.7), and dredging impacts (Figure 3.1.3). These impacts would all be lessened or eliminated by locating the terminal at University rather than at Gilman. Ridership to a University terminal would be different than that to a Gilman terminal. However, since the WTA's ridership forecasts identified a significant number of riders from Emeryville to a Berkeley terminal, it is not clear whether the change in ridership will be significant. ~~A future site specific EIR will need to evaluate a number of alternative sites, and would likely include further analysis of sites at Buchanan and Gilman. Those studies would analyze issues such as access, parking availability, variations in ridership, as well as environmental issues. Without that site specific analysis which might identify advantages of sites other than University, it did not appear appropriate to make findings of over riding concern related to the significant environmental impacts of a Gilman terminal site.~~

A future site specific EIR will need to evaluate the Berkeley route(s) and associated terminal. The project level EIR will consider those issues that could not be fully addressed at the general programmatic level, including potential ridership and catchment area and specific project impacts. However, the impacts identified for the Gilman or Buchanan Ferry terminal site are unlikely to be any more mitigable at the project level. Selection of a Gilman or Buchanan Street terminal would therefore require adoption of a Statement of Overriding Considerations. Such a statement would be difficult to support, given the feasibility and lesser impacts of the University Avenue terminal site.

Thus, unless conditions change significantly from those studied in the DEIR, it appears that a Gilman or Buchanan Street terminal would not meet CEQA's requirements that

alternatives be designed to reduce or avoid project impacts. (See DEIR's discussion of Alternatives 1 and 2 at page 2-4.)

If, at some future time, the WTA determined to further consider a Gilman or Buchanan Street terminal, it would also be necessary to fully study the impacts related to such a project. Further, it appears that mitigation of the already identified impacts at these sites (e.g., erosion impacts – see DEIR Figure 3.3.3; see also letter EIR 1004, comment 5) would require compromises to project service and/or cost that might make such service infeasible. For a Gilman or Buchanan Street terminal to merit further project-level analysis, all these issues would need to first be fully addressed.

Comment Response PROJ-72 is amended to read:

The purpose and need of the WTA ferry expansion plan is to "increase Bay Area regional mobility and transportation options by providing new and expanded water transit services and related ground transportation terminal access in the San Francisco Bay Area". This mission was developed based on legislative direction including Section 66540.24 of the WTA's enabling legislation, which states "The primary focus of the authority shall be the provision of services through the development and operation of a comprehensive water transit system".

As part of the project planning, the WTA evaluated ferry expansion in comparison to several alternative mode investments that were developed by MTC and other transportation planning organizations. This evaluation, summarized in Table 2.2, looked primarily at cost effectiveness measures of ferries compared to other transit investments. In general, most of the other transit investments included in the table are feasible, cost effective, and will reduce vehicle travel in the bridge corridors. For that reason, the express bus/BART capacity, TSM, and Smart Growth alternatives are being further investigated and pursued for implementation by other transportation agencies, such as MTC. In addition, the WTA does not have the jurisdiction to implement the non-ferry alternatives. The merit of these other projects do not diminish the ferry expansion's ability to increase regional mobility and transportation options. For that reason, investments in other modes were not considered further in this document, but are being pursued by other appropriate agencies.

Because it would not be the lead agency to implement those alternatives, this EIR has not given in depth consideration to the potential impacts of the non-ferry project alternatives described in Section 2 of the EIR. Any consideration of the relative merits of the Proposed Project compared to the non-ferry alternatives sketched out in the EIR would require a full analysis of potential benefits and impacts. Such an analysis was beyond the scope of this EIR.

NATURE SAVER™ FAX MEMO 01616 | Date 6/20/03 | # of pages ▶ 3
To Kristen | From S. Bourguignon
Co./Dept. WTA | Co. BAAQMD
Phone # | Fax #

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William C. Norton
EXECUTIVE OFFICER/APCO

RECEIVED
JUN 20 2003
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

May 13, 2003

EIR 1021

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: Water Transit Authority Revised Draft Program Environmental Impact Report

Dear Ms. Haught Johnson:

On November 25, 2002, Bay Area Air Quality Management District (District) staff submitted a comment letter in response to the Water Transit Authority's (WTA) Draft Program Environmental Impact Report (DEIR) for the expansion of ferry transit service in the San Francisco Bay Area. The DEIR and the Draft Implementation & Operations Plan (IOP) describe expanded water transit systems for the region. District staff have received a Revised DEIR, and we have the following comments.

We note considerable improvement in the organization and readability of the Revised DEIR and are especially pleased that the WTA has included the IOP ferry system as the proposed project alternative. This provides a logical comparison between the environmental impacts from the proposed project and no project alternatives. We are also glad that your agency included a copy of the District's Independent Analysis of the WTA's Implementation and Operations Plan in the Revised DEIR (*Appendix AIR-B*). Our analysis was approved by our Board of Directors on February 19, 2003, and we believe it fulfills the requirements specified by the California Health and Safety Code Section 66540.22k. As noted in our report, we concluded that the expansion of ferry service proposed in the WTA's IOP should result in less emissions than the current passenger ferry system.

While the Revised DEIR is an improvement over the earlier environmental document, we still have some questions about the WTA's analysis. First, the *Program Description* section does not mention the Alcatraz route; however this route is included in the *Air Quality* section and *Table 3.6.1*, which summarizes the proposed ferry power usage. Please clarify whether the Alcatraz route is considered part of the proposed project.

In our November 25, 2002 comment letter, we recommended a discussion of the air quality impacts from dredging. The Revised DEIR still does not address this issue. According to the *Dredging* section, the proposed project alternative would call for construction dredging at the Hercules/Rodeo terminal, amounting to approximately 49,830 cubic yards of dredged material. The kinds of dredging tools listed in *Table 3.1.2* are primarily diesel powered, and with continuous use, can lead to significant particulate matter emissions. We urge the WTA to require the

implementation of all feasible control measures. Some of our suggested mitigations include: use diesel oxidation catalyst or particulate filters on dredging equipment; use alternatively fueled equipment (CNG, biodiesel, water emulsion fuel, electric); minimize idling time of equipment; maintain properly tuned equipment; and limit hours of operation of heavy duty equipment.

As we mentioned in our earlier comment letter, we are concerned about potential land use conflicts that might arise from the development of new terminals and residential units in areas with existing sources of air pollutants. Air quality problems arise when sources of air pollution and sensitive receptors are located near one another. If there are nearby industrial uses, ferry riders and new residents may be affected by odors, dust, and diesel exhaust impacts from activities associated with those existing uses. Citizen complaints can lead to nuisance cases that are difficult and expensive to resolve. We suggest that the WTA's environmental document contain a screening level analysis of potential land use conflicts between existing sources of pollutants/odors and proposed terminals and residences. A screening level analysis will indicate if more detailed review will be needed in subsequent site-specific environmental impact reviews.

In our independent analysis, we assumed that an appropriate No Project Alternative would use regional vehicle miles traveled (VMT) projections from the Metropolitan Transportation Commission's most recent Regional Transportation Plan (RTP) as the most likely scenario for future transportation projects and activity in the region. However, in reviewing MTC's 2001 RTP, we note that their No Project VMT figures for 2025 are significantly higher than those listed in your Revised DEIR. This leads us to believe that the WTA has a different set of assumptions about the No Project Alternative than what has been forecasted in the RTP. We recommend that the WTA's environmental document and the IOP use MTC's estimates for the No Project Alternative or provide an explanation for using different estimates.

As we commented in our earlier letter, the WTA should provide more information about the assumptions that were made concerning the transportation modal split for the proposed project. For example, the IOP states that the WTA has conducted ridership surveys which conclude that the new ferry system will "draw most of its riders from vehicles and that these are people who have proved unwilling to regularly use other forms of transit." However, *Table 3.12.3* shows ridership changes by alternative between different transit modes. The figures indicate that ridership from the majority of existing transit modes will decrease with the implementation of a more robust ferry service (except for an increase in commuter rail), indicating there would be a significant number of riders switching to ferries from other transit modes. Figures from *Tables 3.12.3* and *3.12.4* seem inconsistent, because the projected change in ridership on other forms of transit (12,243 riders) and the number of automobile trips reduced (9,058 trips) do not add up to the approximate number of projected new ferry riders (36,974 according to the Revised DEIR). We suggest that the WTA better explain the projected effect of the proposed ferry system on transit ridership, and how the WTA came to the conclusion that the majority of new ferry riders would come from single-occupant vehicles.

We are encouraged that the WTA intends to minimize cold-start emissions with *Mitigation A-2.1* which states that "cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals." However, it is not clear how this parking-related mitigation measure will be implemented. The amount of potential available parking spaces at the ferry

terminals and the projected demand for those parking spaces is provided in *Table 3.12.6*. However those demand figures do not coincide with the number of riders who are projected to be accessing the terminals in automobiles (*Table 3.12.5*). Please provide clarification about how many riders are expected to drive to and park at ferry terminals. According to the details provided in the earlier DEIR and its technical appendices, the WTA's ridership model is predicated on providing ample parking at the majority of the ferry terminals. Again, if this mitigation measure includes a reduction in the amount of available parking, the environmental document should analyze the effect upon projected ferry ridership.

The DEIR analysis estimates the overall mode split for accessing the ferry terminals to be: 66% drive, 16% bus/rail and 18% walk/bike. The WTA's environmental document should clearly show how these figures were determined and how they fit into the concept of creating more transit-oriented development near existing and new ferry terminals. If there is an expectation that a majority of ferry riders will be driving to terminals, please give more detail on how the areas surrounding terminals can provide adequate parking and also be appropriately transit-oriented.

If you have any questions regarding these comments, please contact Michael Murphy, Principal Planner, at (415) 749-4644 or Suzanne Bourguignon, Environmental Planner, at (415) 749-5093.

Sincerely,

William C. Norton

William C. Norton
Executive Officer/ APCO

WN:SB

cc: BAAQMD Board of Directors

WTA

June 27, 2003

William Norton
Executive Director
BAAQMD
939 Ellis Street
San Francisco, CA 94109

Thank you for your comments addressing the revised draft Environmental Impact Report (EIR) dated April 2003, which addresses WTA's proposed Implementation and Operations Plan (IOP) to expand ferry service on the San Francisco Bay. We note that the BAAQMD letter is dated May 13,2003. However, because the comment letter was addressed to the WTA Board President, the WTA point of contact designated to receive all EIR comment letters did not receive the BAAQMD letter until after the close of the comment period. The BAAQMD letter was faxed to the WTA point of contact on June 20, 2003.

We are very appreciative of the input provided by BAAQMD throughout the IOP and EIR planning process. Enclosed you will find WTA's responses to the comments submitted by BAAQMD on the April 2003 EIR. Please note that because these comments where received by the WTA point of contact after the close of the comment period, they were not included in the final EIR. However, the BAAQMD comments and comment responses will be entered into the administrative record during the next WTA Board meeting, and incorporated into the final EIR as an addendum.

Again, thank you for your review and input. If you have any questions please call Steve Castleberry at 415/291-3377.

Sincerely,

Thomas Bertken
Chief Executive Officer

Comment: We note considerable improvement in the organization and readability of the Revised DEIR and are especially pleased that the WTA has included the IOP ferry system as the proposed project alternative. This provides a logical comparison between the environmental impacts from the proposed project and no project alternatives. We are also glad that your agency included a copy of the District's Independent Analysis of the WTA's Implementation and Operations Plan in the Revised DEIR (Appendix AIR-B). Our analysis was approved by our Board of Directors on February 19, 2003, and we believe it fulfills the requirements specified by the California Health and Safety Code Section 66540.22k. As noted in our report, we concluded that the expansion of ferry service proposed in the WTA's IOP should result in less emissions than the current passenger ferry system.

While the Revised DEIR is an improvement over the earlier environmental document, we still have some questions about the WTA's analysis. First, the Program Description section does not mention the Alcatraz route; however this route is included in the Air Quality section and Table 3.6.1, which summarizes the proposed ferry power usage. Please clarify whether the Alcatraz route is considered part of the proposed project.

Response:

Ferry service to Alcatraz is existing service. It is not, therefore, part of the Proposed Project. For the Air Quality analysis, emissions and energy usage from service to Alcatraz were included in all alternatives (including the No Project Alternative), as this service is anticipated to continue regardless of whether the Proposed Project is implemented.

Comment: In our November 25, 2002 comment letter, we recommended a discussion of the air quality impacts from dredging. The Revised DEIR still does not address this issue. According to the Dredging section, the proposed project alternative would call for construction dredging at the Hercules/Rodeo terminal, amounting to approximately 49,830 cubic yards of dredged material. The kinds of dredging tools listed in Table 3.1.2 are primarily diesel powered, and with continuous use, can lead to significant particulate matter emissions. We urge the WTA to require the implementation of all feasible control measures. Some of our suggested mitigations include: use diesel oxidation catalyst or particulate filters on dredging equipment; use alternatively fueled equipment (CNG, biodiesel, water emulsion fuel, electric); minimize idling time of equipment; maintain properly tuned equipment; and limit hours of operation of heavy duty equipment.

Response:

Evaluation of emissions from potential dredging has been included in the FEIR under Air Impact A-8. The impact states "Equipment and boats used for dredging of the harbor at the Hercules/Rodeo terminal would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines." An analysis is included in the FEIR, which

concludes "Dredging for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years. This is a potentially significant impact."

Two mitigation measures were included:

Mitigation A-8.1: Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval.

Mitigation A-8.2: Utilize dredging contractors with the best available emission controls on their equipment.

Impact After Mitigation: With implementation of Mitigations A-8.1 and A-8.2, Impact A-8 would be less than significant.

The additional suggestions included in the comment could be evaluated for implementation on specific projects.

Comment: As we mentioned in our earlier comment letter, we are concerned about potential land use conflicts that might arise from the development of new terminals and residential units in areas with existing sources of air pollutants. Air quality problems arise when sources of air pollution and sensitive receptors are located near one another. If there are nearby industrial uses, ferry riders and new residents may be affected by odors, dust, and diesel exhaust impacts from activities associated with those existing uses. Citizen complaints can lead to nuisance cases that are difficult and expensive to resolve. We suggest that the WTA's environmental document contain a screening level analysis of potential land use conflicts between existing sources of pollutants/odors and proposed terminals and residences. A screening level analysis will indicate if more detailed review will be needed in subsequent site-specific environmental impact reviews.

Response:

The FEIR does not include a screening level analysis of proposed terminal sites as the specific locations have not been finalized. Analysis of these potential impacts would be performed on a site specific basis once specific terminal locations and ferry services are proposed.

Comment: In our independent analysis, we assumed that an appropriate No Project Alternative would use regional vehicle miles traveled (VMT) projections from the Metropolitan Transportation Commission's most recent Regional Transportation Plan (RTP) as the most likely scenario for future transportation projects and activity in the region. However, in reviewing MTC's 2001 RTP, we note that their No Project VMT figures for 2025 are significantly higher than those listed in your Revised DEIR. This

leads us to believe that the WTA has a different set of assumptions about the No Project Alternative than what has been forecasted in the RTP. We recommend that the WTA's environmental document and the IOP use MTC's estimates for the No Project Alternative or provide an explanation for using different estimates.

Response:

Following publication of the DEIR, in a follow-up to consultation with MTC, the WTA did a comparison of VMT for the 2025 No Project Alternative between the WTA ferry ridership model and the MTC regional travel model (Cambridge Systematices, memorandum dated December 3, 2002). There are some differences in the results of each model, based on differences that are inherent in the model structures. The WTA model was developed using TransBay travel behavior and was designed to capture the TransBay trip movements compared to observed data. The WTA model relies on trip generation and distribution components of the MTC model for input. A direct comparison of the 2025 No Project output of both models shows that the WTA model predicts lower VMT compared to the MTC model by about 10 percent regionwide. This difference is primarily due to a lower prediction of vehicle trips in the mode-choice model and because the trips that are associated with the lower estimate are generally longer trips. The differences between the VMT results are considered reasonable based on the objective of the WTA model and the results of model validation.

Comment: As we commented in our earlier letter, the WTA should provide more information about the assumptions that were made concerning the transportation modal split for the proposed project. For example, the IOP states that the WTA has conducted ridership surveys which conclude that the new ferry system will "draw most of its riders from vehicles and that these are people who have proved unwilling to regularly use other forms of transit." However, Table 3.12.3 shows ridership changes by alternative between different transit modes. The figures indicate that ridership from the majority of existing transit modes will decrease with the implementation of a more robust ferry service (except for an increase in commuter rail), indicating there would be a significant number of riders switching to ferries from other transit modes. Figures from Tables 3.12.3 and 3.12.4 seem inconsistent, because the projected change in ridership on other forms of transit (12,243 riders) and the number of automobile trips reduced (9,058 trips) do not add up to the approximate number of projected new ferry riders (36,974 according to the Revised DEIR). We suggest that the WTA better explain the projected effect of the proposed ferry system on transit ridership, and how the WTA came to the conclusion that the majority of new ferry riders would come from single-occupant vehicles.

Response: The mode split, or percentage of commuters predicted to travel by each mode of transit, car, or pedestrian/bike is a result of the travel model output. The WTA developed a mode choice model specific to the water transit expansion project, based, among other factors, on survey results regarding peoples preferences about which forms of travel they would prefer to use, if available, to access terminals. These choices were applied in the model that generated the percentages by mode estimated to access the

terminals. These percentages are listed in FEIR Table 3.12.12 for all of the terminals considered. The proportion of each access mode (walk, drive, transit) listed in the table does vary by ferry route and terminal.

Comment: We are encouraged that the WTA intends to minimize cold-start emissions with Mitigation A-2.1 which states that "cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals." However, it is not clear how this parking-related mitigation measure will be implemented.

Response:

Encouraging non-drive access to terminals has been included in Transportation Mitigation T-2.2 in the FEIR, which states: Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

Comment: The amount of potential available parking spaces at the ferry terminals and the projected demand for those parking spaces is provided in Table 3.12.6. However, those demand figures do not coincide with the number of riders who are projected to be accessing the terminals in automobiles (Table 3.12.5). Please provide clarification about how many riders are expected to drive to and park at ferry terminals.

Response:

Tables 3.12.5 and 3.12.6 in the Revised DEIR are now Tables 3.12.12 and 3.12.13 in the FEIR. For clarity, in Table 3.12.13, Proposed Project parking demand percentage has been replaced with Proposed Project parking demand in the FEIR. Available parking and parking demand are reported by number of parking spaces. Drive access is reported by number of people. Parking demand was developed from data on numbers of drive trips to a ferry terminal and factors from the on-board survey data that allowed conversion of those trips into numbers of vehicle that would park at a ferry terminal. These factors were derived for existing ferry terminals and applied to all terminals in a corridor for future alternatives. Average auto occupancy of drive access trips was applied to drive access trips to produce drive access vehicles for all ferry terminals. (The vehicle occupancy rate varies from site to site but varies between 1.5 and 2.) Trips that would park outside the ferry terminals (percent overflow) and trips that drive to the station to drop someone off (percent kiss and ride) were subtracted from the overall total of vehicles that would park at a station to produce the number of vehicles that would park on site.

This is described in more detail in the *Ridership Model Forecasts Draft Working Paper* prepared for the WTA by Cambridge Systematics. The paper is included as an appendix to the IOP and on the WTA website.

Comment: According to the details provided in the earlier DEIR and its technical appendices, the WTA's ridership model is predicated on providing ample parking at the majority of the ferry terminals. Again, if this mitigation measure includes a reduction in the amount of available parking, the environmental document should analyze the effect upon projected ferry ridership.

Response:

Reduction of available parking could lower potential ridership. However, encouraging carpooling, use of shuttle buses, and use of public transportation should not lower ridership. In addition, based on market based ridership studies, the WTA believes that a targeted marketing effort could increase ridership beyond the current forecasts. Potential impacts of possible mitigation measures would be analyzed on a site specific basis.

Comment: The DEIR analysis estimates the overall mode split for accessing the ferry terminals to be: 66% drive, 16% bus/rail and 18% walk/bike. The WTA's environmental document should clearly show how these figures were determined and how they fit into the concept of creating more transit-oriented development near existing and new ferry terminals. If there is an expectation that a majority of ferry riders will be driving to terminals, please give more detail on how the areas surrounding terminals can provide adequate parking and also be appropriately transit-oriented.

Response:

Mode splits are described in the *Ridership Model Forecasts Draft Working Paper* prepared for the WTA by Cambridge Systematics. The paper is included as an appendix to the IOP and on the WTA website.

EIR 1022

Air Resources Board

Winston H. Hickox
Agency Secretary

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

RECEIVED
JUN 20 2003
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

May 15, 2003

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

Dear Ms. Haught Johnson:

Thank you for providing us with the opportunity to review and comment on the revised draft Program Environmental Impact Report (EIR) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of the EIR was limited to the revised subject matter pertaining to air quality issues, since we understand that our previous comments on the earlier draft will also be addressed in the Final EIR.

Overall, we are supportive of revision to the EIR, which now focuses on the proposed project described in the Implementation and Operations Plan (IOP). In particular, we applaud the commitment to ferries that will exceed EPA's 2007 Tier II air quality standards by 85 percent, as described in Section 2 of the EIR. However, we do have one comment on the analysis in section 3.6. It appears from the discussion under "Ferry Emissions," that the air quality impacts are based on a 90 percent reduction in nitrogen oxides, and a 95 percent reduction in PM_{10}. These higher emission reduction figures may alter the impacts of the project (see Impacts A-1, A-3, A-4, A-6). We suggest the analysis be based on the 85 percent emission reduction specified in the "Proposed Project," or else redefine the Proposed Project with these higher emission reductions.

Thank you again for this opportunity to provide comments. If you have any questions about our comments, please contact Mr. Daniel E. Donohoue, Chief of the Emissions Assessment Branch, at (916) 322-6023, or by email at ddonohou@arb.ca.gov.

Sincerely,

/s/

Peter D. Venturini, Chief
Stationary Source Division

cc: Mr. Daniel E. Donohoue, Chief
Emissions Assessment Branch
Air Resources Board

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

...ston H. Hickox
...gency Secretary

Gray Davis
Governor

EIR#151

RECEIVED
JUN 20 2003
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

October 23, 2002

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

Dear Ms. Haught Johnson:

Thank you for providing us with the opportunity to review and comment on the draft Program Environmental Impact Report (EIR) and Implementation and Operations Plan (IOP) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of these documents was limited to the subject matter pertaining to air quality issues, and we have provided some technical comments in the enclosure to this letter, which we hope will be helpful.

As you know, air quality is intrinsically linked to transportation and land use decisions. Though California has successfully reduced mobile source smog-forming pollutants since the 1970's through new vehicle and fuel technologies, those gains have been eroded by dramatic growth in population and vehicle miles traveled (VMT). Reducing the growth in VMT is challenging, however research has helped demonstrate that one way to slow growth is to give people more transportation choices – choices that enrich their lifestyles and make their communities more livable and healthy. It has been our experience, however, that new transit services of any kind must be the cleanest possible in order to benefit clean air.

With that said, we want to commend WTA's effort to expand ferry transit in the San Francisco Bay Area and for the commitment to build the fleet at an emissions standard that is 85 percent lower than the United States Environmental Protection Agency's Tier II standards. We also want to acknowledge WTA's efforts to develop zero-emission ferries. For California to meet its long-term air quality goals, it is critical to move beyond traditional technologies to zero- and near-zero emissions technologies. Clearly putting a transit system in operation that demonstrates state-of-the-art emission control technology and the development of zero-emission ferries will help achieve our air quality goals and be a model for other regions to follow.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

California Environmental Protection Agency

Printed on Recycled Paper

Thank you again for this opportunity to provide comments. If you have any questions about our comments, please contact Mr. Daniel E. Donohoue, Chief of the Emissions Assessment Branch, at (916) 322-6023, or by email at ddonohou@arb.ca.gov.

Sincerely,

Peter D. Venturini, Chief
Stationary Source Division

Enclosure

cc: Mr. Daniel E. Donohoue, Chief
Emissions Assessment Branch
Air Resources Board

Comments on San Francisco Bay Area Water Transit Authority's Implementation and Operations Plan and Program Environmental Impact Report

Comments on the Implementation and Operations Plan (IOP)

Air Quality Benefits of the Proposed Ferry Expansion:

There are several statements throughout the IOP describing the proposed expanded ferry service as a "strategy to improve air quality." However, there is no technical data in the IOP to support that claim, and it does not appear that the data in the EIR supports this claim (see comments on EIR below). In the event the WTA has technical data to support the claim, we recommend the IOP include that information, or reference the appropriate documents. If such data is available, we suggest adding an additional question to the IOP, such as "How and to what extent will the IOP improve air quality in the Bay Area?" In the event the data does not support this claim, we recommend the IOP place emphasis on the other positive aspects of the project.

In addition, while the IOP reflects a strong commitment to an 85% emission reduction goal below EPA Tier 2 standards, the EIR presents a different view. The ferry project emissions in section 3.6 under the section "Ferry Emissions" in the EIR are estimated assuming only that the EPA Tier 2 standards would be in effect. Under this scenario, all of the proposed ferry projects are correctly assumed to result in significant air quality impacts. The use of selective catalytic reduction and particulate traps (which could achieve an 85% emission reduction) is only listed as one possible mitigation option, not a commitment. We continue to believe that the best available technology should be used in the ferries. It has been our experience that new transit services of any kind must be the cleanest possible in order to benefit clean air.

In-Service Emissions Testing

In Chapter 5, it is reported that the existing fleet of ferries is cleaner than previously reported. We do not believe the data presented in the IOP substantiates this. In particular, we have the following concerns with Figure 23 in the IOP, which compares reported in-use emissions values (based on the report entitled "Measurement of Air Pollutant Emissions from In-Service Passenger Ferries") to published values.

- All of the in-use values are based on the "high-speed cruise" operating condition, which generally results in the lowest emissions value on a grams per horsepower-hour basis. There appears to be no attempt to

incorporate the other operating conditions and arrive at a composite emission factor, which is the convention for reporting emissions factors. For example, the "published" oxides of nitrogen (NOx) emission factor in Figure 23 for the Cummins KTA 50 is based on the ISO 8178 E3 Cycle, which is a composite value using engine power at loads of 25%, 50%, 75% and 100%.

- References are not provided for the "published" values, making it difficult to verify their accuracy, and the conditions under which they were generated. Of the three engines, we were only able to find published data for the NOx emissions of the Cummins KTA 50 engine. Information was also provided to us by a Bay Area marine dealer on the MTU engine that is inconsistent with the published values in Figure 23.

- According to the emissions report prepared for the WTA by Engine, Fuel, and Emissions Engineering, Incorporated, the in-use particulate matter (PM) emission value for the Caterpillar engine is based on emulsified diesel fuel instead of conventional diesel fuel.

- The in-use hydrocarbon (HC) emissions value for the Cummins engine in the IOP does not correspond to the value in the emissions report prepared for the WTA by Engine, Fuel, and Emissions Engineering, Incorporated.

- The in-use emissions values presented in the IOP were generated using a testing methodology different from the standard laboratory testing for marine engines. The in-use testing methodology (referred to as "ride-along vehicle emission measurement" system or "RAVEM") has not been fully correlated to reference laboratory methods. Until this correlation is completed, it may not be correct to assume that the in-use emissions values based on the RAVEM test method most accurately represent the marine fleet's "true" emissions. It is possible that the test method itself is not as accurate as test procedures conducted in a laboratory setting (although satisfactory given the constraints of in-use testing).

Comments on the Program Environmental Impact Report (EIR)

Emissions Estimates for Ferry Expansion Alternatives

More information is needed to understand how the emissions figures provided in Tables 3.6-5, 3.6-6, and 3.6-7 were derived. In addition, it appears there are errors in the figures provided. For example, in Table 3.6-6, a *decrease* in NOx and PM is estimated for ferries under the expansion project termed "Reduced Routes" Alternative 2, as compared to the "No Project" scenario. It appears that the only way it is possible to achieve an overall emission reduction with more ferries (and disregarding cars and buses) is to add SCR and Traps to all ferries --

both for *existing* routes and the expanded routes the WTA is proposing. Our understanding is that the project does not include retrofit controls on ferries serving the existing routes.

Dredging

Due to the significant amount of dredging that would be required under ferry expansion alternatives #1 and #2, we recommend that the air quality impact of dredging operations be included in the EIR under either section 3.1, "Dredging," or section 3.6, "Air Quality." We also recommend that mitigation measures be investigated. Since most dredges are diesel powered, many of the same emission control options investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels" could be applied to dredges. For example, selective catalytic reduction is being used to control NOx emissions on some dredges in California. Another option is electrically-powered dredges, which have been used at the Port of Oakland, and in other areas.

Auxiliary Engines

It is not clear in the EIR whether the ferry emissions figures include the emissions from on-board diesel generators. If not, we suggest the WTA include these emissions and their impacts in section 3.6 of the EIR, and investigate mitigation measures such as those investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels."

WTA

June 27, 2003

Mike Kenny
Executive Director
CARB
1001 "I" Street
PO Box 2815
Sacramento, CA 95812

Thank you for your input and follow-up regarding ARB comments on the draft Environmental Impact Report (EIR) addressing the WTA's proposed Implementation and Operations Plan (IOP), which will expand ferry service on the San Francisco Bay. The ARB submitted a comment letter dated October 23, 2002 that addressed the August 2002 version of the draft EIR. Our understanding is that this letter was intended to include an enclosure that was inadvertently omitted from the transmittal. That enclosure, which includes comments on both the IOP and the EIR, was forwarded by ARB to the WTA on June 20, 2003.

ARB also submitted a comment letter dated May 15, 2003 which addressed the revised/recirculated draft EIR dated April 2003. Because this letter was addressed to the WTA Board President, WTA's designated point of contact did not receive this letter until after the close of the comment period.

WTA appreciates the input provided by the ARB. In that regard, we have drafted the attached responses to the comments submitted by ARB, which address both the draft (August 2002) and revised draft (April 2003) EIR. Because these comments were received by the WTA point of contact after the close of the comment period, they were not included the FEIR. However, please note that they will be entered into the administrative record during the next WTA Board meeting and incorporated into the final EIR as an addendum.

Again, that you for your review and input. If you have any questions please call Steve Castleberry at 415/291-3377.

Sincerely,

Thomas Bertken
Chief Executive Officer

Revised Draft EIR Comments (ARB 5/15/03)

Comment: Thank you for providing us with the opportunity to review and comment on the revised draft Program Environmental Impact Report (EIR) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of the EIR was limited to the revised subject matter pertaining to air quality issues, since we understand that our previous comments on the earlier draft wilt also be addressed in the Final EIR.

Overall, we are supportive of revision to the EIR, which now focuses on the proposed project described in the Implementation and Operations Plan (IOP) In particular, we applaud the commitment to ferries that will exceed EPA's 2007 Tier II air quality standards by 85 percent, as described in Section 2 of the EIR. However, we do have one comment on the analysis in section 3.6. It appears from the discussion under "Ferry Emissions," that the air quality impacts are based on a 90 percent reduction in nitrogen oxides, and a 95 percent reduction in PM_{10} These higher emission reduction figures may alter the impacts of the project (see Impacts A-1, A-3, A-4, A-6). We suggest the analysis be based on the 85 percent emission reduction specked in the "Proposed Project," or else redefine the Proposed Project with these higher emission reductions.

Response:

In the DEIR, use of SCR and PM traps was included as mitigations for air quality impacts. As described under "Ferry Emissions" in Section 3.6.2 of the FEIR, ferry emissions were estimated assuming that USEPA Tier 2 standards would be in effect. These standards require that new diesel engines manufactured after the year 2007 meet lower emissions requirements than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would have engines that would at least meet the USEPA Tier 2 standards. With the Proposed Project, the ferries would also have control devices to reduce the levels of NOx and PM10. Selective catalytic reduction (SCR) and particulate traps would reduce NOx emissions to 10 percent of Tier 2 levels and PM10 emissions to 5 percent of Tier 2 levels. Therefore, for the Proposed Project emissions were assumed to be at least 85% below Tier 2 standards. These standards are included in the WTA Vessel Specifications. The WTA has mandated an emission target of 85% below EPA Tier 2 (2007) standards and the Vessel Performance Specification reflect this mandate.

Comment: More information is needed to understand how the emissions figures provided in Tables 3.6-5, 3.6-6, and 3.6-7 were derived. In addition, it appears there are errors in the figures provided. For example, in Table 3.6-6, a decrease in NO_X and PM is estimated for ferries under the expansion project termed "Reduced Routes" Alternative 2, as compared to the "No Project" scenario.

Response:

In the DEIR, use of SCR and PM traps was included as mitigations for air quality impacts. As described under "Ferry Emissions" in Section 3.6.2 of the FEIR, ferry emissions were estimated assuming that USEPA Tier 2 standards would be in effect. These standards require that new diesel engines manufactured after the year 2007 meet lower emissions requirements than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would have engines that would at least meet the USEPA Tier 2 standards. With the Proposed Project, the ferries would also have control devices to reduce the levels of NOx and PM10. Selective catalytic reduction (SCR) and particulate traps would reduce NOx emissions to 10 percent of Tier 2 levels and PM10 emissions to 5 percent of Tier 2 levels. Therefore, for the Proposed Project emissions were assumed to be at least 85% below Tier 2 standards. These standards are included in the WTA Vessel Specifications. The WTA has mandated an emission target of 85% below EPA Tier 2 (2007) standards and the Vessel Performance Specification reflect this mandate.

Comment: It appears that the only way it is possible to achieve an overall emission reduction with more ferries (and disregarding cars and buses) is to add SCR and Traps to all ferries, both for existing routes and the expanded routes the WTA is proposing. Our understanding is that the project does not include retrofit controls on ferries serving the existing routes.

Response:

The Proposed Project includes increased service on some existing routes. The WTA does not have the authority to mandate requirements, such as SCR and PM traps for existing ferry service and vessels. Existing operators would be affected by the WTA recommendations only if they wanted to use the WTA's program EIR to cover future expanded service. However, the WTA will seek to work cooperatively with the operators of those services in implementing recommendations contained in the IOP as they may apply to their operations.

Comment: Due to the significant amount of dredging that would be required under ferry expansion alternatives #1 and #2, we recommend that the air quality impact of dredging operations be included in the EIR under either section 3.1, "Dredging," or section 3.6,

"Air Quality," We also recommend that mitigation measures be investigated. Since most dredges are diesel powered, many of the same emission control options investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels" could be applied to dredges. For example, selective catalytic reduction is being used to control NO_X emissions on some dredges in California. Another option is electrically-powered dredges, which have been used at the Port of Oakland, and in other areas.

Response:

Evaluation of emissions from potential dredging has been included in the FEIR under Air Impact A-8. The impact states "Equipment and boats used for dredging of the harbor at the Hercules/Rodeo terminal would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines." An analysis is included in the FEIR, which concludes "Dredging for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years. This is a potentially significant impact."

Two mitigation measures were included:

Mitigation A-8.1: Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval.

Mitigation A-8.2: Utilize dredging contractors with the best available emission controls on their equipment.

Impact After Mitigation: With implementation of Mitigations A-8.1 and A-8.2, Impact A-8 would be less than significant.

Comment: It is not clear in the EIR whether the ferry emissions figures include the emissions from on-board diesel generators. If not, we suggest the WTA include these emissions and their impacts in section 3.6 of the EIR, and investigate mitigation measures such as those investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels."

Response:

On-board generator power was considered negligible compared to the power output of the ferry engines (e.g. 100 kW of generator power compared to roughly 2,400 kW of engine power). As such, emissions from these generators would be negligible as well when compared to emissions from the ferry engines.

Revised Draft EIR Comments (ARB 5/15/03)

Comment: Thank you for providing us with the opportunity to review and comment on the revised draft Program Environmental Impact Report (EIR) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of the EIR was limited to the revised subject matter pertaining to air quality issues, since we understand that our previous comments on the earlier draft wilt also be addressed in the Final EIR.

Overall, we are supportive of revision to the EIR, which now focuses on the proposed project described in the Implementation and Operations Plan (IOP) In particular, we applaud the commitment to ferries that will exceed EPA's 2007 Tier II air quality standards by 85 percent, as described in Section 2 of the EIR. However, we do have one comment on the analysis in section 3.6. It appears from the discussion under "Ferry Emissions," that the air quality impacts are based on a 90 percent reduction in nitrogen oxides, and a 95 percent reduction in PM_{10} These higher emission reduction figures may alter the impacts of the project (see Impacts A-1, A-3, A-4, A-6). We suggest the analysis be based on the 85 percent emission reduction specked in the "Proposed Project," or else redefine the Proposed Project with these higher emission reductions.

Response:

In the DEIR, use of SCR and PM traps was included as mitigations for air quality impacts. As described under "Ferry Emissions" in Section 3.6.2 of the FEIR, ferry emissions were estimated assuming that USEPA Tier 2 standards would be in effect. These standards require that new diesel engines manufactured after the year 2007 meet lower emissions requirements than current diesel engines. The assumption was that all ferries in the year 2025, with or without the project, would have engines that would at least meet the USEPA Tier 2 standards. With the Proposed Project, the ferries would also have control devices to reduce the levels of NOx and PM10. Selective catalytic reduction (SCR) and particulate traps would reduce NOx emissions to 10 percent of Tier 2 levels and PM10 emissions to 5 percent of Tier 2 levels. Therefore, for the Proposed Project emissions were assumed to be at least 85% below Tier 2 standards. These standards are included in the WTA Vessel Specifications. The WTA has mandated an emission target of 85% below EPA Tier 2 (2007) standards and the Vessel Performance Specification reflect this mandate.



Technical Appendices

Final Program Environmental Impact Report

Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:
URS Corporation

June 2003

Prepared for:
WATER TRANSIT AUTHORITY

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ENRG-A

Proposed Project Non-Peak Ferry Times and Distances

	A	B	C	D	E	F	G	H	I	J
1		**Freqency**	**Travel Time**	**Distance**	**AveSpd**	**Idle Time**	**Number of**	**Total Run Time/**	**Total Idle Time/**	**Total Distance/**
2	**Ferry**	**(min)**	**(min)**	**(miles)**	**(mph)**	**(min)**	**Runs/Period**	**Period (min)**	**Period (min)**	**Period (miles)**
3	90_ALASF	60	28.8	7.52	18.1	1.2	9.0	259	11	68
4	90_ALASF-	60	28.8	7.52	18.1	1.2	9.0	259	11	68
5	Alcatraz	60	8.4	4.00	12.0	6.6	9.0	76	59	36
6	Alcatraz	60	8.4	4.00	12.0	6.6	9.0	76	59	36
7	90_HBFB	0								
8	90_HBFB-	0								
9	90_OAKFW	60	24.0	8.80	11.7	6.0	9.0	216	54	79
10	90_OAKFW	60	24.0	8.80	11.7	6.0	9.0	216	54	79
11	92_SSLTO	60	20.4	7.66	15.3	9.6	9.0	184	86	69
12	92_SSLTO-	60	20.4	7.66	15.3	9.6	9.0	184	86	69
13	93_TIBFW	60	20.4	5.47	9.4	9.6	9.0	184	86	49
14	93_TIBFW-	60	20.4	5.47	9.4	9.6	9.0	184	86	49
15	95_BERSFMBA	60	20.4	9.05	17.4	9.6	9.0	184	86	81
16	95_BERSFMBA-	60	20.4	9.05	17.4	9.6	9.0	184	86	81
17	95_RDWCSF	60	48.8	24.57	32.0	11.2	9.0	439	101	221
18	95_RDWCSF-	60	48.8	24.57	32.0	11.2	9.0	439	101	221
19	95_RMDFB	60	33.0	9.00	25.0	12.0	9.0	297	108	81
20	95_RMDFB-	60	33.0	9.00	25.0	12.0	9.0	297	108	81
21	95_SSFSF	60	30.0	10.44	32.0	0.0	9.0	270	0	94
22	95_SSFSF-	60	30.0	10.44	32.0	0.0	9.0	270	0	94
23	96_SFTI	30	13.2	2.11	16.0	1.8	18.0	238	32	38
24	96_SFTI-	30	13.2	2.11	16.0	1.8	18.0	238	32	38
25	91_LARKN	60	43.6	12.74	16.0	13.2	9.0	392	119	115
26	91_LARKS	60	43.6	12.74	19.1	13.2	9.0	392	119	115
27	94_VALFB	60	53.8	26.55	29.0	6.2	9.0	484	56	239
28	94_VALFB-	60	53.8	26.55	29.0	6.2	9.0	484	56	239
29	95_HERSF	240	43.6	19.57	26.0	16.4	2.3	98	37	44
30	95_HERSF-	240	43.6	19.57	26.0	16.4	2.3	98	37	44
31	96_PITSF	200	80.7	34.10	26.0	9.3	2.7	218	25	92
32	96_PITSF-	200	80.7	34.10	26.0	9.3	2.7	218	25	92
33									**Total Miles**	**2613**
34										
35	**Small ferry total min.**							**4691**	**1249**	
36	**Small ferry total hrs.**							**78.2**	**20.8**	**Hours**
37	**Large ferry total min.**							**2385**	**473**	
38	**Large ferry total hrs.**							**39.8**	**7.9**	**Hours**

ENRG-A

Proposed Project Peak Ferry Times and Distances

	A	B	C	D	E	F	G	H	I	J
36	91_LARKN	20	43.6	12.74	16.0	13.2	18.0	785	238	229
37	91_LARKS	20	43.6	12.74	19.1	13.2	18.0	785	238	229
38	Deadhead							30		
39	94_VALFB	30	53.8	26.55	29.0	6.2	12.0	646	74	319
40	94_VALFB-	30	53.8	26.55	29.0	6.2	12.0	646	74	319
41	Deadhead							40		
42	95_HERSF	60	43.6	19.57	26.0	16.4	6.0	262	98	117
43	95_HERSF-	60	43.6	19.57	26.0	16.4	6.0	262	98	117
44	Deadhead							60		
45	96_PITSF	60	80.7	34.10	26.0	9.3	6.0	484	56	205
46	96_PITSF-	60	80.7	34.10	26.0	9.3	6.0	484	56	205
47	Deadhead							30		
48									**Total Miles**	**3636**
49										
50	**Small ferry total min.**							**6109**	**1466**	
51	**Small ferry total hrs.**							**101.8**	**24.4**	**Hours**
52	**Large ferry total min.**							**4512**	**932**	
53	**Large ferry total hrs.**							**75.2**	**15.5**	**Hours**

ENRG-A

No Project 2025 Non-Peak Ferry Times and Distances

	A	B	C	D	E	F	G	H	I	J	K
1		**Freqency**	**Time**	**Distance**	**AveSpd**	**Idle Time**	**Number of**	**Total Run Time/**	**Total Idle Time/**	**Total Distance/**	**Running Hours**
2	**Ferry**	**(min)**	**(min)**	**(miles)**	**(mph)**	**(min)**	**Runs/Period**	**Period (min)**	**Period (min)**	**Period (miles)**	**Route**
3	90_FWALA	90	44	8.8	12	6.6	4.3	191	29	38	3.2
4	Alcatraz	60	10	4.00	17.3	5	6.5	65	33	26	
5	Alcatraz	60	10	4.00	17.3	5	6.5	65	33	26	2.2
6	90_OAKFW	90	45.12	8.8	11.7	6	4.3	196	26	38	3.3
7	91_LARKN	90	47.78	12.74	16	13.2	4.3	207	57	55	
8	91_LARKS	90	40.02	12.74	19.1	13.2	4.3	173	57	55	6.3
9	92_SSFW	99.99	37.31	5.41	8.7	9.6	3.9	146	37	21	
10	92_SSFW-	99.99	37.31	5.41	8.7	9.6	3.9	146	37	21	
11	92_SSLTO	90	30.04	7.66	15.3	9.6	4.3	130	42	33	
12	92_SSLTO-	90	30.04	7.66	15.3	9.6	4.3	130	42	33	9.2
13	93_TIBFW	99.99	34.91	5.47	9.4	9.6	3.9	136	37	21	
14	93_TIBFW-	99.99	34.91	5.47	9.4	9.6	3.9	136	37	21	4.5
15	94_VALFB	90	54.93	26.55	29	6.2	4.3	238	27	115	
16	94_VALFB-	90	54.93	26.55	29	6.2	4.3	238	27	115	7.9
17											
18	**Total Min.**							**2196**	**521**		
19	**Total Hrs.**							**36.6**	**8.7**	**Hours**	

ENRG-A
No Project 2025
Peak Ferry Times and Distances

	A	B	C	D	E	F	G	H	I	J	K
1		**Freqency**	**Time**	**Distance**	**AveSpd**	**Idle Time**	**Number of**	**Total Run Time/**	**Total Idle Time/**	**Total Distance/**	**Running Hours**
2	**Ferry**	**(min)**	**(min)**	**(miles)**	**(mph)**	**(min)**	**Runs/Period**	**Period (min)**	**Period (min)**	**Period (miles)**	**Route**
3	90_FBALA	40	34.94	7.86	13.5	6.6	9.00	314	59	71	
4	Deadhead							15			5.5
5	Alcatraz	60	10	4.00	17.3	5	6.00	60	30	24	
6	Alcatraz	60	10	4.00	17.3	5	6.00	60	30	24	
7	Deadhead							15			2.3
8	90_HBFB	99.99	29.03	9.87	20.4	6	3.60	105	22	36	
9	90_HBFB-	99.99	29.03	9.87	20.4	13.2	3.60	105	48	36	
10	Deadhead							60			4.5
11	90_OAKFB	60	29.42	7.11	14.5	13.2	6.00	177	79	43	
12	Deadhead							60			3.9
13	91_LARKN	60	47.78	12.74	16	13.2	6.00	287	79	76	
14	91_LARKS	30	40.02	12.74	19.1	13.2	12.00	480	159	153	
15	Deadhead							30			13.3
16	92_SSLTO	60	30.04	7.66	15.3	9.6	6.00	180	58	46	
17	92_SSLTO-	60	30.04	7.66	15.3	9.6	6.00	180	58	46	
18	Deadhead							30			6.5
19	93_TIBFB	50	21.79	6.9	19	9.6	7.20	157	69	50	
20	93_TIBFB-	50	21.79	6.9	19	9.6	7.20	157	69	50	
21	Deadhead							30			5.7
22	94_VALFB	60	54.93	26.55	29	6.2	6.00	330	37	159	
23	94_VALFB-	60	54.93	26.55	29	6.2	6.00	330	37	159	
24	Deadhead							30			11.5
25											
26											
27	**Total min.**							**3190**	**834**		
28	**Total hrs.**							**53.2**	**13.9**	**Hours**	
29											

APPENDIX TRAN-A

This information is summarized from the Metropolitan Transit Commission's (MTC's) Bay Area Transit Information web page (www.transitinfo.org), which provides a full description of existing Bay Area transit system routes and schedules, and hosts an interactive web-based personalized transit trip planner.

1.0 SCHEDULED BUS SERVICE

AC Transit

The Alameda-Contra Costa Transit District (AC Transit) serves Western Alameda and Contra Costa Counties, with transbay service to the San Francisco Transbay Terminal.

Altamont Commuter Express

The Altamont Commuter Express (ACE) is a new commuter train service providing two morning and two afternoon trains traveling between Stockton and San Jose, with additional stops in Lathrop/Manteca, Tracy, Livermore, Pleasanton, Fremont and Santa Clara.

American Canyon Transit

Bus service is operated by the City of American Canyon and the Napa County Transportation Planning Agency.

Benicia Transit

Provides local service in the City of Benicia with connecting service to Vallejo, Pleasant Hill BART, and Sun Valley Mall.

Cloverdale Transit

Provides fixed-route and demand-response service in the city of Cloverdale. It also has connections to Sonoma County Transit for intercity trips.

County Connection

This service is maintained by the Central Contra Costa Transit Authority. It serves Central Contra Costa County and provides with connections to Pleasanton and Antioch.

Dumbarton Express

Weekday express bus service across the Dumbarton Bridge, connecting Union City (BART), Fremont, Newark, Menlo Park and Palo Alto. Dumbarton Express service is provided through a consortium of AC Transit, BART, Union City Transit and Santa Clara Valley Transportation Authority.

Fairfield-Suisun Transit

Provides local service in the cities of Fairfield and Suisun City and Cordelia Villages. Provides express service between Fairfield, Vacaville, Davis and the Pleasant Hill BART station. Service between Fairfield, Solano College, Vallejo, and the El Cerrito Del Norte BART station is provided by Vallejo Transit.

Golden Gate Transit

Golden Gate Transit provides daily bus service within Marin, Sonoma, San Francisco and Contra Costa counties.

Greyhound

Greyhound provides inter-city coach service between Bay Area cities and beyond.

Healdsburg In-City Transit

Provides fixed-route service in the city of Healdsburg. It also has connections to Sonoma County Transit for intercity trips.

Lake Transit

Provides fixed-route and demand-responsive bus service in Lake County, with connections from Route 3 to Napa Valley Transit in Calistoga (Lincoln and Napa River and Bothe-Napa State Park).

Mendocino Transit

Provides local and rural service in Mendocino County with connecting service to Santa Rosa via U.S. 101 and S.R. 1. Rural service in Mendocino County is also provided by Mendocino Stage and the California Western Railroad (the famous "Skunk").

Napa Valley Commute Club

Napa Valley Commute Club (NVCC) is a nonprofit organization that has been providing commuters with an alternative to driving to and from San Francisco for over 20 years. NVCC provides bus service into San Francisco each weekday morning and back home each afternoon. Morning stops are at three convenient locations in the City of Napa.

Petaluma Transit

Provides local service in the City of Petaluma and connections to Sonoma County Transit for intercity trips.

SamTrans

SamTrans provides service throughout San Mateo County with connecting service to San Francisco, the Transbay Terminal, and Palo Alto.

San Benito County Transit

Provides shuttle bus service between Hollister, San Juan Bautista, Salinas, and South Santa Clara County, as well as Dial-A-Ride service and Rideshare matching.

San Francisco Muni

Provides bus, streetcar, and cable car service in the City of San Francisco.

San Joaquin Regional Transit (SMART)

SMART operates local and express service in Stockton. Connections can be made to French Camp, Lathrop, Manteca, and Tracy via County Area Transit. SMART also provides interregional commuter routes serving the Bay Area.

Santa Clara VTA

Santa Clara Valley Transportation Authority (VTA) provides bus and light rail service in Santa Clara County. Jointly operates Highway 17 Express with Santa Cruz Metro.

Santa Rosa CityBus

Provides local service in the City of Santa Rosa. Connections to Sonoma County Transit and Golden Gate Transit are available at the Santa Rosa Transit Mall.

Sonoma County Transit

Provides intercity service in Sonoma County and local service in Rohnert Park, Cotati, Guerneville, Sebastopol and Windsor.

St. Helena VINE

Provides local service in the City of St. Helena and to Deer Park at St. Helena Hospital. Connections to VINE at St. Helena City Hall (northbound side) and Main at Pope Streets (southbound side) in downtown St. Helena, and to Lake Transit at St. Helena Hospital.

Tri Delta Transit

Eastern Contra Costa Transit Authority (ECCTA, Tri Delta Transit) provides local service in Shore Acres, Bay Point, Pittsburg, Antioch, Oakley and Brentwood. Connections to BART at Pittsburg/Bay Point BART station. Connection to County Connection Route 930 is at Hillcrest Park and Ride or County East Mall.

Union City Transit

Union City Transit is Union City's own bus system operating within the city limits. Routes are coordinated with BART trains, AC Transit, and the Dumbarton Express to areas outside of the City. Main transfer points are at the Union City BART station and Alvarado and Dyer.

VINE

The VINE is the Napa County region's fixed route bus service along Highway 2, operating seven days a week. VINE service is provided by the Napa County Transportation Planning Agency.

Vacaville City Coach

Provides local service in the City of Vacaville.

Vallejo Transit

Provides local service in the city of Vallejo and express service between Solano County, Vallejo, Hercules and the El Cerrito Del Norte BART station. Vallejo Transit also operates the Vallejo Baylink Ferry between San Francisco, Angel Island, and Vallejo.

VTA

Santa Clara Valley Transportation Authority (VTA) provides bus and light rail service in Santa Clara County. It jointly operates Highway 17 Express with Santa Cruz Metro.

WHEELS (LAVTA)

WHEELS is a service of the Livermore Amador Valley Transit Authority (LAVTA) and serves the communities of Dublin, Livermore, and Pleasanton. WHEELS service is centered around the Dublin/Pleasanton BART station and the Livermore Transit Center.

WestCAT

Provides service in Pinole, Hercules, and neighboring communities. Express service to El Cerrito Del Norte BART station is provided weekdays, weekends and holidays. Local fixed route service operates on weekdays, with some Saturday service.

Yolobus

Yolobus operates local and express bus service 365 days a year in Yolo County and to downtown Sacramento. Yolobus connects with UC Davis Unitrans and Citylink in Davis and with Sacramento Regional Transit District buses and Light Rail in Sacramento.

Yountville Shuttle

Provides local service in the Town of Yountville and the Veterans Home of California. Connections to VINE at Veterans Home and on Washington Street in downtown Yountville.

2.0 SHUTTLES, PARATRANSIT, AND DIAL-A-RIDE SERVICE

Brentwood Dimes-A-Ride

Dimes-A-Ride service is provided in Brentwood by Tri Delta Transit. Fares are partially subsidized by the City of Brentwood.

Broadway Shuttle

The Free Broadway Shuttle provides electric bus service along Broadway in Downtown Oakland between Kaiser Center and Jack London Square.

Calistoga Handy Van

This is the dial-a-ride service for City of Calistoga and provides countywide service for both non-ADA and ADA certified riders. Regional connections can be made to Vallejo Transit and Vallejo Baylink Ferry.

Emery Go-Round

A free shuttle connecting Emeryville's employers and shopping centers with MacArthur BART station. Service is provided on weekdays and Saturdays. The Emery Go-Round is funded by the City of Emeryville and local businesses.

Intercity Van Go

Intercity Van Go is the dial-a-ride service for Napa County, and provides countywide service for both non-ADA and ADA-certified riders. Regional connections can be made to Vallejo Transit and the Vallejo Ferry.

Marguerite Shuttle

This service connects Stanford University campus with various Palo Alto locations.

Menlo Park Midday Shuttle

The Menlo Park Midday Shuttle is a free service connecting points in Menlo Park, the Menlo Park Caltrain Station, Stanford Shopping Center, and Stanford Medical Center, and operates Monday through Friday from 10:00 a.m. to 2:30 p.m. Tuesday through Friday, the route is extended to include the Menlo Park Senior Center, the Belle Haven neighborhood, and the OICW Training Center.

Rio Vista Transit

Rio Vista Transit is a dial-a-ride service for the general public in the city of Rio Vista. Service is also provided to locations in Antioch, Fairfield, and Lodi.

VINE Go

VINE Go is the paratransit/dial-a-ride service for Napa County and provides countywide service for both non-ADA and ADA-certified riders. Regional connections can be made to Vallejo Transit and Vallejo Baylink Ferry.

West Berkeley Shuttle

West Berkeley Shuttle (formerly Berkeley Electric Shuttle Transit, or BEST) connects the Ashby BART Station with West Berkeley employment centers Monday through Friday during peak commute hour. WBS is provided by the Berkeley Gateway Transportation Management Association, the City of Berkeley, the Bayer Corporation, and Wareham Development.

WestCAT

Dial-a-Ride Transportation is available to seniors and to passengers with disabilities Monday through Saturday. General public Dial-a-ride service is available in Rodeo and Crockett weekdays, and throughout the service area on Saturdays

3.0 FERRY SERVICE

Alameda/Oakland Ferry Service

Ferry service between Alameda Main Street, Jack London Square, Oakland, San Francisco Ferry Bldg., San Francisco Pier 39 (Fisherman's Wharf), and Angel Island State Park.

Angel Island - Tiburon Ferry

Ferry service between Tiburon and Angel Island.
Service between San Francisco and locations around the Bay for both commute and pleasure trips. Blue & Gold Fleet also operates the Alameda/Oakland Ferry and the Vallejo Baylink Ferry.

Golden Gate Ferry

Golden Gate Ferry provides daily ferry service between Larkspur or Sausalito (Marin County) and San Francisco.

Harbor Bay Ferry

Ferry service from the Harbor Bay Isle Ferry Landing located at the end of Harbor Bay Parkway on Bay Farm Island (City of Alameda) to the San Francisco Ferry Building. Travel time is approximately 25 minutes.

Red and White Fleet

Since 1892, the Red and White Fleet has been providing service around the bay for both commuter and pleasure trips. Red and White Fleet Ferries operates ferry service to the U.S.S Aircraft Carrier Hornet on Alameda Point. The Richmond Ferry no longer operates.

Vallejo Baylink Ferry

The Vallejo Baylink Ferry provides service between San Francisco and Vallejo with connection service to Marine World. Baylink is operated by Vallejo Transit.

Table 3.12-2 in Section 3.12 of the Program EIR summarizes existing water transit service in San Francisco Bay. Current routes are presented in Figure in Section 2 of the Program EIR.

4.0 RAIL SERVICE

Amtrak California/Capitol Corridor

Amtrak provides intercity passenger rail throughout the country. The Capitol Corridor connects the cities of Auburn, Sacramento, Oakland and San Jose. It provides 18 daily trips between Sacramento and Bay Area stations. Amtrak California, a partnership between Amtrak and Caltrans (the State Department of Transportation), provides additional intercity rail and bus service within California.

ACE

The Altamont Commuter Express (ACE) train serves Stockton, Lathrop/Manteca, Tracy, Livermore, Pleasanton, Fremont, Santa Clara, and San Jose.

BART

The Bay Area Rapid Transit (BART) operates rail service in San Francisco and the East Bay.

Caltrain

Provides commuter rail service along the San Francisco Peninsula, with 26 stations between San Francisco and Gilroy via San Jose. Bus connection is available to Santa Cruz. Passenger service on the Peninsula corridor began in 1863 under the authority of the San Francisco and San Jose Railroad Company. Later, the Department of Transportation, Caltrans assumed responsibility for the line. In 1987 the Peninsula Corridor Joint Powers Board (JPB) was formed with SamTrans as its administrative arm. The JPB assumed operating responsibility for Caltrain in 1992.

Muni

Light rail service along five lines within the City of San Francisco.

VTA Light Rail Service

Service between South San Jose and the Great America Industrial Area of Santa Clara via the San Jose Civic Center.

APPENDIX CUL-A

Shipwreck Index and Cultural Resources Overview 1

1.0 State Lands Commission Shipwreck File 1
2.0 Cultural Resources Overview 2
3.0 References.....21

This appendix contains a shipwreck index and overview of cultural resources in the study area.

1.0 STATE LANDS COMMISSION SHIPWRECK FILE

The following is a list of shipwrecks located in the vicinity of proposed ferry sites.

Location	Longitude	Latitude	Name of Shipwreck
Oakland Wharf	-	122° 22'	Great Western
Government Island, Oakland Estuary	37° 47'	122° 15'	Golden Gate, Edwin May, Alven Besse, James Rolph Jr., Simla, Ruth, and Star of Vancouver
Oakland Wharf	37° 48'	122° 15'	Friedebergh and Herald
Point Richmond	37° 54'	122° 23'	Adele Hobson and Associated Oil #8
Antioch	38° 00'	122° 48'	Forrester
Pittsburg Landing	38° 01'	121° 51'	Leader
Pittsburg	38° 01'	121° 52'	Charles B. Kennedy, Golden Shore
Point Benicia and Martinez	38° 02'	122° 11'	Sacramento
Angel Island	37° 51'	122° 27'	New England
In SF Bay, near Angel Island	37° 51'	122° 27'	Seven Sisters and Benton
Sausalito	37° 51'	122° 28'	Service, Aloha and Caroline
San Rafael Canal	37° 58'	122° 27'	Maryland, Novato and Annie
Clay Street Wharf	37° 46'	122° 23'	Mary Ellen
Presidio Wharf	37° 48'	122° 28'	Golden Rule
Alcatraz	37° 49'	122° 25'	McPherson
Alcatraz	37° 49'	122° 27'	Fernstream
Near Alcatraz	37° 49'	122° 28'	Oliver Cutts
At Half Moon Bay	37° 29'	122° 28'	At least 10 ships located here.

For the locations listed below, refer to Figures 2-1, 2-2, and 2-3 and the discussion of the corresponding project alternatives in Section 2 of the program Environmental Impact Report (EIR). Numerical assignment in parentheses indicates the location of existing and potential new ferry terminals noted on Figures 2-1, 2-2, and 2-3.

Descriptions of known shipwrecks listed in the California State Lands Commission Database (California State Lands Commission n.d.) were examined. One shipwreck is listed in the "Carquinez Straits" (the *Uncle Abe*), and another is listed as "between Benecia and Martinez" (the *Sacramento*). The database does not clarify their locations in relation to the ferry routes or terminals examined in this EIR.

2.0 CULTURAL RESOURCES OVERVIEW

Marin County

Larkspur (1)

- **Location:** Southeast of the intersection of Highway 101 and East Sir Francis Drake Boulevard. This is an existing and functioning ferry terminal.
- **Wharves:** Steamboats and ferries have been functioning in this area since 1850 by way of Corte Madera Creek. This area was also a busy terminal on the Northwest Pacific Railroad. Although it is likely most of the older wharves associated with this use are now gone, portions of wharves or piers may still be extant from this long period of use.
- **Piers:** see Wharves.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Tiburon (2)

- **Location:** Paradise Drive and Main Street. This is an existing and functioning ferry terminal.
- **Wharves:** None recorded.
- **Piers:** Piers were established in this area for the Railroad-Ferry Depot circa 1900. Most have been destroyed, but the area may still contain remains of pier construction.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The Railroad-Ferry Depot (c. 1900) for the railroad-ferry yards and piers at Point Tiburon is the only dual-use terminal to survive west of the Hudson River. The depot is on the National Register of Historic Places. Near the ferry site on Main Street is the McNeil Building, constructed in 1886 and the first structure built on water side of the street. The McNeil building may be considered eligible for the National Register.
- **Other:** None recorded.
- **Prehistoric:** Nelson shellmound No. 41 noted in Belvedere Cove.

Sausalito (3)

- **Location:** Bridgeway at Anchor Street. This is an existing and functioning ferry terminal.
- **Wharves:** Sausalito waterfront was widely known as an anchorage and supply station for whaling vessels and military transportation. The Sausalito Land and Ferry Company built

wharves to transport ferries and people to San Francisco area in the mid-1850s, therefore the wharves and any remains of wharves may be considered historic.

- **Piers:** None recorded.
- **Shipwrecks:** Recorded in the vicinity are the shipwrecks of the *Service*, the *Aloha*, and the *Caroline*.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** A former dry dock cassion is located here but was rendered not eligible to National Register in 1987; however, the dry dock cassion may continue to act as an obstruction in the water.
- **Prehistoric:** Archaeological site at Caledonia and Pine Street, CA-Mrn-3. None recorded.

San Rafael (30)

- **Location:** Location not specifically defined.
- **Wharves:** Yacht Harbor located in San Rafael.
- **Piers:** None recorded.
- **Shipwrecks:** Recorded in the vicinity are the wrecks of the *Maryland,* the *Novaso*, and the *Annie*.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** Nelson shellmounds No. 93, 94, 91, 31, 7 identified.

Angel Island (5)

- **Location:** Ayala Cove on north side of island. This is an existing and functioning ferry terminal.
- **Wharves:** From 1863-1946, Angel Island was used as an Army base, Fort McDowell. The East Garrison station was a major induction station. A quarantine station was built in 1888 at Hospital Cove (Ayala Cove), and Angel Island became a major immigration and public health facility ("Ellis Island of the West") until 1946. During World War II approximately 87,000 troops passed through here on way to Pacific front. Prisoners of war were interned here as well. Wharves, piers, or docks may be extant from this long period of use. Angel Island became a state park in 1955.
- **Piers:** see Wharves.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The Angel Island U.S. Immigration Station is listed on the National Register and is part of the Golden Gate National Recreation Area.
- **Other:** None recorded.

- **Prehistoric:** A report notes a "steeply sloping shell midden on what may have been a natural terrace." Nelson shellmound No. 45 identified in area.

Fort Baker (8)

- **Location:** Horseshoe Bay, just east of the Golden Gate Bridge.
- **Wharves:** Fort Baker has been occupied by the military since 1850. Wharves, piers or docks may be extant from this long period of occupation.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc):** Fort Baker is now part of the Golden Gate National Recreation Area and is listed on the National Register. Many potentially historic houses are located in Fort Baker, in particular many built between 1901 and 1904.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Contra Costa County

Martinez (24)

- **Location:** In the vicinity of the Martinez Yacht Harbor at the end of Court Street.
- **Wharves:** Martinez was a center for wheat shipping until the railroad came through in 1879. It was also the southern terminus for the busy ferries that crossed Carquinez Strait from Benicia until the Benicia-Martinez bridge was opened in 1960. With this long period of use, associated wharves, piers, docks, or their remains may be present and should be considered historic.
- **Piers:** See wharves.
- **Shipwrecks:** Recorded in the vicinity is the shipwreck of the *Sacramento* and *Uncle Abe*.
- **Designations (National Register, National Register eligible, etc.):** Martinez Historic District is centered on Main and Ferry Street.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Pittsburg (26)

- **Location:** At the Pittsburg Marina/Central Harbor, accessed via Marina Boulevard.
- **Wharves:** Railroad and wharves were built in Pittsburg in the early 1860s to facilitate transportation of coal from mines to Pittsburg and New York Landing. The associated wharves, piers, or railways may be extant in area and may be considered a historic resource.

- **Piers:** None recorded.
- **Shipwrecks:** Wreck noted off of electrical transmission substation, recorded wrecks of the *Forester*, the *Charles B. Kennedy*, and the *Golden Shore*.
- **Designations (National Register, National Register eligible, etc.):** Historic District of New York Landing is listed on the National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Crockett (27)

- **Location:** Location not specifically defined.
- **Wharves:** Crockett has served as the company town of California and Hawaiian Sugar Refinery for many years. Historic wharves, piers, or docks associated with this company may still exist near the project location.
- **Piers:** See wharves
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The California and Hawaiian Sugar Refinery may be considered eligible to the National Register.
- **Other:** None recorded.
- **Prehistoric:** One report noted that Crockett was once the site of a Native American village. None recorded.

Hercules/Rodeo (28)

- **Location:** Unspecified location along San Pablo Bay.
- **Wharves:** Hercules began as the California Powder Works company town in 1881. The potent and explosive black powder produced in Hercules was first used in World War I. In 1917, after the U.S. had entered the war, the Hercules plant became the largest producer of TNT in the country. In the 1960s, the plant transitioned to the production of fertilizer. The plant was sold in 1976 and closed permanently in 1977 due to economic factors. It remained idle until 1979 when it was purchased by a group of investors. There may be historic wharves, piers, or docks associated with the California Powder Works and/or the fertilizer plant near the project location.
- **Piers:** see Wharves.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The fertilizer plant may be considered eligible to National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Point Molate (29)

- **Location:** Location not specifically defined.
- **Wharves:** Located at Point Molate was Winehaven (built in 1911), said to be the largest winery in the United States. The area is now known as the U.S. Naval Fuel Supply Depot. Wharves, piers or docks may remain that were associated with Winehaven and/or the U.S. Naval Fuel Supply Depot.
- **Piers:** None recorded.
- **Shipwrecks:** Possible shipwreck right of Point Molate pier; recorded shipwrecks of the *Adele Hobson* and the *Associated Oil #8*.
- **Designations (National Register, National Register eligible, etc.):** In 1978, Winehaven was added to the National Register (also know as Point Molate; Fuel Department; NSCO).
- **Other:** Point Molate Beach is the location of a Chinese shrimp village. Docks or associated building remnants may be located in this area. Point Molate is part of the U.S. Naval Fuel Supply Depot.
- **Prehistoric:** Three archaeological sites are recorded in the area. Nelson shellmound identified at edge of Point Molate.

Antioch (46)

- **Location:** No location specified.
- **Wharves:** Ferry service from Antioch to Sherman Island was established here by the Lauritzen brothers to transport people and later cars throughout the Delta. The ferry service thrived until in 1926 when it was replaced by the Antioch Bridge. Wharves, piers or docks may remain that were associated with the ferry service.
- **Piers:** Piers or docks associated with the ferry service may still be extant.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Richmond (4)

- **Location:** Harbor Way South/Scott Avenue. This is an existing terminal but service has been suspended.
- **Wharves:** In the early 1900s, shipyards grew along Richmond's South Shoreline, and by World War II Kaiser Richmond Shipyards was one of the biggest wartime shipbuilding operations on the West Coast. It closed in 1945, but many buildings and auxiliary structures are still located in the area. To the north of the Inner Harbor Basin is the Richmond Shipyard No. 3 on Harbor Channel. Above the Inner Harbor Basin is the Plate Shop of the Richmond Shipyard No. 2, and to the northeast of the Inner Harbor Basin is the Ship Ways of the

Richmond Shipyard No. 2. Most likely extant wharves, piers and docks are located here that are associated with the extensive shipyard history.

- **Piers:** See wharves.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Four industrial facilities, Plate Shop of Kaiser Shipyard, Prefabrication Plant of Shipyard No. 2, Kaiser Shipyard No. 3, and Ford Motor Company Assembly Plant, were determined eligible for the National Register. The Filice & Perrelli Cannery may be eligible for the National Register as well.
- **Other:** None recorded.
- **Prehistoric:** Three prehistoric sites within Inner Harbor Basin Area. The former site of Ellis Landing is located near the top of Harbor Channel. The Ellis Landing shellmound at foot of Eleventh Street was the site of one largest shellmounds in the Bay Region. Nelson shellmound site No. 295 identified here. Coles and Loud also recorded shellmounds in this area.

Solano County

Vallejo/Mare Island (25)

- **Location:** 495 Mare Island Way in Memorial Park. This is an existing and functioning ferry terminal.
- **Wharves:** Wharves and piers are associated with existing ferry service
- **Piers:** see wharves
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Buildings just north of the project site have been surveyed and determined eligible for the National Register. The ferry site is near Memorial Park. Vallejo served as the state capitol in 1852. Near the existing ferry site is the Vallejo City Hall and County Building Branch at 734 Marin, listed on the National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Benicia (40)

- **Location:** Location not specifically defined but may be at terminus of First Street or Fifth Street.
- **Wharves:** In 1847 the town of Benicia was laid out by Dr. Robert Semple, who in 1849 established a ferry that provided continuous service from Benicia and Martinez for 115 years. Benicia was an important port of entry for many years. It has the advantage of deep water at

the shore where seagoing vessels could discharge their cargoes directly on land. At the water's edge are concretions, scattered old timbers and railroad ties. A wharf existed here in mid to late 1800s.

- **Piers:** Early pier pilings are abundant in several locations in both inland and tidal settings.
- **Shipwrecks:** A shipwreck (the 1843 Boston whaler *Stamboul*) is located northwest of the Benicia Point city wharf. Used as whaler in San Francisco until 1894 and moved to Carquinez Straits Shallows, it was used as a floating work platform until 1918.
- **Designations (National Register, National Register eligible, etc.):** Numerous historic resources within the project vicinity including at the end of First Street are the Lido Tavern, two historical markers, and a railway station. On the north side of the Marina is the Benicia Antique Shop, a historical marker, the "What Not" Shop (1848), Salt Box House (c. 1850), and the Washington House (1850) (Benicia's oldest hotel building), all considered historic sites. At the end of Fifth Street St. Dominic's Church (1854) is located about two blocks northwest of the end of Fifth Street which is also considered a historic resource.
- **Other:** None recorded.
- **Prehistoric:** A report states that exposed historic archaeological deposits are evident in areas near the shoreline. These include glass, ceramic, brick, sawn bone, and wood. Much of the area has been covered in man-made fill material for decades, isolating the cultural deposits and resulting in potential for the presence of significant historic features (foundations, privies, trash deposits). The report also notes the presence of two Native American shell middens. Nelson shellmounds have been identified at end of Fifth Street (No. 238) and near Gull Point (No. 237).

Alameda County

Berkeley/Albany (7)

- **Location:** Along the Berkeley waterfront.
- **Wharves:** The Berkeley Marina is one of the largest and oldest yacht harbors in the East Bay. It was constructed in 1935 and may have wharves associated with recreational boating.
- **Piers:** None recorded. Berkeley Pier nearby.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** The park area near the Berkeley Marina was created by capping a landfill site from the 1900s. None recorded.

Oakland Army Base (32)

- **Location:** Location not specifically defined.

- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Numerous buildings and structures within the Oakland Army Base have been listed on or determined to be eligible to the National Register or the California Register of Historic Resources. Two National Register Historic Districts are located within the Oakland Army Base, the Northeast OARB district and the Northwest OARB district. Both districts were identified and determined eligible for listing on the National Register as a result of the 1990 study for the Cypress structure replacement project by Caltrans. A separate report states that the Southern Pacific Interlocking Tower (built in 1919) is considered eligible to the National Register under Criteria A.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Oakland International Airport/Oakland Coliseum (42)

- **Location:** Unspecified, along east Bay shore.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The North Field of the Oakland International Airport is a local landmark district. A World War II training center, the U.S. Army Air Corps Mechanics Training Detachment may be eligible for listing on the National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Oakland Inner Harbor (47)

- **Location:** No location specified.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** Recorded near the harbor is the shipwreck of the *James Rolph Jr*., the *Simla*, the *Ruth,* and the *Star of Vancouver*.
- **Designations (National Register, National Register eligible, etc.):** A few potentially historic buildings are located along the Lake Merritt Channel, including a few early warehouse structures and Western Pacific Railroad trestles. Lake Merritt Channel Park is located along Lake Merritt Channel.

- **Other:** None recorded.
- **Prehistoric:** None recorded.

Alameda Point (13)

- **Location:** Seaplane Lagoon.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** Possible historic shipwrecks. Also possible that disabled aircraft associated with the operations of Alameda Naval Air Station (NAS) have been ditched within the project area.
- **Designations (National Register, National Register eligible, etc.):** This location is part of Alameda NAS.
- **Other:** Extensively dredged in the 1930s and 1940s for the naval facility. Historic resources are limited to potential submarine features associated with the heavy shipping traffic around the Oakland Harbors and possibly crashed aircraft.
- **Prehistoric:** Low probability of prehistoric resources because of extensive dredging. None recorded.

Alameda/Harbor Bay Isle (14)

- **Location:** Harbor Bay, Parkway and McCartney Rd. This is an existing and functioning ferry location.
- **Wharves:** New construction in project area.
- **Piers:** New construction in project area.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Portions of Harbor Bay Isle/Bay Farm Island were farmed until the 1930s; however, the island has been extensively altered for new residential development. The ferry site is constructed on recent fill.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Alameda-Main Street (15)

- **Location:** Main Street along Oakland estuary.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.

- **Designations (National Register, National Register eligible, etc.):** This location is part of Alameda NAS.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Jack London Square (16)

- **Location:** Foot of Clay Street, two blocks west of Broadway. This is an existing and functioning ferry terminal.
- **Wharves:** All of the development in this area is of recent construction.
- **Piers:** None recorded.
- **Shipwrecks:** Recorded near the wharf are the shipwrecks of the *Great Western*, the *Golden Gate*, the *Besse*, the *Edwin May*, and the *Alven.*
- **Designations (National Register, National Register eligible, etc.):** U.S.S. Potomac, which is on the National Register, sits near the edge of the site. Also on the National Register is the Pacific Gas and Electric (PG&E) Building at 1625 Clay Street. A potentially eligible historic structure is the PG&E substation located at 689 Second Street. Located at 552-592 Second Street is the Oakland Iron Works-United Works and the Remillard Brick Company, which is listed on the National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

San Leandro Marina (17)

- **Location:** Unspecified, but likely at San Leandro Marina.
- **Wharves:** The San Leandro Marina prospered during the 1890s with the oyster industry. Seed oysters were brought around the Horn and implanted in the San Leandro oyster beds. The industry diminished after 1911 because of pollution of San Francisco Bay. Remnants of this industry may still be present in the project area.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded. Nelson shellmounds Nos. 324 and 325 identified north of the Marina.

San Mateo County

San Francisco International Airport (18)

- **Location:** Unspecified location.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** The *Port Costa* was recorded off of South San Francisco; however, potential for additional shipwrecks is high due to the level of maritime activity.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** Aircraft remains may be located in project area due to proximity of airport.
- **Prehistoric:** None recorded.

Oyster Point (19)

- **Location:** End of Oyster Point Boulevard in Oyster Point Marina/Park.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Half Moon Bay (43)

- **Location:** Location unspecified.
- **Wharves:** Although Half Moon Bay has been home to whalers, dairymen and farmers, the location is unspecified, so no cultural resources have been recorded. However, cultural resources association with these industries should be anticipated.
- **Piers:** None recorded.
- **Shipwrecks:** Ten shipwrecks recorded in the vicinity.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** One report states that caches of historic artifacts, trash or privy pits, architectural or foundation remnants may remain. Possible that subsurface resources may exist and/or may be obscured by recent cultural or natural factors.
- **Prehistoric:** None recorded.

Redwood City (21)

- **Location:** Unspecified, Redwood Creek along Harbor Boulevard.
- **Wharves:** A natural shipping point was established where the slough emptied into the Bay. Lumber became an important industry at this locale. Although no resources have been recorded, due to the shipping history, wharves, piers, or docks may exist in this area.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Santa Clara County

Moffett Field (22)

- **Location:** Unspecified, along south Bay shore.
- **Wharves:** None recorded.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Moffett Field is a National Register Historic District under the name U.S. Naval Air Station Sunnyvale, California, Historic District. Near this district is potential to encounter further historic archaeological deposits associated with Old Whelan Farm or other farm structures.
- To the east of Moffett Field is a site in the Bay water that has been designated a San Francisco Bay National Wildlife Refuge.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Coyote Point (35)

- **Location:** Location unspecified.
- **Wharves:** During the latter half of the 19th and first half of the 20th centuries, the western side of the point was home to a series of commercial and recreational piers and wharves. In 1868, a wharf for the Wisnom Lumber Company was constructed on the northwestern side of Coyote Point. By the 1930s, the eastern side of the point was used as a popular small craft anchorage, and the County of San Mateo responded by building a small marina here in the 1940s. During World War II, Coyote Point served as a U.S. Merchant Marine Cadet School. Due to the long period of activity in this area, wharves, piers or docks may be associated with the project area.

- **Piers:** see Wharves.
- **Shipwrecks:** An old Scow wreck of the *Daisy Gadsby*, built in 1911, was placed near the marina to create an artificial breakwater. World War II concrete barges from Richmond Shipyards were moved here and are currently used as fuel docks and offices.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** In 1922 this site became home to the Pacific City Amusement Park, the "Coney Island of the West," which closed the following year due to bankruptcy.
- **Prehistoric:** Evidence of an isolated burial. Many Nelson shellmounds identified in vicinity. Shellmounds documented by Hamilton are also identified in the vicinity including sites C-788, C-787 and C-786.

Foster City (36)

- **Location:** Location unspecified
- **Wharves:** Brewer's Island, upon which Foster City was eventually established, was originally developed for dairy purposes in the early 1900s by Frank M. Brewer. In the late 1950s, the land was owned by the Leslie Salt Company and the Schilling Estate. At this time, the planned community of Foster City was established. It was an engineering challenge to create Foster City from the marshlands of Brewer's Island, but by 1964 the first home was built in Foster City. Therefore, no wharves, piers or docks are considered historic resources, however, the land and environs have had a long period of use.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

East Palo Alto (37)

- **Location:** Location unspecified
- **Wharves**: Ravenswood (later changed to East Palo Alto) Point was unique along the Peninsula in that it offered a dry land port accessible from deep water. A long wharf was built, and the town of Ravenswood began to grow on an economy driven by shipping. In 1863, Lester Cooley purchased the wharf and renamed it Cooley's Landing. Although nothing remains of the wharf, nonvisible underwater portions may be extant.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.

- **Prehistoric:** None recorded.

San Francisco County

Mission Bay (12)

- **Location:** Unspecified, adjacent to the Mission Bay Redevelopment Area.
- **Wharves**: In the 1880s and 1890s, lumber and hay were the predominant cargo brought into Channel Street, which formed the northern boundary of Mission Bay. Steamboat Point had a shipyard and later boatbuilders who constructed steam schooners, square-rigged sailing vessels, and yachts. The boatbuilders eventually moved south as the hay and lumber business boomed. Waterlots were sold and some owners drove 80-foot pilings to create fences on the property. Others sank wooden vessels to become "improvements intended as fill" and validate their ownership claims. Piers and bulkheads reached out to enclose the waterlots, which were filled with log cribbing to hold rocks, sand, and dirt. Pile drivers operated day and night as piers spread into the bay. Millions of cubic yards of fill extended the waterfront farther east. By 1867, a causeway had enclosed two-thirds of Mission Bay. With this extensive period of use and fill, associated wharves, piers, pilings, docks, or their remains may be present and should be considered historic.
- **Piers:** See wharves
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** Del Monte Fruit built the China Basin cannery warehouse in 1925 with railroad spur tracks to unload banana boats that came into the channel directly into railroad freight cars. This area is now under redevelopment by University of California, San Francisco.
- **Prehistoric:** None recorded.

China Basin/Pac Bell Park (11)

- **Location:** South of Pac Bell Park on the Mission Street Channel.
- **Wharves:** The history of the site is similar to Mission Bay; however, much of the area has been altered due to the addition of the new ballpark. With the extensive period of use and fill, associated wharves, piers, pilings, docks, or their remains may be present and should be considered historic.
- **Piers:** see Wharves
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** The China Basin cannery warehouse was built in 1925 by Del Monte Fruit with railroad spur tracks to unload banana boats that docked into the channel and loaded directly into railroad freight cars. This area is now under redevelopment by University of California San Francisco.

- **Prehistoric:** None recorded.

Presidio (10)

- **Location:** Location unspecified.
- **Wharves:** The Presidio has been in military control under the Spanish, Mexican, and U.S. armies for over 200 years. Today, the Presidio is part of the National Park Service. Many historic wharves or piers may be present in this area due to the extensive period of use.
- **Piers:** None recorded.
- **Shipwrecks:** Recorded in the vicinity is the shipwreck of the *Golden Rule*.
- **Designations (National Register, National Register eligible, etc.):** The Presidio is a National Historic Landmark and part of the Golden Gate National Recreation Area.
- **Other:** None recorded.
- **Prehistoric:** An archaeological site of an 1858 dump and a 20th century residential dump near a small pier was noted, along with many other archaeology sites. None recorded.

San Francisco Pier 41/43 (9)

- **Location:** The Embarcadero at the foot of Powell Street. This is an existing and functioning ferry terminal.
- **Wharves:** This area has been an integral part of shipping for the San Francisco area for many decades. Therefore, wharves, piers or docks may be present in the area due to the long period of use.
- **Piers:** Permanently docked on Pier 41 East is the *Balclutha* (Star of Alaska) ship.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The *Balclutha* is on the National Register of Historic Places.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Treasure Island (6)

- **Location:** Unspecified location.
- **Wharves:** Treasure Island is a man-made island constructed in 1939-1940 for the Golden Gate International Exposition. It was later taken over by the U.S. Navy. Wharves, piers, docks, or their remains may still be extant from naval use.
- **Piers:** see Wharves.
- **Shipwrecks:** None recorded.

- **Designations (National Register, National Register eligible, etc.):** Building 3, the aircraft hangar, is potentially eligible to the National Register based on its association with the Golden Gate International Exposition. The building was used as the Palace of Fine and Decorative Arts during the Exposition. Treasure Island is a former Naval Reservation.
- **Other:** None recorded.
- **Prehistoric:** Low probability of prehistoric remains due to dredging for construction of island in the 1930s; however, there are prehistoric sites on adjacent Yerba Buena island. None recorded.

San Francisco Ferry Building (20)

- **Location:** On the Embarcadero at the foot of Market Street. This is an existing and functioning ferry terminal.
- **Wharves:** The Ferry Building has an extensive history of transporting people to and from various areas in the Bay Area. A report states there is no evidence of Gold Rush wharves, buried hulks or trash deposits under or adjacent to the footprint of the Ferry Building. The report does state that possible trash and disassociated artifacts may have been lost or discarded off the far ends of the historic wharves during the Gold Rush or City Building Period, but these would be disassociated materials of limited scientific value. The project area could contain remains of wharves, piers, or docks.
- **Piers:** See Wharves.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** The Ferry Building, built in 1896-1903, is on the National Register of Historic Places. The Ferry Station Post Office Building (also known as the Agricultural Building) is also on the National Register of Historic Places. The Ferry Building rests on the east side of the New Seawall, which may be eligible for nomination to the National Register.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Fort Mason (31)

- **Location:** Location unspecified.
- **Wharves:** Starting in 1797 and lasting through the Spanish and Mexican period, Fort Mason was one of two sites in the Bay that was armed for defense of the harbor. It also served as an important element in the first submarine mining of the Bay, in the Spanish-American War. From the Spanish-American War to the Korean Conflict, Fort Mason's role was the headquarters of the San Francisco Port of Embarkation, which concentrated the various branches of supply operations serving the garrisons of new U.S. possessions in the Pacific. Due to the significant and changing military history, wharves, piers or docks may be extant or underwater, but should be considered historic resources.

- **Piers:** The last Liberty ship from World War II, the *Jeremiah O'Brien*, is moored at one of the Fort Mason Piers.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** Fort Mason Historic District is listed on the National Register. The Old Parade Route and MacArthur Avenue contribute to the listing on the National Register. Fort Mason is the headquarters for the Golden Gate National Recreation Area.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Hunters Point (33)

- **Location:** Unspecified, at Hunters Point Shipyard.
- **Wharves:** The function of shipbuilding and repair had dominated the development of Hunters Point from the 1860s until 1945 when the Navy used the site while preparing to enter into World War II. Most of the flat land was created by cut-and-fill work undertaken by the Navy during World War II. Approximately half of the buildings were constructed during this period as well.
- **Piers:** None recorded.
- **Shipwrecks:** Decaying ships were beached in the shallows off the north side of Hunters Point. In 1930s it was noted that five historic ships sat rotting in the cove west of the point, but Navy filling during World War II may have destroyed these ships. They should be taken into consideration as potential historic resources.
- **Designations (National Register, National Register eligible, etc.):** Hunters Point Commercial Dry Docks Historic District comprises eight buildings and wharves in the area. A 1988 report concluded that three properties meet the criteria for National Register Listing: Dry Dock No. 1, treated as archaeologically sensitive area and potentially contributing element to the historic district, Drydock No. 4; and Building 253, Ordnance and Optical Building. Hunters Point is also a U.S. Naval Reservation.
- **Other:** None recorded.
- **Prehistoric:** A report states that four potentially archaeological sensitive zones including possible prehistoric shellmounds, early settlement and commercial development, industrial resources, Chinese shrimp camps, maritime resources, and 20th century landfills are present in the area. None recorded.

Candlestick Point (34)

- **Location:** Location not specifically defined.
- **Wharves:** None recorded.
- **Piers:** A report states that the Thomas Avenue Pier was located in the area as well as the Carroll Avenue Pier. The Empire Lead Mill Company Pier appears to have been razed or

buried during the 1940s, but remains of the pier may still exist below ground surface. Remains of piers and or wharves may be located in this area and, if found, would be considered a historic resource.

- **Shipwrecks:** Wrecks noted on U.S. Geological Survey map. A report states that the burnt hull of a wooden sailing vessel is exposed in Bay mud and is reasonably well preserved. A different report states that maritime resources in the form of sunken or abandoned late 19th or early 20th century vessels may be found deeply buried below South Basin and Visitation Cove fill. These would consist of Chinese junks, scow schooners, barges, and other small vessels.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** The "powder houses" associated with the Carroll Avenue Pier may exist below several feet of fill.
- **Prehistoric:** None recorded. Two Nelson shellmounds, Nos. 7 and 8, identified in area.

Alcatraz Island (38)

- **Location:** Northeast side of island. This is an existing and functioning ferry terminal.
- **Wharves:** Alcatraz has an extensive history, beginning as a military compound from 1850-1933. From 1934-1963, it was a federal prison and then occupied by Native Americans from 1969 to 1971. Alcatraz is currently a national park. Due to the extensive history, extant or remains of wharves, piers or docks may be considered historic resources.
- **Piers:** None recorded.
- **Shipwrecks:** Recorded in vicinity is the shipwreck of the *Fernstream,* the *McPherson*, and the *Oliver Cutts*.
- **Designations (National Register, National Register eligible, etc.):** Alcatraz is listed on the National Register and is part of the Golden Gate National Recreation Area.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Sonoma County

Gnoss Field (44)

- **Location:** Northeast of Novato along the Petaluma River.
- **Wharves:** This area was used for shipping from the Mexican Period onward. Specifically, the area became an important source of grain, which was then exported to San Francisco. About a mile from the site is the former Donahue's Landing, which provided a successful ferry operation to San Francisco for over a decade staring in 1872. There may be historic resources associated with manufacturing on the site including hide tanning, tallow, and winery operations during 1847-1900. Due to the shipping and manufacturing history, there may be extant or remains of wharves, docks or piers, which may be considered historic.

- **Piers:** see Wharves
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded.

Port Sonoma (45)

- **Location:** Port Sonoma Marina, along the Petaluma River.
- **Wharves:** Ferries once traveled up the Petaluma River regularly but due to the siltation problem at the marina, the ferry line was eliminated. There may be wharves, piers, or docks associated with the project area.
- **Piers:** None recorded.
- **Shipwrecks:** None recorded.
- **Designations (National Register, National Register eligible, etc.):** None recorded.
- **Other:** None recorded.
- **Prehistoric:** None recorded. Numerous Nelson shellmounds identified at Petaluma Point.

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APPENDIX LU-A

Appendix LU-A: Agencies Contacted

Location	First Name	Last Name	JobTitle	Company	Address1	City	State	Postal Code
Vallejo	Brian	Dolan	Planning Manager	Vallejo City Hall	555 Santa Clara Street, Second Floor	Vallejo	CA	94590
9th Street	Leslie	Gould	Director	Oakland Planning and Zoning	250 Frank Ogawa Plaza #2114	Oakland	CA	94612
Alameda Point	Cynthia	Eliason	Planning Manager	Alameda Planning and Building Department	2263 Santa Clara Ave, Rm 190	Alameda	CA	94501
Alameda	Cynthia	Eliason	Planning Manager	Alameda Planning and Building Department	2263 Santa Clara Ave, Rm 190	Alameda	CA	94501
Antioch	Joseph	Brandt	Director	Antioch Community Development Department	PO Box 5007	Antioch	CA	94531-5007
Benicia	Karen	Majors	Interim Director/ Assistant City manager	Benicia Planning Department	City Hall 250 East L Street	Benicia	CA	94510
Berkeley/Albany	Andrew	Thomas	Planner	Berkeley Planning and Development Department	2118 Milvia Street, Suite 300	Berkeley	CA	94704
Candlestick	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Coyote Point	Ron	Munekawa	Chief of Planning	City of San Mateo	330 West 20th Avenue	San Mateo	CA	94403
Crockett	Catherine	Kutsuris	Deputy Director of Current Planning	Contra Costa County, Community Development Agency	651 Pine Street, 4th Floor, North Wing	Martinez	CA	94553
East Palo Alto	Lori	Reese-Brown	Senior Planner	East Palo Alto Community Development Department, Planning Division	2200 University Avenue	East Palo Alto	CA	94303
Ferry Building (SF)	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Foster City	Richard	Marks	Director	Foster City Community Development Department	610 Foster City Blvd.	Foster City	CA	94404
Gnoss Field/Port Sonoma (Sonoma County)	Pete	Parkinson	AICP, Planning Manager	Sonoma County Permit & Resource Management Department	2550 Ventura Avenue	Santa Rosa	CA	95442
Half Moon Bay	Kenneth	Curtis	Planning Director	Half Moon Bay Planning Department	501 Main Street	Half Moon Bay	CA	94019
Harbor Bay Isle (Alameda)	Cynthia	Eliason	Planning Manager	Alameda Planning and Building Department	2263 Santa Clara Ave, Rm 190	Alameda	CA	94501

Appendix LU-A: Agencies Contacted

Location	First Name	Last Name	JobTitle	Company	Address1	City	State	Postal Code
Hunter's Point	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Jack London Square	Leslie	Gould	Director	Oakland Planning and Zoning	250 Frank Ogawa Plaza #2114	Oakland	CA	94612
Larkspur	Jan	Vasquez	Director	Larkspur Planning Department	400 Magnolia Avenue	Larkspur	CA	94939
Mare Island	Brian	Dolan	Planning Manager	Vallejo City Hall	555 Santa Clara Street, Second Floor	Vallejo	CA	94590
Martinez	Dina	Tasini	Deputy Director	Martinez Community Development Department	525 Henrietta Street	Martinez	CA	94553
Mission Bay	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Oakland Army Base	Leslie	Gould	Director	Oakland Planning and Zoning	250 Frank Ogawa Plaza #2114	Oakland	CA	94612
Oyster Point	Marty	Van Duyn	Director	South San Francisco Planning Division	PO Box 711	South San Francisco	CA	94083
PacBell Park/China Basin	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Pier 41-43	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Pittsburg	Randy	Jerome	Acting Director of Planning and Building	Pittsburg Community Development Department	65 Civic Ave.	Pittsburg	CA	94565
Point Molate (Richmond)	Martin	Jacobson	Planning Director	Richmond Planning Department	City Hall, 2nd Floor 2600 Barrett Ave	Richmond	CA	94804
Redwood City	Michael	Church	Planning Manager	Redwood City Planning and Redevelopment Agency	PO Box 391	Redwood City	CA	94063-0391
Richmond	Martin	Jacobson	Planning Director	Richmond Planning Department	City Hall, 2nd Floor 2600 Barrett Ave	Richmond	CA	94804
Rodeo	Catherine	Kutsuris	Deputy Director of Current Planning	Contra Costa County, Community Development Agency	651 Pine Street, 4th Floor, North Wing	Martinez	CA	94553
San Leandro Marina	Steve	Emslie	Director	San Leandro Planning Division	835 East 14th Street	San Leandro	CA	94577
San Rafael	Robert	Brown	Director	San Rafael Community	PO Box 151560	San Rafael	CA	94915-

Appendix LU-A: Agencies Contacted

Location	First Name	Last Name	JobTitle	Company	Address1	City	State	Postal Code
				Development Department				1560
Sausalito	Charlotte	Flynn	Director	Sausalito Community Development Department	420 Litho Street	Sausalito	CA	94965
SFO	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Tiburon	Scott	Anderson	Director	Tiburon Planning and Building Department	1505 Tiburon Blvd. Town Hall	Tiburon	CA	94920
Treasure Island	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
Alameda County	Adolph	Martinelli	Director	Alameda County Community Development Agency	224 W. Winton Ave., Rm 11C	Hayward	CA	94544
Contra Costa County	Catherine	Kutsuris	Deputy Director of Current Planning	Contra Costa County, Community Development Agency	651 Pine Street, 4th Floor, North Wing	Martinez	CA	94553
Marin County	Brian C.	Crawford	Deputy Director of Planning Services	Marin County Community Development Agency, Planning Division	3501 Civic Center Drive, Rm 308	San Rafael	CA	94903
Napa County	Jeffrey R.	Redding	Director	Napa County Conservation Development and Planning Department	1195 Third Street, Room 210	Napa	CA	94559
San Francisco	Gerald R.	Green	Director	San Francisco Planning Department	1660 Mission Street	San Francisco	CA	94103
San Mateo County	Terry	Burnes	Planning Administrator	San Mateo County Environmental Services Agency, Planning and Building Division	590 Hamilton Street, 2nd Floor	Redwood City	CA	94063
Santa Clara County	Michael M.	Lopez	Land Development Coordinator	Santa Clara County Department of Planning and Development	70 West Hedding Street, 7th Floor, East Wing	San Jose	CA	95110
Sonoma County	Pete	Parkinson	AICP, Planning Manager	Sonoma County Permit & Resource Management Department	2550 Ventura Avenue	Santa Rosa	CA	95442

Emissions 1

1.0 Introduction 1

Tables

Existing Water Transit System (Null Alternative)

Alternative 1 - Aggressive Water Transit System

Alternative 2 - Robust Water Transit System

"Reduced" Alternative 2 Peak Ferry Times and Distances

"Reduced" Alternative 2 Non-Peak Ferry Times and Distances

Alternative 3 - Enhanced (Existing) Water Transit System

Summary of Marine Emissions for the No Project and Alternative 1 Project Scenarios Assuming EPA Tier 2 Emissions Standards for Diesel Engines

Summary of Marine Emissions for the No Project and Alternative 1 Project Scenarios Assuming Diesel Engines with SCR

Summary of Marine Emissions for the No Project and Alternative 2 Project Scenarios Assuming EPA Tier 2 Emissions Standards for Diesel Engines

Summary of Marine Emissions for the No Project and Alternative 2 Project Scenarios Assuming Diesel Engines with SCR

Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming EPA Tier 2 Emissions Standards for Diesel Engines

Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming Diesel Engines with SCR

Summary of Marine Emissions for the No Project and Alternative 3 Project Scenarios Assuming EPA Tier 2 Emissions Standards for Diesel Engines

Summary of Marine Emissions for the No Project and Alternative 3 Project Scenarios Assuming Diesel Engines with SCR

1.0 INTRODUCTION

This appendix includes six tables summarizing the ferry service route information for each alternative, followed by eight tables summarizing the emissions on a per-route basis for the project alternatives and mitigated emissions.

Existing Water Transit System (Null Alternative)

Corridor	Route	Vessel Type	Speed (Knots)	Headways Weekdays	Vessels	*Per Trip* Sailing Time	*Per Trip* Idle Time	*Per Day- Minutes* Sailing Time	*Per Day- Minutes* Idle Time	*In Minutes* Deadhead Time	Weekday Trips	Weekday Service Hrs	Weekend Service Hrs	Annualized Service Hrs	Pk Hour Seats	Annual Patronage
Transbay	Vallejo - SF	300	35	60	2	53.8	6.2	1184	136	10	22	22	22	8,030	300	736,000
	Oakland - Alameda - SF	350	25	60-120	2	24.0	6.0	624	156	30	26	13	10	4,430	500	496,000
	Harbor Bay - SF	250	25	60	1	25.2	4.8	302	58	15	12	6	0	1,560	250	114,000
	Subtotal Transbay Corridor				*5*							*41*	*32*	*14,020*	*1,050*	*1,346,000*
Golden Gate	Sausalito-San Francisco	590	15	60	1	26.4	3.6	528	72	15	20	14	10	4,690	400	454,000
	Tiburon-San Francisco	400	25	60	1	20.4	9.6	265	125	15	13	7	0	1,820	400	125,000
	Larkspur-San Francisco	400	35	15	5	31.8	13.2	1334	556	5	42	50	10	14,050	1,400	1,400,000
	Subtotal Golden Gate Corridor				*7*							*71*	*20*	*20,560*	*2,200*	*1,979,000*
GGNRA Service	Alcatraz	400	15	30	1	20.0	10.0	640	320	15	32	10	10	1,850	N/A	2,720,000
															Subtotals	
	TOTAL SYSTEM				**12**			**4,878**	**1,422**	**105**	**167**	**112**	**52**	**34,580**	**3,250**	**3,325,000**

DATE: June 20 2002
alternative null

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Alternative 1 - Aggressive Water Transit System

Corridor	Route	Vessel Type	Speed (Knots)	Headways Weekdays	Vessels	Per Trip Sailing Time	Per Trip Idle Time	Weekdays: Per Day- Minutes Sailing Time	Weekdays: Per Day- Minutes Idle Time	Weekdays: In Minutes Deadhead Time	Weekday Trips	Weekday Service Hrs	Weekends: Per Day- Minutes Sailing Time	Weekends: Per Day- Minutes Idle Time	Weekends: In Minutes Deadhead Time	Weekend Trips	Weekend Service Hrs	Annualized Service Hrs	Pk Hour Seats	Patronage Estimates: Initial MTC Model Runs	Patronage Estimates: Non MTC Estimates
Transbay	Vallejo - SF	350+	35	15	8	53.8	6.2	6459	741	40	120	128	3229	371	20	60	65	40,105	1,500	5,440	
	Benicia/Martinez - SF	350+	35	30	4	57.2	2.8	3435	165	60	60	60	1717	83	30	30	30	18,750	750	1,600	
	Antioch - SF	350+	35	30/60	6	80.7	9.3	3227	373	30	40	60	0	0	0	0	0	15,600	750	12	
	Pittsburg - SF	350+	35	30/60	5	75.4	14.6	3016	584	25	40	60	0	0	0	0	0	15,600	750	360	
	Hercules/Rodeo - SF	350+	35	30	4	43.6	16.4	2617	983	60	60	60	1309	491	30	30	30	18,750	750	1,570	
	Richmond-San Francisco	149	25	15	6	33.0	12.0	3960	1440	90	120	90	1980	720	45	60	45	28,125	600	1,860	
	Berkeley-SF	149	25	15	4	20.4	9.6	2448	1152	60	120	60	2448	1152	60	120	60	21,900	600	3,400	
	Alameda Point-Mission Bay-SF	149	25	15	4	28.8	1.2	3456	144	60	120	60	3456	144	60	120	60	21,900	600	2,600	
	Oakland Army Base -SF	149	25	15	2	14.4	0.6	1728	72	30	120	30	0	0	0	0	0	7,800	600	10	
	Oakland - SF	149	25	15	4	24.0	6.0	2880	720	60	120	60	2880	720	60	120	60	21,900	600	2,700	
	Harbor Bay - SF	149	25	15	4	25.2	4.8	3024	576	60	120	60	1512	288	30	60	30	18,750	600	1,030	
	Harbor Bay - Hunters Point	149	25	30	2	18.0	12.0	1080	720	30	60	30	540	360	15	30	15	9,375	300	1,030	
	San Leandro to San Francisco	149	35	15	6	39.6	5.4	4752	648	90	120	90	2376	324	45	60	45	28,125	600	300	
	East Bay (Harbor Bay) to So. San Francisco	149	25	15	6	30.0	15.0	3600	1800	90	120	90	1800	900	45	60	45	28,125	600	1,700	
	East Bay (San Leandro) to Coyote Point	149	25	15	4	25.2	4.8	3024	576	60	120	60	1512	288	30	60	30	18,750	600	170	
	East Bay (San Leandro) to Foster City	149	25	15	4	25.2	4.8	3024	576	60	120	60	1512	288	30	60	30	18,750	600	900	
	East Bay (San Leandro) to Redwood City	149	25	15	6	40.8	4.2	4896	504	90	120	90	2448	252	45	60	45	28,125	600	300	
	East Bay (San Leandro) to East Palo Alto	Hover	40	15	4	31.5	13.5	3780	1620	60	120	90	1890	810	30	60	45	28,125	500	900	
	East Bay (San Leandro) to Moffett Field	Hover	40	15	6	37.5	7.5	4500	900	90	120	90	2250	450	45	60	45	28,125	500	50	
	Subtotal Transbay Corridor				*89*							*1328*					*680*	*416,680*	*12,400*	*25,932*	
Golden Gate	Sausalito-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	1224	576	30	60	30	10,950	300	6,100	
	Tiburon-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	1224	576	30	60	30	10,950	300	2,600	
	Larkspur-San Francisco	350+	35	15	6	31.8	13.2	3812	1588	30	120	90	1906	794	15	60	45	28,125	1,500	14,000	
	Port Sonoma-San Francisco	350+	35	15	8	43.6	16.4	5235	1965	120	120	120	2617	983	60	60	60	37,500	750	2,230	
	Subtotal Golden Gate Corridor				*18*							*270*					*165*	*87,525*	*2,850*	*24,930*	
Peninsula	South San Francisco to San Fran	149	25	15	4	30.0	0.0	3600	0	60	120	60	1800	0	30	60	30	18,750	600	2,290	
	Coyote Point to San Francisco	149	35	30	4	40.2	19.8	2412	1188	60	60	60	1206	594	30	30	30	18,750	300	300	
	Foster City to San Francisco	149	35	30	4	36.9	23.1	2211	1389	60	60	60	1106	694	30	30	30	18,750	300	870	
	Redwood City to San Francisco	149	35	30	4	48.8	11.2	2926	674	60	60	60	1463	337	30	30	30	18,750	300	1,170	
	East Palo Alto to San Francisco	Hover	40	30	4	40.5	19.5	2430	1170	60	60	60	1215	585	30	30	30	18,750	250	2,800	
	Moffett Field to San Francisco	Hover	40	30	4	48.0	12.0	2880	720	60	60	60	1440	360	30	30	30	18,750	250	2,000	
	Subtotal Peninsula Corridor				*24*							*360*					*180*	*112,500*	*2,000*	*9,430*	
Treasure Island	Berkeley to Treasure Island	149	25	15	4	15.6	14.4	1872	1728	60	120	60	1872	1728	60	120	60	21,900	600		3,000
	Oakland to Treasure Island	149	25	15	4	21.6	8.4	2592	1008	60	120	60	2592	1008	60	120	60	21,900	600		2,000
	San Francisco to Treasure Island	149	25	15	2	13.2	1.8	1584	216	30	120	30	1584	216	30	120	30	10,950	600		5,000
	Subtotal Treasure Island Service				*10*							*150*					*150*	*54,750*	*1,800*		*10,000*
Airport Access	OAK Airport - SF	Hover	40	15	4	25.5	4.5	3060	540	60	120	60	3060	540	60	120	60	32,850	N/A		2,500
	OAK Airport - San Fran Airport	Hover	40	15	4	24.0	6.0	2880	720	60	120	60	2880	720	60	120	60	38,325	N/A		1,500
	SFO to San Francisco	Hover	40	15	4	27.0	3.0	3240	360	60	120	60	3240	360	60	120	60	32,850	N/A		4,000
	SFO to Moffett Field	Hover	40	15	6	34.5	10.5	4140	1260	30	120	90	4140	1260	30	120	90	43,800	N/A		1,500
	Subtotal Airport Access				*18*							*270*					*270*	*147,825*	N/A		*9,500*
GGNRA Service	GGNRA Circle Line/East Bay Svc	149	25	60	0	55.0	5.0	880	80	0	16	16	880	80	0	16	16	2,960	N/A		2,500
	Alcatraz	200	25	60	1	8.4	6.6	134	106	15	16	10	134	106	15	16	10	1,850	N/A		7,500
	Subtotal GGNRA Service				*1*							*26*					*26*	*4,810*	N/A		*10,000*
																			Subtotal	60,292	29,500
	TOTAL SYSTEM				**160**			**113,243**	**30,157**	**2,090**	**3,592**	**2,404**	**68,443**	**19,157**	**1,310**	**2,372**	**1,471**	**824,090**	**19,050**	**89,792**	

Alternative 2 - Robust Water Transit System

Corridor	Route	Vessel Type	Speed (Knots)	Headways Weekdays	Vessels	Weekdays: Per Trip Sailing Time	Weekdays: Per Trip Idle Time	Weekdays: Per Day- Minutes Sailing Time	Weekdays: Per Day- Minutes Idle Time	Weekdays: In Minutes Deadhead Time	Weekday Trips	Weekday Service Hrs	Weekends: Per Day- Minutes Sailing Time	Weekends: Per Day- Minutes Idle Time	Weekends: In Minutes Deadhead Time	Weekend Trips	Weekend Service Hrs	Annualized Service Hrs	Pk Hour Seats	Patronage Estimates: Initial MTC Model Runs	Patronage Estimates: Non MTC Estimates
Transbay	Vallejo - SF	350+	35	15	8	53.8	6.2	6459	741	40	120	128	3229	371	20	60	65	40,105	1,500	5,440	
	Benicia/Martinez - SF	350+	35	30	4	57.2	2.8	3435	165	60	60	60	1717	83	30	30	30	18,750	750	1,600	
	Antioch - SF	350+	35	30/60	6	80.7	9.3	3227	373	30	40	50	0	0	0	0	0	13,000	750	12	
	Hercules/Rodeo - SF	350+	35	30	4	43.6	16.4	2617	983	60	60	60	1309	491	30	30	30	18,750	750	1,570	
	Richmond-San Francisco	149	25	15	6	33.0	12.0	3960	1440	90	120	90	1980	720	45	60	45	28,125	600	1,860	
	Berkeley-SF	149	25	15	4	20.4	9.6	2448	1152	60	120	60	2448	1152	60	120	60	21,900	600	3,400	
	Alameda Point-Mission Bay-SF	149	25	15	4	28.8	1.2	3456	144	60	120	60	3456	144	60	120	60	21,900	600	2,600	
	Oakland - SF	149	25	15	4	24.0	6.0	2880	720	60	120	60	2880	720	60	120	60	21,900	600	2,700	
	Harbor Bay - SF	149	25	15	4	25.2	4.8	3024	576	60	120	60	1512	288	30	60	30	18,750	600	1,030	
	San Leandro to San Francisco	149	35	15	6	39.6	5.4	4752	648	90	120	90	2376	324	45	60	45	28,125	600	300	
	East Bay (Harbor Bay) to So. San Francisco	149	25	15	6	30.0	15.0	3600	1800	90	120	90	1800	900	45	60	45	28,125	600	1,030	
	East Bay (San Leandro) to Redwood City	149	25	15	6	40.8	4.2	4896	504	90	120	90	2448	252	45	60	45	28,125	600	300	
	East Bay (San Leandro) to Moffett Field	Hover	40	15	6	37.5	7.5	4500	900	90	120	90	2250	450	45	60	45	28,125	500	50	
	Subtotal Transbay Corridor				*68*							*988*					*560*	*315,680*	*9,050*	*21,892*	
Golden Gate	Sausalito-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	1224	576	30	60	30	10,950	300	6,100	
	Tiburon-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	1224	576	30	60	30	10,950	300	2,600	
	Larkspur-San Francisco	350+	35	15	6	31.8	13.2	3812	1588	30	120	90	1906	794	15	60	45	28,125	1,500	14,000	
	Port Sonoma-San Francisco	350+	35	30/60	4	43.6	16.4	1745	655	60	40	40	0	0	0	0	0	10,400	750	1,660	
	Subtotal Golden Gate Corridor				*14*							*190*					*105*	*60,425*	*2,850*	*24,360*	
Peninsula	South San Francisco to San Fran	149	25	15	4	30.0	0.0	3600	0	60	120	60	0	0	0	0	0	15,600	600	2,290	
	Redwood City to San Francisco	149	35	30	4	48.8	11.2	2926	674	60	60	60	0	0	0	0	0	15,600	300	1,170	
	Moffett Field to San Francisco	Hover	40	30	4	48.0	12.0	2880	720	60	60	60	0	0	0	0	0	15,600	250	2,000	
	Subtotal Peninsula Corridor				*12*							*180*					*0*	*46,800*	*1,150*	*5,460*	
Treasure Island	Berkeley to Treasure Island	149	25	15	4	15.6	14.4	1872	1728	60	120	60	1872	1728	60	120	60	21,900	600		3,000
	Oakland to Treasure Island	149	25	15	4	21.6	8.4	2592	1008	60	120	60	2592	1008	60	120	60	21,900	600		2,000
	San Francisco to Treasure Island	149	25	15	2	13.2	1.8	1584	216	30	120	30	1584	216	30	120	30	10,950	600		5,000
	Subtotal Treasure Island Service				*10*							*150*					*150*	*54,750*	*1,800*		*10,000*
Airport Access	OAK Airport - SF	Hover	40	15	4	25.5	4.5	3060	540	60	120	60	3060	540	60	120	60	32,850	N/A		2,500
	OAK Airport - San Fran Airport	Hover	40	15	4	24.0	6.0	2880	720	60	120	60	2880	720	60	120	60	38,325	N/A		1,500
	SFO to San Francisco	Hover	40	15	4	27.0	3.0	3240	360	60	120	60	3240	360	60	120	60	32,850	N/A		4,000
	SFO to Moffett Field	Hover	40	15	6	34.5	10.5	4140	1260	30	120	90	4140	1260	30	120	90	43,800	N/A		1,500
	Subtotal Airport Access				*18*							*270*					*270*	*147,825*	N/A		*9,500*
GGNRA Service	GGNRA Circle Line/East Bay Svc	149	25	60	0	55.0	5.0	880	80	0	16	16	880	80	0	16	16	2,960	N/A		2,500
	Alcatraz	200	25	60	1	8.4	6.6	134	106	15	16	10	134	106	15	16	10	1,850	N/A		7,500
	Subtotal GGNRA Service				*1*							*26*					*26*	*4,810*	N/A		*10,000*
																			Subtotal	51,712	29,500
	TOTAL SYSTEM				**123**			**87,048**	**20,952**	**1,585**	**2,752**	**1,804**	**52,142**	**13,858**	**965**	**1,892**	**1,111**	**630,290**	**14,850**	**81,212**	

DATE: April 4 2002
alternative 2~rev

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"Reduced" Alternative 2 Peak Ferry Times and Distances

Ferry	Freqency (min)	Travel Time (min)	Distance (miles)	AveSpd (mph)	Idle Time (min)	Number of Runs/Period	Total Run Time/ Period (min)	Total Idle Time/ Period (min)	Total Distance/ Period (miles)		Per-Route Diesel w/SCR Emissions NO_x (lb/day)	SO_2(lb/day)	PM(lb/day)	CO(lb/day)	VOC(lb/day)	Per-Route Diesel EPA Tier 2 NO_x (lb/day)	SO_2(lb/day)	PM(lb/day)	CO(lb/day)	VOC(lb/day)
90_ALAMBSF	15	28.8	7.52	18.1	1.2	24.0	691	29	180		25.5	11.2	0.8	13.8	6.9	244.0	8.4	14.5	13.8	12.9
90_ALAMBSF-	15	28.8	7.52	18.1	1.2	24.0	691	29	180		25.5	11.2	0.8	13.8	6.9	244.0	8.4	14.5	13.8	12.9
Deadhead							60				2.2	1.0	0.1	1.2	0.6	21.2	0.7	1.3	1.2	1.1
90_HBFB	30	25.2	9.87	20.4	4.8	12.0	302	58	118		11.2	4.9	0.3	6.2	3.0	106.8	3.7	6.4	6.2	5.6
90_HBFB-	30	25.2	9.87	20.4	4.8	12.0	302	58	118		11.2	4.9	0.3	6.2	3.0	106.8	3.7	6.4	6.2	5.6
Deadhead							60				2.2	1.0	0.1	1.2	0.6	21.2	0.7	1.3	1.2	1.1
90_OAKFB	15	24.0	7.11	14.5	6.0	24.0	576	144	171		21.3	9.4	0.6	11.9	5.8	203.6	7.0	12.1	11.9	10.8
90_OAKFB	15	24.0	7.11	14.5	6.0	24.0	576	144	171		21.3	9.4	0.6	11.9	5.8	203.6	7.0	12.1	11.9	10.8
Deadhead							60				2.2	1.0	0.1	1.2	0.6	21.2	0.7	1.3	1.2	1.1
92_SSLTO	30	20.4	7.66	15.3	9.6	12.0	245	115	92		9.1	4.0	0.3	5.3	2.5	86.6	3.0	5.2	5.3	4.6
92_SSLTO-	30	20.4	7.66	15.3	9.6	12.0	245	115	92		9.1	4.0	0.3	5.3	2.5	86.6	3.0	5.2	5.3	4.6
Deadhead							30				1.1	0.5	0.0	0.6	0.3	10.6	0.4	0.6	0.6	0.6
93_TIBFB	30	20.4	6.90	19.0	9.6	12.0	245	115	83		9.1	4.0	0.3	5.3	2.5	86.6	3.0	5.2	5.3	4.6
93_TIBFB-	30	20.4	6.90	19.0	9.6	12.0	245	115	83		9.1	4.0	0.3	5.3	2.5	86.6	3.0	5.2	5.3	4.6
Deadhead							30				1.1	0.5	0.0	0.6	0.3	10.6	0.4	0.6	0.6	0.6
95_BERSFMBA	15	20.4	9.05	17.4	9.6	24.0	490	230	217		18.1	8.0	0.5	10.5	4.9	173.2	6.0	10.3	10.5	9.2
95_BERSFMBA-	15	20.4	9.05	17.4	9.6	24.0	490	230	217		18.1	8.0	0.5	10.5	4.9	173.2	6.0	10.3	10.5	9.2
Deadhead							60				2.2	1.0	0.1	1.2	0.6	21.2	0.7	1.3	1.2	1.1
95_RMDFB	15	33.0	9.00	25.0	12.0	24.0	792	288	216		29.3	12.9	0.9	16.7	8.0	280.1	9.6	16.7	16.7	14.8
95_RMDFB-	15	33.0	9.00	25.0	12.0	24.0	792	288	216		29.3	12.9	0.9	16.7	8.0	280.1	9.6	16.7	16.7	14.8
Deadhead							90				3.3	1.5	0.1	1.8	0.9	31.8	1.1	1.9	1.8	1.7
91_LARKN	15	43.6	12.74	16.0	13.2	24.0	1046	317	306	B	103.0	45.3	3.1	56.3	27.9	983.8	33.9	58.6	56.3	51.9
91_LARKS	15	43.6	12.74	19.1	13.2	24.0	1046	317	306	B	103.0	45.3	3.1	56.3	27.9	983.8	33.9	58.6	56.3	51.9
Deadhead							30				3.0	1.3	0.1	1.6	0.8	28.2	1.0	1.7	1.6	1.5
94_MZBFB	30	57.2	35.67	27.0	2.8	12.0	686	34	428	B	67.5	29.7	2.0	36.3	18.2	645.0	22.2	38.5	36.3	34.0
94_MZBFB-	30	57.2	35.67	27.0	2.8	12.0	686	34	428	B	67.5	29.7	2.0	36.3	18.2	645.0	22.2	38.5	36.3	34.0
Deadhead							60				5.9	2.6	0.2	3.2	1.6	56.4	1.9	3.4	3.2	3.0
94_VALFB	15	53.8	26.55	29.0	6.2	24.0	1291	149	637	B	127.0	55.9	3.8	68.6	34.3	1213.5	41.8	72.3	68.6	63.9
94_VALFB-	15	53.8	26.55	29.0	6.2	24.0	1291	149	637	B	127.0	55.9	3.8	68.6	34.3	1213.5	41.8	72.3	68.6	63.9
Deadhead							40				3.9	1.7	0.1	2.1	1.1	37.6	1.3	2.2	2.1	2.0
95_HERSF	30	43.6	19.57	26.0	16.4	12.0	523	197	235	B	51.5	22.7	1.5	28.3	13.9	492.0	16.9	29.3	28.3	26.0
95_HERSF-	30	43.6	19.57	26.0	16.4	12.0	523	197	235	B	51.5	22.7	1.5	28.3	13.9	492.0	16.9	29.3	28.3	26.0
Deadhead							60				5.9	2.6	0.2	3.2	1.6	56.4	1.9	3.4	3.2	3.0
96_PITSF	30	80.7	34.10	26.0	9.3	12.0	968	112	409	B	95.3	41.9	2.9	51.5	25.7	910.1	31.3	54.3	51.5	47.9
96_PITSF-	30	80.7	34.10	26.0	9.3	12.0	968	112	409	B	95.3	41.9	2.9	51.5	25.7	910.1	31.3	54.3	51.5	47.9
Deadhead							30				3.0	1.3	0.1	1.6	0.8	28.2	1.0	1.7	1.6	1.5
Small ferry total min.							**7072**	**1958**		Peak sum	1172	516	35	640	317	11195	385	667	640	590
Small ferry total hrs.							**117.9**	**32.6**	**Hours**	Off-peak sum	1493	657	45	819	404	14264	491	850	819	753
Large ferry total min.							**9251**	**1615**		TOTAL:	2665	1172	80	1459	721	25459	876	1518	1459	1343

"Reduced" Alternative 2 Non-Peak Ferry Times and Distances

Ferry	Freqency (min)	Travel Time (min)	Distance (miles)	AveSpd (mph)	Idle Time (min)	Number of Runs/Period	Total Run Time/ Period (min)	Total Idle Time/ Period (min)	Total Distance/ Period (miles)		Per-Route Diesel w/SCR Emissions NO_x (lb/day)	SO_2(lb/day)	PM(lb/day)	CO(lb/day)	VOC(lb/day)	Per-Route Diesel EPA Tier 2 NO_x (lb/day)	SO_2(lb/day)	PM(lb/day)	CO(lb/day)	VOC(lb/day)	Per-Route Diesel w/SCR Emissions NO_x (lb/day)	SO_2(lb/day)	PM(lb/day)	CO(lb/day)	VOC(lb/day)
90_ALAMBSF	15	28.8	7.52	18.1	1.2	36.0	1037	43	271		38.3	16.9	1.1	20.7	10.3	366.0	12.6	21.8	20.7	19.3	82.7	0.0	0.0	17.3	4.1
90_ALAMBSF-	15	28.8	7.52	18.1	1.2	36.0	1037	43	271		38.3	16.9	1.1	20.7	10.3	366.0	12.6	21.8	20.7	19.3	82.7	0.0	0.0	17.3	4.1
90_HBFB	15	25.2	9.87	20.4	4.8	36.0	907	173	355		33.5	14.8	1.0	18.6	9.1	320.5	11.0	19.1	18.6	16.9	72.4	0.0	0.0	15.6	3.6
90_HBFB-	15	25.2	9.87	20.4	4.8	36.0	907	173	355		33.5	14.8	1.0	18.6	9.1	320.5	11.0	19.1	18.6	16.9	72.4	0.0	0.0	15.6	3.6
90_OAKFW	15	24.0	8.80	11.7	6.0	36.0	864	216	317		32.0	14.1	1.0	17.9	8.7	305.3	10.5	18.2	17.9	16.1	69.0	0.0	0.0	15.0	3.5
90_OAKFW	15	24.0	8.80	11.7	6.0	36.0	864	216	317		32.0	14.1	1.0	17.9	8.7	305.3	10.5	18.2	17.9	16.1	69.0	0.0	0.0	15.0	3.5
92_SSLTO	30	20.4	7.66	15.3	9.6	18.0	367	173	138		13.6	6.0	0.4	7.9	3.7	129.9	4.5	7.7	7.9	6.9	29.3	0.0	0.0	6.6	1.5
92_SSLTO-	30	20.4	7.66	15.3	9.6	18.0	367	173	138		13.6	6.0	0.4	7.9	3.7	129.9	4.5	7.7	7.9	6.9	29.3	0.0	0.0	6.6	1.5
93_TIBFW	30	20.4	5.47	9.4	9.6	18.0	367	173	98		13.6	6.0	0.4	7.9	3.7	129.9	4.5	7.7	7.9	6.9	29.3	0.0	0.0	6.6	1.5
93_TIBFW-	30	20.4	5.47	9.4	9.6	18.0	367	173	98		13.6	6.0	0.4	7.9	3.7	129.9	4.5	7.7	7.9	6.9	29.3	0.0	0.0	6.6	1.5
95_BERSFMBA	15	20.4	9.05	17.4	9.6	36.0	734	346	326		27.2	11.9	0.8	15.8	7.4	259.9	8.9	15.5	15.8	13.8	58.7	0.0	0.0	13.2	3.0
95_BERSFMBA-	15	20.4	9.05	17.4	9.6	36.0	734	346	326		27.2	11.9	0.8	15.8	7.4	259.9	8.9	15.5	15.8	13.8	58.7	0.0	0.0	13.2	3.0
95_RMDFB	15	33.0	9.00	25.0	12.0	36.0	1188	432	324		44.0	19.3	1.3	25.0	12.0	420.1	14.4	25.0	25.0	22.3	94.9	0.0	0.0	21.0	4.8
95_RMDFB-	15	33.0	9.00	25.0	12.0	36.0	1188	432	324		44.0	19.3	1.3	25.0	12.0	420.1	14.4	25.0	25.0	22.3	94.9	0.0	0.0	21.0	4.8
91_LARKN	15	43.6	12.74	16.0	13.2	36.0	1570	475	459	B	154.5	68.0	4.6	84.4	41.8	1475.8	50.8	88.0	84.4	77.8	333.3	0.0	0.0	70.8	16.7
91_LARKS	15	43.6	12.74	19.1	13.2	36.0	1570	475	459	B	154.5	68.0	4.6	84.4	41.8	1475.8	50.8	88.0	84.4	77.8	333.3	0.0	0.0	70.8	16.7
94_MZBFB	60	57.2	35.67	27.0	2.8	9.0	515	25	321	B	50.6	22.3	1.5	27.2	13.7	483.7	16.7	28.8	27.2	25.5	109.3	0.0	0.0	22.8	5.5
94_MZBFB-	60	57.2	35.67	27.0	2.8	9.0	515	25	321	B	50.6	22.3	1.5	27.2	13.7	483.7	16.7	28.8	27.2	25.5	109.3	0.0	0.0	22.8	5.5
94_VALFB	15	53.8	26.55	29.0	6.2	36.0	1937	223	956	B	190.5	83.9	5.7	102.9	51.5	1820.2	62.7	108.5	102.9	95.9	411.1	0.0	0.0	86.3	20.6
94_VALFB-	15	53.8	26.55	29.0	6.2	36.0	1937	223	956	B	190.5	83.9	5.7	102.9	51.5	1820.2	62.7	108.5	102.9	95.9	411.1	0.0	0.0	86.3	20.6
95_HERSF	30	43.6	19.57	26.0	16.4	18.0	785	295	352	B	77.2	34.0	2.3	42.4	20.9	738.0	25.4	44.0	42.4	38.9	166.7	0.0	0.0	35.6	8.4
95_HERSF-	30	43.6	19.57	26.0	16.4	18.0	785	295	352	B	77.2	34.0	2.3	42.4	20.9	738.0	25.4	44.0	42.4	38.9	166.7	0.0	0.0	35.6	8.4
96_PITSF	60	80.7	34.10	26.0	9.3	9.0	726	84	307	B	71.4	31.5	2.1	38.6	19.3	682.6	23.5	40.7	38.6	36.0	154.2	0.0	0.0	32.4	7.7
96_PITSF-	60	80.7	34.10	26.0	9.3	9.0	726	84	307	B	71.4	31.5	2.1	38.6	19.3	682.6	23.5	40.7	38.6	36.0	154.2	0.0	0.0	32.4	7.7
											1492.9	656.9	44.8	818.6	404.1	14264.0	491.0	850.2	818.6	752.6	3221.6	0.0	0.0	686.1	161.5
Small ferry total min.							**10930**	**3110**																	
Small ferry total hrs.							**182.2**	**51.8**	**Hours**																
Large ferry total min.							**11065**	**2205**																	
Large ferry total hrs.							**184.4**	**36.8**	**Hours**																

Alternative 3 - Enhanced (Existing) Water Transit System

Corridor	Route	Vessel Type	Speed (Knots)	Headways Weekdays	Vessels	Per Trip Sailing Time	Per Trip Idle Time	Weekdays: Per Day- Minutes Sailing Time	Weekdays: Per Day- Minutes Idle Time	Weekdays: In Minutes Deadhead Time	Weekday Trips	Weekday Service Hrs	Weekends: Per Day- Minutes Sailing Time	Weekends: Per Day- Minutes Idle Time	Weekends: In Minutes Deadhead Time	Weekend Trips	Weekend Service Hrs	Annualized Service Hrs	Pk Hour Seats	Patronage Estimates: Initial MTC Model Runs	Patronage Estimates: Non MTC Estimates
Transbay	Vallejo - SF	350+	35	15	8	53.8	6.2	6459	741	40	120	128	3229	371	20	60	65	40,105	1,500	6,500	
	Alameda Point-Mission Bay-SF	149	25	15	4	28.8	1.2	3456	144	60	120	60	3456	144	60	120	60	21,900	600	2,600	
	Oakland - SF	149	25	15	4	24.0	6.0	2880	720	60	120	60	2880	720	60	120	60	21,900	600	2,700	
	Harbor Bay - SF	149	25	15	4	25.2	4.8	3024	576	60	120	60	1512	288	30	60	30	18,750	600	1,030	
	Subtotal Transbay Corridor				*20*							*308*					*215*	*102,655*	*3,300*	*12,830*	
Golden Gate	Sausalito-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	612	288	15	30	15	9,375	300	6,100	
	Tiburon-San Francisco	149	25	30	2	20.4	9.6	1224	576	30	60	30	612	288	15	30	15	9,375	300	2,600	
	Larkspur-San Francisco	350+	35	15	6	31.8	13.2	3812	1588	30	120	90	1906	794	15	60	45	28,125	1,500	14,000	
	Subtotal Golden Gate Corridor				*10*							*150*					*75*	*46,875*	*2,100*	*22,700*	
GGNRA Service	Alcatraz	200	25	60	1	8.4	6.6	134	106	15	16	10	134	106	15	16	10	1,850	N/A		7,500
	Subtotal GGNRA Service				*1*							*10*					*10*	*1,850*	N/A		*7,500*
																			Subtotals	35,530	7,500
	TOTAL SYSTEM				**31**			**22,213**	**5,027**	**325**	**736**	**468**	**14,342**	**2,998**	**230**	**496**	**300**	**151,380**	**5,400**	**43,030**	

DATE: 09-Apr-02
alternative 3~rev

DRAFT - FOR DISCUSSION ONLY

Summary of Marine Emissions for the No Project and Alternative 1 Project Scenarios
Assuming EPA Tier 2 Emissions Standards for Diesel Engines

	Year 2025 No Project	Year 2025 Alternative 1		
Large Ferry Power Rating (kW)	--	5369.1	2 engines	
Small Ferry Power Rating (kW)	--	1946.3	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		309.3266667		
Total Transit Hours (hr/day) -small ferry	52.2	441.6		
Large Ferry Total Power Usage (kW-hr)		1110171.3		
Small Ferry Total Power Usage (kW-hr)	128582	595227.8		
Total Idle Hours (hr/day) - Large ferry		71.3		
Total Idle Hours (hr/day) - Small ferry	9.4	116.2		
NOx Emissions (lb/day)	2021	26811		
SO2 Emissions (lb/day)	70	923		
PM Emissions (lb/day)	120	1598		
CO Emissions (lb/day)	115	1543		
VOC Emissions (lb/day)	107	1415		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		392.8		
Total Operating Hours (hr/day) - Small Ferry	35.4	644.1		
Large Ferry Total Power Usage (kW-hr)		1409720.7		
Small Ferry Total Power Usage (kW-hr)	87345	868235.4		
Total Idle Hours (hr/day) large		98		
Total Idle Hours (hr/day)- small	6.8	177.1		
NOx Emissions (lb/day)	1373	35816		
SO2 Emissions (lb/day)	47	1233		
PM Emissions (lb/day)	82	2135		
CO Emissions (lb/day)	78	2066		
VOC Emissions (lb/day)	72	1891		
				Increase in Emissions from Future Baseline (lb/day)
Total Daily Emissions				
NOx Emissions (lb/day)	3394	62627		**59233**
SO2 Emissions (lb/day)	117	2156		**2039**
PM Emissions (lb/day)	202	3733		**3531**
CO Emissions (lb/day)	194	3609		**3415**
VOC Emissions (lb/day)	179	3306		**3127**

Summary of Marine Emissions for the No Project and Alternative 1 Project Scenarios Assuming Diesel Engines with SCR

	Year 2025 No Project	Year 2025 Alternative 1		
Large Ferry Power Rating (kW)	--	5369.1	2 engines	
Small Ferry Power Rating (kW)	--	1946.3	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		309.3266667		
Total Transit Hours (hr/day) -small ferry	52.2	441.6		
Large Ferry Total Power Usage (kW-hr)		1110171.3		
Small Ferry Total Power Usage (kW-hr)	128582	595227.8		
Total Idle Hours (hr/day) - Large ferry		71.3		
Total Idle Hours (hr/day) - Small ferry	9.4	116.2		
NOx Emissions (lb/day)	2021	2806		
SO2 Emissions (lb/day)	70	1235		
PM Emissions (lb/day)	120	84		
CO Emissions (lb/day)	115	1543		
VOC Emissions (lb/day)	107	760		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		392.8		
Total Operating Hours (hr/day) - Small Ferry	35.4	644.1		
Large Ferry Total Power Usage (kW-hr)		1409720.7		
Small Ferry Total Power Usage (kW-hr)	87345	868235.4		
Total Idle Hours (hr/day) large		98		
Total Idle Hours (hr/day)- small	6.8	177.1		
NOx Emissions (lb/day)	1373	3749		
SO2 Emissions (lb/day)	47	1649		
PM Emissions (lb/day)	82	112		
CO Emissions (lb/day)	78	2066		
VOC Emissions (lb/day)	72	1015		
				Increase in Emissions from Future Baseline (lb/day)
Total Daily Emissions				
NOx Emissions (lb/day)	3394	6555		**3161**
SO2 Emissions (lb/day)	117	2884		**2767**
PM Emissions (lb/day)	202	197		**-6**
CO Emissions (lb/day)	194	3609		**3415**
VOC Emissions (lb/day)	179	1775		**1596**

Summary of Marine Emissions for the No Project and Alternative 2 Project Scenarios
Assuming EPA Tier 2 Emissions Standards for Diesel Engines

	Year 2025 No Project	Year 2025 Alternative 2		
Large Ferry Power Rating (kW)	--	5705.0	2 engines	
Small Ferry Power Rating (kW)	--	1638.0	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		296.4266667		
Total Transit Hours (hr/day) -small ferry	52.2	316.2		
Large Ferry Total Power Usage (kW-hr)		1063873.3		
Small Ferry Total Power Usage (kW-hr)	128582	426225.6		
Total Idle Hours (hr/day) - Large ferry		58.7		
Total Idle Hours (hr/day) - Small ferry	9.4	80.0		
NOx Emissions (lb/day)	2021	23423		
SO2 Emissions (lb/day)	70	806		
PM Emissions (lb/day)	120	1396		
CO Emissions (lb/day)	115	1343		
VOC Emissions (lb/day)	107	1236		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		375.7		
Total Operating Hours (hr/day) - Small Ferr	35.5	464.3		
Large Ferry Total Power Usage (kW-hr)		1348348.9		
Small Ferry Total Power Usage (kW-hr)	87550	625852.5		
Total Idle Hours (hr/day) large		79		
Total Idle Hours (hr/day)- small	6.9	122.9		
NOx Emissions (lb/day)	1376	31035		
SO2 Emissions (lb/day)	47	1068		
PM Emissions (lb/day)	82	1850		
CO Emissions (lb/day)	79	1783		
VOC Emissions (lb/day)	73	1638		
Total Daily Emissions				**Increase in Emissions from Future Baseline (lb/day)**
NOx Emissions (lb/day)	3397	54459		**51062**
SO2 Emissions (lb/day)	117	1875		**1758**
PM Emissions (lb/day)	202	3246		**3044**
CO Emissions (lb/day)	194	3126		**2932**
VOC Emissions (lb/day)	179	2873		**2694**

Summary of Marine Emissions for the No Project and Alternative 2 Project Scenarios Assuming Diesel Engines with SCR

	Year 2025 No Project	Year 2025 Alternative 2		
Large Ferry Power Rating (kW)	--	5705.0	2 engines	
Small Ferry Power Rating (kW)	--	1638.0	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		296.4266667		
Total Transit Hours (hr/day) -small ferry	52.2	316.2		
Large Ferry Total Power Usage (kW-hr)		1063873.3		
Small Ferry Total Power Usage (kW-hr)	128582	426225.6		
Total Idle Hours (hr/day) - Large ferry		58.7		
Total Idle Hours (hr/day) - Small ferry	9.4	80.0		
NOx Emissions (lb/day)	2021	2452		
SO2 Emissions (lb/day)	70	1079		
PM Emissions (lb/day)	120	74		
CO Emissions (lb/day)	115	1343		
VOC Emissions (lb/day)	107	663		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		375.7		
Total Operating Hours (hr/day) - Small Ferr	35.5	464.3		
Large Ferry Total Power Usage (kW-hr)		1348348.9		
Small Ferry Total Power Usage (kW-hr)	87550	625852.5		
Total Idle Hours (hr/day) large		79		
Total Idle Hours (hr/day)- small	6.9	122.9		
NOx Emissions (lb/day)	1376	3248		
SO2 Emissions (lb/day)	47	1429		
PM Emissions (lb/day)	82	97		
CO Emissions (lb/day)	79	1783		
VOC Emissions (lb/day)	73	879		
Total Daily Emissions				**Increase in Emissions from Future Baseline (lb/day)**
NOx Emissions (lb/day)	3397	5700		**2303**
SO2 Emissions (lb/day)	117	2508		**2391**
PM Emissions (lb/day)	202	171		**-32**
CO Emissions (lb/day)	194	3126		**2932**
VOC Emissions (lb/day)	179	1543		**1364**

Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios
Assuming EPA Tier 2 Emissions Standards for Diesel Engines

	Year 2025 No Project	Year 2025 Alternative 2		
Large Ferry Power Rating (kW)	--	5705.0	2 engines	
Small Ferry Power Rating (kW)	--	1638.0	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		154.1866667		
Total Transit Hours (hr/day) -small ferry	52.2	117.9		
Large Ferry Total Power Usage (kW-hr)		553374.9		
Small Ferry Total Power Usage (kW-hr)	128582	158865.8		
Total Idle Hours (hr/day) - Large ferry		26.9		
Total Idle Hours (hr/day) - Small ferry	9.4	32.6		
NOx Emissions (lb/day)	2021	11195		
SO2 Emissions (lb/day)	70	385		
PM Emissions (lb/day)	120	667		
CO Emissions (lb/day)	115	640		
VOC Emissions (lb/day)	107	590		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		184.4		
Total Operating Hours (hr/day) - Small Ferr	35.5	182.2		
Large Ferry Total Power Usage (kW-hr)		661846.3		
Small Ferry Total Power Usage (kW-hr)	87550	245537.0		
Total Idle Hours (hr/day) large		37		
Total Idle Hours (hr/day)- small	6.9	51.8		
NOx Emissions (lb/day)	1376	14264		
SO2 Emissions (lb/day)	47	491		
PM Emissions (lb/day)	82	850		
CO Emissions (lb/day)	79	819		
VOC Emissions (lb/day)	73	753		
Total Daily Emissions				**Increase in Emissions from Future Baseline (lb/day)**
NOx Emissions (lb/day)	3397	25459		**22062**
SO2 Emissions (lb/day)	117	876		**759**
PM Emissions (lb/day)	202	1518		**1315**
CO Emissions (lb/day)	194	1459		**1265**
VOC Emissions (lb/day)	179	1343		**1164**

Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming Diesel Engines with SCR

	Year 2025 No Project	Year 2025 Alternative 2		
Large Ferry Power Rating (kW)	--	5705.0	2 engines	
Small Ferry Power Rating (kW)	--	1638.0	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		154.1866667		
Total Transit Hours (hr/day) -small ferry	52.2	117.9		
Large Ferry Total Power Usage (kW-hr)		553374.9		
Small Ferry Total Power Usage (kW-hr)	128582	158865.8		
Total Idle Hours (hr/day) - Large ferry		26.9		
Total Idle Hours (hr/day) - Small ferry	9.4	32.6		
NOx Emissions (lb/day)	2021	1172		
SO2 Emissions (lb/day)	70	516		
PM Emissions (lb/day)	120	35		
CO Emissions (lb/day)	115	640		
VOC Emissions (lb/day)	107	317		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		184.4		
Total Operating Hours (hr/day) - Small Ferr	35.5	182.2		
Large Ferry Total Power Usage (kW-hr)		661846.3		
Small Ferry Total Power Usage (kW-hr)	87550	245537.0		
Total Idle Hours (hr/day) large		37		
Total Idle Hours (hr/day)- small	6.9	51.8		
NOx Emissions (lb/day)	1376	1493		
SO2 Emissions (lb/day)	47	657		
PM Emissions (lb/day)	82	45		
CO Emissions (lb/day)	79	819		
VOC Emissions (lb/day)	73	404		
Total Daily Emissions				**Increase in Emissions from Future Baseline (lb/day)**
NOx Emissions (lb/day)	3397	2665		**-732**
SO2 Emissions (lb/day)	117	1172		**1056**
PM Emissions (lb/day)	202	80		**-123**
CO Emissions (lb/day)	194	1459		**1265**
VOC Emissions (lb/day)	179	721		**542**

Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming Diesel Engines with SCR

	Year 2025 No Project	Year 2025 Alternative 2		
Large Ferry Power Rating (kW)	--	5705.0	2 engines	
Small Ferry Power Rating (kW)	--	1638.0	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		154.1866667		
Total Transit Hours (hr/day) -small ferry	52.2	117.9		
Large Ferry Total Power Usage (kW-hr)		553374.9		
Small Ferry Total Power Usage (kW-hr)	128582	158865.8		
Total Idle Hours (hr/day) - Large ferry		26.9		
Total Idle Hours (hr/day) - Small ferry	9.4	32.6		
NOx Emissions (lb/day)	2021	1172		
SO2 Emissions (lb/day)	70	516		
PM Emissions (lb/day)	120	35		
CO Emissions (lb/day)	115	640		
VOC Emissions (lb/day)	107	317		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		184.4		
Total Operating Hours (hr/day) - Small Ferr	35.5	182.2		
Large Ferry Total Power Usage (kW-hr)		661846.3		
Small Ferry Total Power Usage (kW-hr)	87550	245537.0		
Total Idle Hours (hr/day) large		37		
Total Idle Hours (hr/day)- small	6.9	51.8		
NOx Emissions (lb/day)	1376	1493		
SO2 Emissions (lb/day)	47	657		
PM Emissions (lb/day)	82	45		
CO Emissions (lb/day)	79	819		
VOC Emissions (lb/day)	73	404		
Total Daily Emissions				**Increase in Emissions from Future Baseline (lb/day)**
NOx Emissions (lb/day)	3397	2665		**-732**
SO2 Emissions (lb/day)	117	1172		**1056**
PM Emissions (lb/day)	202	80		**-123**
CO Emissions (lb/day)	194	1459		**1265**
VOC Emissions (lb/day)	179	721		**542**

Summary of Marine Emissions for the No Project and Alternative 3 Project Scenarios
Assuming EPA Tier 2 Emissions Standards for Diesel Engines

	Year 2025 No Project	Year 2025 Alternative 3		
Large Ferry Power Rating (kW)	--	5369.1	2 engines	
Small Ferry Power Rating (kW)	--	1946.3	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		79.08666667		
Total Transit Hours (hr/day) -small ferry	52.2	74.2		
Large Ferry Total Power Usage (kW-hr)		283841.5		
Small Ferry Total Power Usage (kW-hr)	128582	100029.1		
Total Idle Hours (hr/day) - Large ferry		15.5		
Total Idle Hours (hr/day) - Small ferry	9.4	15.5		
NOx Emissions (lb/day)	2021	6034		
SO2 Emissions (lb/day)	70	208		
PM Emissions (lb/day)	120	360		
CO Emissions (lb/day)	115	345		
VOC Emissions (lb/day)	107	318		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		116.9		
Total Operating Hours (hr/day) - Small Ferry	35.4	104.9		
Large Ferry Total Power Usage (kW-hr)		419481.5		
Small Ferry Total Power Usage (kW-hr)	87345	141450.7		
Total Idle Hours (hr/day) large		23		
Total Idle Hours (hr/day)- small	6.8	23.3		
NOx Emissions (lb/day)	1373	8817		
SO2 Emissions (lb/day)	47	304		
PM Emissions (lb/day)	82	526		
CO Emissions (lb/day)	78	504		
VOC Emissions (lb/day)	72	465		
				Increase in Emissions from Future Baseline (lb/day)
Total Daily Emissions				
NOx Emissions (lb/day)	3394	14850		**11457**
SO2 Emissions (lb/day)	117	511		**394**
PM Emissions (lb/day)	202	885		**683**
CO Emissions (lb/day)	194	849		**656**
VOC Emissions (lb/day)	179	783		**604**

Summary of Marine Emissions for the No Project and Alternative 3 Project Scenarios Assuming Diesel Engines with SCR

	Year 2025 No Project	Year 2025 Alternative 3		
Large Ferry Power Rating (kW)	--	5369.1	2 engines	
Small Ferry Power Rating (kW)	--	1946.3	2 engines	
Existing Ferry Average Power Rating (kW)	2464.5			
Peak Hours				
Total Transit Hours (hr/day) -large ferry		79.08666667		
Total Transit Hours (hr/day) -small ferry	52.2	74.2		
Large Ferry Total Power Usage (kW-hr)		283841.5		
Small Ferry Total Power Usage (kW-hr)	128582	100029.1		
Total Idle Hours (hr/day) - Large ferry		15.5		
Total Idle Hours (hr/day) - Small ferry	9.4	15.5		
NOx Emissions (lb/day)	2021	631		
SO2 Emissions (lb/day)	70	278		
PM Emissions (lb/day)	120	19		
CO Emissions (lb/day)	115	345		
VOC Emissions (lb/day)	107	171		
Off Peak Hours				
Total Operating Hours (hr/day) - Large Ferry		116.9		
Total Operating Hours (hr/day) - Small Ferry	35.4	104.9		
Large Ferry Total Power Usage (kW-hr)		419481.5		
Small Ferry Total Power Usage (kW-hr)	87345	141450.7		
Total Idle Hours (hr/day) large		23		
Total Idle Hours (hr/day)- small	6.8	23.3		
NOx Emissions (lb/day)	1373	923		
SO2 Emissions (lb/day)	47	406		
PM Emissions (lb/day)	82	28		
CO Emissions (lb/day)	78	504		
VOC Emissions (lb/day)	72	250		
				Increase in Emissions from Future Baseline (lb/day)
Total Daily Emissions				
NOx Emissions (lb/day)	3394	1554		**-1839**
SO2 Emissions (lb/day)	117	684		**567**
PM Emissions (lb/day)	202	47		**-156**
CO Emissions (lb/day)	194	849		**656**
VOC Emissions (lb/day)	179	421		**242**

APPENDIX AIR-B

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ALAMEDA COUNTY
Roberta Cooper
Scott Haggerty
(Chairperson)
Nate Miley
Shelia Young

CONTRA COSTA COUNTY
Mark DeSaulnier
Mark Ross
Gayle Uilkema
(Secretary)

MARIN COUNTY
Harold C. Brown, Jr.

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
Willie Brown, Jr.
Chris Daly
(Vacant)

SAN MATEO COUNTY
Jerry Hill
Marland Townsend
(Vice-Chairperson)

SANTA CLARA COUNTY
Liz Kniss
Julia Miller
Dena Mossar
(Vacant)

SOLANO COUNTY
John F. Silva

SONOMA COUNTY
Tim Smith
Pamela Torliatt

William C. Norton
EXECUTIVE OFFICER/APCO

February 20, 2003

RECEIVED
FEB 25 REC'D
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

Thomas G. Bertken
Chief Executive Officer
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

The Bay Area Air Quality Management District has completed its independent air quality analysis of the Water Transit Authority (WTA) Implementation and Operations Plan (IOP). A copy of the completed analysis is enclosed. Our analysis was reviewed at public meetings held on February 13 and 19, 2003, and was approved by the Air District's Board of Directors. We believe that this analysis fulfills the requirements of the California Health and Safety Code Section 66540.22k.

As noted in our report, the expansion of ferry service proposed in the WTA's IOP should result in less emissions than the current passenger ferry services in the Bay Area. However, there is a potential for concentrations of nitrogen dioxide and particulate matter at the San Francisco terminal to be above state and federal ambient air quality standards.

We recommend that the WTA examine the potential for further reductions in emissions from future ferry vessels by scaling back non-peak service on some routes and through the use of alternative diesel fuels, such as water emulsion fuels and biodiesel. We also recommend that vessel design, pier design, and system operations be carefully planned to minimize local exposure to air pollutants and associated cancer risk.

I would like to express my appreciation for the efforts of you and your staff in providing technical data for our work and comments on our draft analysis. I look forward working with the WTA in its ongoing efforts to expand ferry service in the Bay Area in a manner that minimizes impacts to the region's air quality.

Please contact Michael Murphy, Principal Planner, at 415/749-4644, if you have any questions regarding the enclosed analysis.

Sincerely,

William C. Norton
Executive Officer/APCO

Enclosure

WCN:MRM

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BAY AREA AIR QUALITY MANAGEMENT DISTRICT **5**

Memorandum

To: Chairperson Smith and
Members of the Mobile Source Committee

From: Thomas Perardi
Director of Planning

Date: February 6, 2003

Re: Independent Analysis of the Bay Area Water Transit Authority's *Implementation and Operations Plan*

RECOMMENDED ACTION:

Consider recommending to the Board of Directors that the Executive Officer forward the Air District's independent analysis of the air quality impacts from the Bay Area Water Transit Authority's (WTA) *Implementation and Operations Plan – December 2002* to the Water Transit Authority. The WTA will include the independent analysis in their final plan to the Legislature when it is submitted in Spring 2003.

BACKGROUND

The WTA was created in 1999 by SB428 (Perata). The WTA was created to "*... operate a comprehensive San Francisco Bay regional public water transit system, that includes water-transit terminals, feeder buses and any other transport and facilities supportive of the system." (Health & Safety Code §66540.24)* The legislation also directed the WTA to "*... prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan. The plan shall include all appropriate landside, vessel, and support elements, operational and performance standards, and policies. " (Health & Safety Code §66540.20)* A draft Implementation and Operations Plan (IOP) was submitted to the Legislature on December 13, 2002. A final plan, along with environmental documentation, is due to the legislature by the Spring 2003.

The final plan is to be accompanied by ".. *an independent evaluation conducted by the Bay Area Air Quality Management District to assess the air quality impacts of the complete water transit system, as set forth in the ... Implementation and Operations Plan, in comparison to transporting the same number of people over the same distance by motor vehicles and other modes of transportation." (Health & Safety Code §66540.22(k))* This staff report represents the independent evaluation of the WTA's IOP and covers both regional and localized impacts from the proposed expansion of ferry service in the Bay Area.

SUMMARY FINDINGS

1. Implementation of the WTA's proposal will result in overall emissions that are lower than those attributable to current passenger ferry service.

2. If the future ferry service passengers used automobiles and other modes of transportation (rail, bus, carpools), regional emissions would also be less than current emissions from passenger ferry service. In comparison to the WTA's proposal, regional emissions of

oxides of nitrogen and particulate matter would be less, but hydrocarbon emissions would be higher.

3. The proposed increase in ferry service at the San Francisco Ferry Building has the potential to increase local concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} & $PM_{2.5}$). Future impacts will depend on actual design of boats and piers, and future operating procedures. Based on available information and reasonable assumptions, the NO_2 concentrations could exceed California's ambient air quality standard, unless dockside operations are limited to approximately 5 minutes per landing. The State PM_{10} & $PM_{2.5}$ standards are already exceeded in most urban areas of California, including San Francisco. The Air District staff's analysis shows that the WTA proposal could add from 6 to 55% to existing concentration values, depending on pollutant, boat design, and dockside idle time. Additionally, the Air District staff's analysis indicates that the potential for localized increases in exposure to particulate matter at the San Francisco terminal could lead to a significant increase in cancer risk. Boat design and exhaust height specifications could be used to mitigate local air quality impacts and risk.

DISCUSSION

During the two-year development of the IOP, the WTA studied four alternatives for service expansion: 1) A comprehensive region-wide system based on the Water Transit Initiative developed by the Bay Area Council and Bay Area Economic Forum; 2) an expanded region-wide system that could be implemented within 10 years; 3) enhancements to the existing ferry system; and 4) A "No-Build" scenario based on the Metropolitan Transportation Commission's *2001 Regional Transportation Plan* (RTP), which envisions future ferry service to be similar to today's ferry routes and frequencies.

The current WTA proposal in the IOP is a subset of the second studied alternative -- enhancements to services on existing routes, plus new services between San Francisco and terminals in San Mateo, Alameda, Sonoma, and Contra Costa Counties. As shown in Table 1, the WTA is proposing more frequent service on six existing routes and new service on eight routes.

TABLE 1
PROPOSED FERRY ROUTES AND PROJECT 2025 DAILY RIDERSHIP

Existing Routes	Oakland – Alameda – San Francisco	4032
	Bay Farm Island – San Francisco	679
	Vallejo – San Francisco	4411
	Sausalito – San Francisco	5118
	Larkspur – San Francisco	6576
	Tiburon – San Francisco	2649
New Routes	Berkeley – San Francisco – Mission Bay	2357
	Richmond – San Francisco	1780
	Treasure Island – San Francisco	2485
	Antioch/Pittsburg – Martinez – San Francisco	2038
	Hercules/Rodeo – San Francisco	933
	South San Francisco – San Francisco	2496
	Redwood City – San Francisco	1420
	Port Sonoma – San Francisco	1657
	Total Daily Ridership	38,631

Source: WTA, *Implementation and Operations Plan – December 2002*, page2

Building on MTC's regional transportation model, WTA has projected that the IOP would result in 38,631 weekday ferry passengers in 2025 (See Table 1). This is approximately 14,000 passengers more than the ridership level projected in the 2001 RTP. The WTA assumed that ferry service would operate on an hourly basis on most routes. Service would be provided for 14 to 16 hours per day. They also assumed that bridge tolls will be $3.00 per vehicle and that parking at BART stations will be $2.00 per car.

Integral to the WTA's plan is the deployment of ferry vessels with engines that are 85% cleaner than the EPA's 2007 marine engine emissions standards. In making this commitment, the WTA is following the recommendations of a 1999 study by the California Air Resources Board (CARB). In their study, CARB staff projected significant increases in overall emissions unless the engines in the ferry vessels were very low emitting.

A comprehensive examination by the WTA of potential emission control technologies concluded that several different mixes of engine and fuel types could achieve the very-low-emission goals adopted by the WTA. Rather than select a preferred approach to controlling the emissions from the future ferry vessels, the WTA proposes to set forth their emission goals in the design specifications for new ferries and leave selection of engines and fuel types to the boat building industry.

Regional Air Quality Impacts

In order to assess the potential impact on regional air quality, Air District staff assessed the potential net emissions of oxides of nitrogen (NOx), hydrocarbons (HC) and particulate matter (PM_{10}) for the following scenarios:

1) Existing ferry service (excluding recreational/tourist services);
2) IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards;
3) IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – with no ferry service provided.

Results of our analysis are shown in Table 2. For each scenario, Air District staff determined net emissions by estimating the emission reductions that will occur from reduced automobile travel by ferry passengers and then added back in the estimated emissions that will occur from the ferry vessels and from the transit and shuttle buses servicing the ferry terminals. A positive number in Table 2 indicates that emissions reductions achieved by removing vehicles from the roadways are exceeded by emissions from the vessels and/or buses. A negative number (shown in parentheses) indicates that the emissions reductions achieved by removing vehicles from the roadways are greater than the emissions from the vessels and buses.

TABLE 2
ESTIMATED EXISTING AND 2025 EMISSIONS (tons/day)

Scenario	NOx	HC	PM_{10}*	$PM_{2.5}$*
Existing ferry service (excluding recreational/tourist services)	2.32	(0.02)	0.12	0.12
IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards	1.04	(0.42)	0.02	0.02
IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – no ferry service.	0.29	0.07	0.02	0.02

* PM emissions will be fine particulate < 2.5 micrometer, so $PM_{10} = PM_{2.5}$

Current weekday ferry service contributes 2.32 tons per day (t/d) of NOx and 0.12 t/d of PM_{10} emissions to the Bay Area, while providing a net reduction of 0.02 t/d of HC. The WTA proposed expansion of ferry service would decrease the amount of NOx and PM_{10} that ferry service contributes to the region, and further reduce hydrocarbon emissions. If the same number of ferry passengers as projected by the WTA instead used automobiles (either alone or as carpools) or rode on transit buses, BART and Caltrain, then regional emissions of NOx and PM10 would be further reduced, but HC emissions would increase.

While Air District staff has generally used data on ridership, service frequency and vessel characteristics provided by the WTA, there are differences in several assumptions between Air District staff's analysis and the analysis in the DEIR:

1) Air District staff used only weekday travel and hours of operation; the DEIR included weekend service.
2) Air District staff used lower daily ridership numbers, as provided by the WTA, and less frequent headways than those used in the DEIR analysis.
3) Air District staff assumed longer idling times for some routes, because the WTA's DEIR contained idling times on these routes of less than five minutes.
4) Air District assumed that the future engines would be 85% cleaner than future EPA standards, while the DEIR assumed the engines would be approximately 90% cleaner.

Despite the differences in these assumptions, the results of Air District staff's analysis show the same relative conclusions as the analysis in the WTA's DEIR and CARB's 1999 study: the deployment of very-low-emitting ferry vessels would result in a reduction of the current regional emissions attributable to passenger ferry service.

Localized Air Quality Impacts

In addition to examining the regional impacts of the WTA's IOP, Air District staff analyzed the potential for increases in localized concentrations of three pollutants – carbon monoxide (CO), NO_2 and particulate matter (both PM_{10} and $PM_{2.5}$) – at the proposed ferry terminals. A review of the proposed ferry service indicated that only the San Francisco terminal would have sufficient numbers of vessel operations to warrant additional consideration. Air District staff used currently available data and computer models to predict pollutant concentrations under three scenarios: existing conditions, one that assumed idling times consistent with the

regional analysis of the IOP discussed above and another that limited dock-side idling under the IOP proposal to five minutes per vessel operation.

Methodology

The computer model chosen to predict the localized impact is an EPA Guideline Model, the Industrial Source Complex Version 3 Model. This is a Gaussian air quality model routinely used to model impacts from a variety of sources.

Two meteorological data sets were considered for use in modeling the impacts at the terminal: data from the San Francisco International Airport (SFO) and data from the Oakland International Airport (OAK). Meteorological data from other Bay Area monitoring stations were analyzed and determined not to be representative of the area around the ferry Terminal. Modeling was performed using both data sets: the latest three years available from SFO (1989-1991) and from OAK (1981-1983). Receptors were placed on all of the gates and other locations around the terminal, inland to a distance of 0.8 miles, to model exposure to passengers and others that would frequent the areas around the San Francisco terminal. Receptors were not placed over San Francisco Bay.

The Air District maintains and operates regional air monitoring stations around the Bay Area. The closest monitoring station, San Francisco - Arkansas Street, is located just 2 miles south of the Terminal. As a regional monitoring station, it is believed that the Arkansas Street monitoring station provides a good representation of the background concentrations around the San Francisco terminal area. Background PM_{10}, $PM_{2.5}$, CO and NO_2 data were available for the last three years (1999-2001). To represent a worst-case situation, background concentrations were assumed to remain constant into the future.

It is important to point out that this analysis of localized impacts, while complete, is only a preliminary analysis. As such it may reflect an overestimation of future pollutant concentrations. With the dedication of more resources and more site-specific information regarding meteorological and ambient air quality conditions, vessel characteristics, and terminal layout, the analysis could be refined to provide better estimates of the potential impacts.

Existing Conditions

For the analysis of the existing situation, we used the current physical layout of the San Francisco terminal and the current vessel fleet. The current fleet consists of a mix of vessel designs – single hull and catamarans – and most significantly for our analysis, varying locations of exhaust pipes. Some of the single hull vessels have exhaust pipes located mid-vessel 24 feet or higher above the water, while others have exhaust pipes located at the rear of the vessels, at about six to eight feet above the water. The catamaran vessels have their exhaust pipes either in the rear, approximately three feet above the water line, or vent exhaust into the space between the two vessel hulls. As discussed below, localized pollutant concentrations are sensitive to the location of the engine exhaust pipes: venting emissions higher above the water tends to lessen concentrations of pollutants at dockside. Emission rates for the current engines were derived from test data published by engine manufacturers and the WTA. Emission rates take into account the benefits achieved through recent engine replacements on a number of current ferry vessels via funding from the Air District's Carl Moyer Program.

Table 3 shows the predicted maximum air quality impacts for the existing fleet of vessels at the existing San Francisco Ferry terminal. Currently, concentrations of particulate matter exceed the California 24-hour and annual PM_{10} standards and the California annual $PM_{2.5}$ standard.

TABLE 3
MAXIMUM EXISTING CONCENTRATIONS
AT SAN FRANCISCO FERRY TERMINAL ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	306.1	6,111	6,417	23,000	40,000
8-hour	87.3	4,090	4,177	10,000	10,000
NO_2					
1-hour	127.2	193.6	321	470	-
annual	6.3	39.5	46	-	100
PM_{10}					
24-hour	2.0	77.9	**80**	50	150
annual	0.37	26	**26**	20 [2]	50
$PM_{2.5}$					
24-hour	2.0	45.1	47	-	65
annual	0.37	12.6	**13**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Future Conditions – WTA IOP

For the two IOP idling scenarios, the future physical layout of the San Francisco terminal was based on a figure in the Draft IOP, published in September 2002. This layout, while very conceptual, reflects the configuration of two recently constructed gates at the terminal. Ferry vessels were modeled as point sources adjacent to each side of six gates (two ferry vessels per gate). Hourly emission rates were calculated based on the estimated number of ferry vessels per hour that would dock to load and unload passengers at each gate.

For the purposes of our analysis, we have assumed that all existing vessel would have been retired from service. Ferry vessels in 2025 would use diesel engines that are compliant with EPA's 2007 emission standards, in conjunction with selective catalytic reduction (SCR) devices and diesel particulate filters (DPF). The use of the SCR and DPF control devices would reduce NOx and PM_{10} from engine exhaust by at least 85%. We selected these control devices to be consistent with the DEIR and the IOP. It should be noted that by assuming the use of diesel engines, we are modeling a reasonable worst-case scenario in terms of exposure to diesel particulate. The use of other engine types and/or cleaner fuels might show different results.

Vessel characteristics were based on conceptual designs published by the WTA in the technical appendix to the IOP. The newest ferries operating on the Bay have exhaust points located approximately three feet above the water. This design was incorporated into the modeling analysis for future local impacts.

Tables 4 and 5 show the predicted maximum air quality impacts for the two future idling scenarios. Table 4 shows that for the regional analysis idling scenario the federal 24-hour and annual $PM_{2.5}$ standards and four California ambient air quality standards could be exceeded -- the one-hour NO_2 standard, the 24-hour and annual PM_{10} standards, and the annual $PM_{2.5}$ standard. Table 5 shows that if the idling for each ferry is limited to a maximum of five minutes at each of the gates, the California 24-hour and annual PM_{10} standards, and California annual $PM_{2.5}$ standard could be exceeded; and the margins would be much smaller.

TABLE 4
MAXIMUM CONCENTRATIONS FROM IOP
IDLING SCENARIO – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	2,970.1	6,111	9,081	23,000	40,000
8-hour	1016.3	4,090	5,106	10,000	10,000
NO_2					
1-hour	430.6	193.6	**624**	470	-
annual	33.8	39.5	73	-	100
PM_{10}					
24-hour	24.3	77.9	**102.2**	50	150
annual	6.7	26	**33**	20 [2]	50
$PM_{2.5}$					
24-hour	24.3	45.1	**69**	-	65
annual	6.7	12.6	**19**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

TABLE 5
MAXIMUM CONCENTRATIONS FROM IOP IDLING SCENARIO, WITH IDLING TIME LIMITED TO 5 MINUTES – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	927.6	6,111	7,039	23,000	40,000
8-hour	338.8	4,090	4,429	10,000	10,000
NO_2					
1-hour	192.1	193.6	386	470	-
Annual	18.1	39.5	58	-	100
PM_{10}					
24-hour	7.9	77.9	**86**	50	150
Annual	2.3	26	**28**	20 [2]	50
$PM_{2.5}$					
24-hour	7.9	45.1	53	-	65
Annual	2.3	12.6	**15**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Health Risk Screening

A health risk screening -- consisting of a screening cancer risk analysis[1] and a chronic health risk analysis[2] -- was also conducted for the existing ferry service and terminal configuration, the IOP scenario, and the IOP scenario with idling limited to five minutes. Under the Air District's *CEQA Guidelines,* a project is acceptable if the associated incremental cancer risk is equal to or less than ten in a million. Additionally, a chronic hazard index of 1.0 or above is considered significant. Table 6 shows the incremental cancer risk and chronic hazard index associated with the existing conditions and the two future IOP idling scenarios.

The estimated existing incremental cancer risk from ferry operations at the San Francisco terminal currently exceeds the Air District's threshold for risk from exposure to diesel particulate matter. Incremental cancer risk is estimated to increase significantly in the future under both IOP idling scenarios because of the increase in ferry operations that is proposed by the WTA. It is estimated that there is not currently nor under the IOP scenarios significant risk for non-cancer health problems due to exposure to diesel particulate matter.

TABLE 6
SUMMARY OF HEALTH RISK ASSESSMENT RESULTS

	Existing idling scenario	IOP idling scenario low exhaust height	IOP scenario with idling limited to 5 minutes low exhaust height
Incremental Cancer Risk	3 in a million	58 in a million	20 in a million
Chronic Hazard Index	0.003	0.059	0.020

As noted above, the results of the health risk assessment were sensitive to the height of the exhaust pipes above the waterline. The higher location of the exhaust pipes on some of the existing vessels, as compared to the assumed height of three feet for future vessels, explains why potential cancer risk under the IOP scenarios is higher than under existing conditions. Since we estimated that future emissions would be less than under existing conditions, we would expect future cancer risk due to exposure to diesel particulate matter to also be lower than under existing conditions.

To test the assumption that the height of the exhaust pipes influenced the Incremental Cancer Risk results shown in Table 6, we conducted a separate health assessment wherein we assumed that for all three scenarios exhaust pipes were located 20 feet above the water. As can be seen from the results shown in Table 7, assuming higher exhaust heights significantly reduces the estimated Incremental Cancer Risk. It should also be noted that higher exhaust locations also should result in lower concentrations in PM_{10} and $PM_{2.5}$.

Although the WTA has already committed to very-low-emission engines in future vessels, the health risk assessment suggests that additional actions and emissions controls to reduce diesel particulate may be warranted.

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[1] A screening risk analysis estimates the maximum offsite cancer risk from exposure to toxic air pollutants.

[2] A chronic health risk analysis is used to estimate the risk of the development of long-term non-cancer health issues, such as asthma, emphysema, high blood pressure, etc. The result of this analysis is expressed in terms of a risk index to allow comparisons between different scenarios and projects.

TABLE 7
SENSITIVITY MODELING OF HEALTH RISK ASSESSMENT
(WITH EXHAUST STACKS AT 20 FEET ABOVE THE WATER)

	Existing idling scenario	IOP idling scenario	IOP scenario with idling limited to 5 minutes
Incremental Cancer Risk	3 in a million	2.6 in a million	1.3 in a million

CONCLUSIONS

The implementation of the WTA's IOP, including the deployment of low emitting ferry vessels, should result in a reduction of current emissions attributable to passenger ferry service. It is recommended that the WTA examine the potential for further reductions in NOx and particulate matter emissions from the ferry vessels by scaling back non-peak service on some routes and through the use of alternative diesel fuels, such as water emulsion fuels and biodiesel.

There is a potential for localized increases of concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) above applicable state and federal ambient air quality standards at the San Francisco terminal. Boat design, pier design, and system operations should be carefully planned to minimize local exposure and associated cancer risk.

The WTA should specifically examine the feasibility of reducing local impacts through the use of alternative fuels and through the location of exhaust points on future ferry vessels. It is also recommended that a more thorough examination of localized impacts be conducted once the WTA's operational plans, ferry vessel design and gate layout for the San Francisco terminal are finalized.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Staff resources were drawn from Program 605 – Mobile Source Measures, using General Fund revenues. Subsequent work, if any, will draw upon the same resource. State law required the Air District to perform this analysis, but our requests for state funding of the work were not successful.

Respectfully submitted,

Thomas Perardi
Director of Planning

Prepared by: Michael Murphy and Glen Long

Forwarded _____

APPENDIX AIR-A

Table 1
Base-Peak

Ferry	Freqency (min)	Time (min)	Distance (miles)	AveSpd (mph)	Idle Time (min)	Runs/ Period	Total Run Time/ Period (min)	Total Idle Time/ Period (min)	Total Distance/ Period (mi)	Running Hours/ Route
90_FBALA	40	34.94	7.86	13.5	6.6	9.00	314	59	71	
Deadhead							15			5.5
Alcatraz	60	10	4.00	17.3	5	6.00	60	30	24	
Alcatraz	60	10	4.00	17.3	5	6.00	60	30	24	
Deadhead							15			2.3
90_HBFB	99.99	29.03	9.87	20.4	6	3.60	105	22	36	
90_HBFB-	99.99	29.03	9.87	20.4	13.2	3.60	105	48	36	
Deadhead							60			4.5
90_OAKFB	60	29.42	7.11	14.5	13.2	6.00	177	79	43	
Deadhead							60			3.9
91_LARKN	60	47.78	12.74	16	13.2	6.00	287	79	76	
91_LARKS	30	40.02	12.74	19.1	13.2	12.00	480	159	153	
Deadhead							30			13.3
92_SSLTO	60	30.04	7.66	15.3	9.6	6.00	180	58	46	
92_SSLTO-	60	30.04	7.66	15.3	9.6	6.00	180	58	46	
Deadhead							30			6.5
93_TIBFB	50	21.79	6.9	19	9.6	7.20	157	69	50	
93_TIBFB-	50	21.79	6.9	19	9.6	7.20	157	69	50	
Deadhead							30			5.7
94_VALFB	60	54.93	26.55	29	6.2	6.00	330	37	159	
94_VALFB-	60	54.93	26.55	29	6.2	6.00	330	37	159	
Deadhead							30			11.5
Total min.							**3,190**	**834**		
Total hrs.							**53.2**	**13.9**	**Hours**	

Table 2
Base Off - Peak

Ferry	Freqency (min)	Time (min)	Distance (miles)	AveSpd (mph)	Idle Time (min)	Runs/ Period	Total Run Time/ Period (min)	Total Idle Time/ Period (min)	Total Distance/ Period (mi)	Running Hours/ Route
90_FWALA	90	44	8.8	12	6.6	4.3	191	29	38	3.2
Alcatraz	60	10	4.00	17.3	5	6.5	65	33	26	
Alcatraz	60	10	4.00	17.3	5	6.5	65	33	26	2.2
90_OAKFW	90	45.12	8.8	11.7	6	4.3	196	26	38	3.3
91_LARKN	90	47.78	12.74	16	13.2	4.3	207	57	55	
91_LARKS	90	40.02	12.74	19.1	13.2	4.3	173	57	55	6.3
92_SSFW	99.99	37.31	5.41	8.7	9.6	3.9	146	37	21	
92_SSFW-	99.99	37.31	5.41	8.7	9.6	3.9	146	37	21	
92_SSLTO	90	30.04	7.66	15.3	9.6	4.3	130	42	33	
92_SSLTO-	90	30.04	7.66	15.3	9.6	4.3	130	42	33	9.2
93_TIBFW	99.99	34.91	5.47	9.4	9.6	3.9	136	37	21	
93_TIBFW-	99.99	34.91	5.47	9.4	9.6	3.9	136	37	21	4.5
94_VALFB	90	54.93	26.55	29	6.2	4.3	238	27	115	
94_VALFB-	90	54.93	26.55	29	6.2	4.3	238	27	115	7.9
Total Min.							**2196**	**521**		
Total Hrs.							**36.6**	**8.7**	**Hours**	

Table 3
Proposed Project – Peak

	Freqency	Travel Time	Distance	AveSpd	Idle Time	Runs/	Total Run Time/	Total Idle Time/	Total Distance/	
Ferry	**(min)**	**(min)**	**(miles)**	**(mph)**	**(min)**	**Period**	**Period (min)**	**Period (min)**	**Period (miles)**	
90_ALASF	30	28.8	7.52	18.1	1.2	12.0	346	14	90	
90_ALASF-	30	28.8	7.52	18.1	1.2	12.0	346	14	90	
Deadhead							60			
Alcatraz	60	8.4	4.00	13.5	6.6	6.0	50	40	24	
Alcatraz	60	8.4	4.00	13.5	6.6	6.0	50	40	24	
Deadhead							15			
90_HBFB	60	25.2	9.87	20.4	4.8	6.0	151	29	59	
90_HBFB-	60	25.2	9.87	20.4	4.8	6.0	151	29	59	
Deadhead							60			
90_OAKFB	30	24.0	7.11	14.5	6.0	12.0	288	72	85	
90_OAKFB	30	24.0	7.11	14.5	6.0	12.0	288	72	85	
Deadhead							60			
92_SSLTO	30	20.4	7.66	15.3	9.6	12.0	245	115	92	
92_SSLTO-	30	20.4	7.66	15.3	9.6	12.0	245	115	92	
Deadhead							30			
93_TIBFB	30	20.4	6.90	19.0	9.6	12.0	245	115	83	
93_TIBFB-	30	20.4	6.90	19.0	9.6	12.0	245	115	83	
Deadhead							30			
95_BERSFMBA	30	20.4	9.05	17.4	9.6	12.0	245	115	109	
95_BERSFMBA-	30	20.4	9.05	17.4	9.6	12.0	245	115	109	
Deadhead							60			
95_RDWCSF	60	48.8	24.57	32.0	11.2	6.0	293	67	147	
95_RDWCSF-	60	48.8	24.57	32.0	11.2	6.0	293	67	147	
Deadhead							60			
95_RMDFB	30	33.0	9.00	25.0	12.0	12.0	396	144	108	
95_RMDFB-	30	33.0	9.00	25.0	12.0	12.0	396	144	108	
Deadhead							90			
95_SSFSF	30	30.0	10.44	32.0	0.0	12.0	360	0	125	
95_SSFSF-	30	30.0	10.44	32.0	0.0	12.0	360	0	125	

Table 3 (Continued)
Proposed Project – Peak

	Freqency	Travel Time	Distance	AveSpd	Idle Time	Runs/	Total Run Time/	Total Idle Time/	Total Distance/	
Ferry	**(min)**	**(min)**	**(miles)**	**(mph)**	**(min)**	**Period**	**Period (min)**	**Period (min)**	**Period (miles)**	
Deadhead							60			
96_SFTI	30	13.2	2.11	16.0	1.8	12.0	158	22	25	
96_SFTI-	30	13.2	2.11	16.0	1.8	12.0	158	22	25	
Deadhead							30			
91_LARKN	20	43.6	12.74	16.0	13.2	18.0	785	238	229	B
91_LARKS	20	43.6	12.74	19.1	13.2	18.0	785	238	229	B
Deadhead							30			
94_VALFB	30	53.8	26.55	29.0	6.2	12.0	646	74	319	B
94_VALFB-	30	53.8	26.55	29.0	6.2	12.0	646	74	319	B
Deadhead							40			
95_HERSF	60	43.6	19.57	26.0	16.4	6.0	262	98	117	B
95_HERSF-	60	43.6	19.57	26.0	16.4	6.0	262	98	117	B
Deadhead							60			
96_PITSF	60	80.7	34.10	26.0	9.3	6.0	484	56	205	B
96_PITSF-	60	80.7	34.10	26.0	9.3	6.0	484	56	205	B
Deadhead							30			
									3,636	**Total Miles**
Small ferry total min.							**6109**	**1466**		Peak sum
Small ferry total hrs.							**101.8**	**24.4**	**Hours**	Off-peak sum
Large ferry total min.							**4512**	**932**		TOTAL:
Large ferry total hrs.							**75.2**	**15.5**	**Hours**	

Table 4
Proposed Project - Off-Peak

Ferry	Freqency (min)	Travel Time (min)	Distance (miles)	AveSpd (mph)	Idle Time (min)	Runs/ Period	Total Run Time/ Period (min)	Total Idle Time/ Period (min)	Total Distance/ Period (miles)	
90_ALASF	60	28.8	7.52	18.1	1.2	9.0	259	11	68	
90_ALASF-	60	28.8	7.52	18.1	1.2	9.0	259	11	68	
Alcatraz	60	8.4	4.00	12.0	6.6	9.0	76	59	36	
Alcatraz	60	8.4	4.00	12.0	6.6	9.0	76	59	36	
90_HBFB	0									
90_HBFB-	0									
90_OAKFW	60	24.0	8.80	11.7	6.0	9.0	216	54	79	
90_OAKFW	60	24.0	8.80	11.7	6.0	9.0	216	54	79	
92_SSLTO	60	20.4	7.66	15.3	9.6	9.0	184	86	69	
92_SSLTO-	60	20.4	7.66	15.3	9.6	9.0	184	86	69	
93_TIBFW	60	20.4	5.47	9.4	9.6	9.0	184	86	49	
93_TIBFW-	60	20.4	5.47	9.4	9.6	9.0	184	86	49	
95_BERSFMBA	60	20.4	9.05	17.4	9.6	9.0	184	86	81	
95_BERSFMBA-	60	20.4	9.05	17.4	9.6	9.0	184	86	81	
95_RDWCSF	60	48.8	24.57	32.0	11.2	9.0	439	101	221	
95_RDWCSF-	60	48.8	24.57	32.0	11.2	9.0	439	101	221	
95_RMDFB	60	33.0	9.00	25.0	12.0	9.0	297	108	81	
95_RMDFB-	60	33.0	9.00	25.0	12.0	9.0	297	108	81	
95_SSFSF	60	30.0	10.44	32.0	0.0	9.0	270	0	94	
95_SSFSF-	60	30.0	10.44	32.0	0.0	9.0	270	0	94	
96_SFTI	30	13.2	2.11	16.0	1.8	18.0	238	32	38	
96_SFTI-	30	13.2	2.11	16.0	1.8	18.0	238	32	38	
91_LARKN	60	43.6	12.74	16.0	13.2	9.0	392	119	115	B
91_LARKS	60	43.6	12.74	19.1	13.2	9.0	392	119	115	B
94_VALFB	60	53.8	26.55	29.0	6.2	9.0	484	56	239	B
94_VALFB-	60	53.8	26.55	29.0	6.2	9.0	484	56	239	B
95_HERSF	240	43.6	19.57	26.0	16.4	2.3	98	37	44	B
95_HERSF-	240	43.6	19.57	26.0	16.4	2.3	98	37	44	B
96_PITSF	200	80.7	34.10	26.0	9.3	2.7	218	25	92	B
96_PITSF-	200	80.7	34.10	26.0	9.3	2.7	218	25	92	B
									2613	**Total Miles**
Small ferry total min.							**4691**	**1249**		
Small ferry total hrs.							**78.2**	**20.8**	**Hours**	
Large ferry total min.							**2385**	**473**		
Large ferry total hrs.							**39.8**	**7.9**	**Hours**	

Table 5
Vehicle Emissions Calculations

PASSENGER VEHICLES

Vehicle Miles Traveled

2025 No Project	**177,851,516**
2025 Proposed Project	**177,709,056**

Year 2025 No Project

	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)
NO_x	0.152	59,598	2,752	1,480	63,830
PM_{10}	0.015	5,881	153	74	6,108
CO	1.544	605,385	70,493	33,141	709,019
ROG	0.158	61,950	6,346	2,885	71,181

Year 2025 Proposed Project

	EMFAC2000 Emission Factors (g/mi) - Year 2025	Running Emissions (lb/day)	AM Cold Start Emissions (lb/day)	PM Cold Start Emissions (lb/day)	Total Vehicle Emissions (lb/day)
NO_x	0.152	59,550	2,751	1,478	63,779
PM_{10}	0.015	5,877	153	74	6,104
CO	1.544	604,900	70,452	33,097	708,449
ROG	0.158	61,900	6,342	2,881	71,123

BUSES TO NEW FERRY TERMINALS

Vehicle Miles Traveled: 9,942

Year 2025 Proposed Project

	EMFAC2000 Emission Factors (g/mi) -	Emissions (lb/day)
NO_x	0.325	7
PM_{10}	0.038	1
CO	2.203	48
ROG	0.368	8

Evaluation of Wake Wash at Representative Shoreline Types 1

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2.0 Clapper Rail Nesting Area - Petaluma River Wetlands 1
2.1 Impacts to Shoreline 1
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3.0 Wetland –Chinese Cove (Point Pinole) 3
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5.0 Narrow Channel - New York Slough 4
6.0 Marina - Paradise Cay 4

Figures

WAKE-E-1 Representative Site Locations
WAKE-E-2 Map of Petaluma—Clapper Rail Nesting Area
WAKE-E-3 Map of Pinole Point—Chinese Cove Wetlands
WAKE-E-4 Map of Yerba Buena—Seal Haul-Out
WAKE-E-5 Seal Haul-Out at Yerba Buena Island
WAKE-E-6 Map of New York Slough—Narrow Channel
WAKE-E-7 Map of Paradise Cay—Marina

1.0 INTRODUCTION

This appendix presents example impact analyses for five sites representing the major shoreline types in the Bay. Predicted wake characteristics from the ferry service alternatives were compared to the significance criteria developed in Appendix WAKE-D.

Existing wind-driven wave characteristics were evaluated as discussed in Appendix A.

Wake wash characteristics of existing conventional and high-speed ferry vessels operating on the six services in San Francisco Bay were measured over a three-day period in February 2002 for this assessment. Details of the measurements are presented in Appendix WAKE-B.

The following representative sites were selected for this assessment:

Potential Concern	Location
California Clapper Rail Nesting Area	Petaluma River Wetlands
Wetland	Point Pinole (Chinese Cove)
Seal Haul-Out	Yerba Buena
Narrow Channel	New York Slough
Marina	Paradise Cay

The locations of these sites are shown on Figure WAKE-E-1.

2.0 CLAPPER RAIL NESTING AREA - PETALUMA RIVER WETLANDS

The Petaluma River Wetlands are located in the North Bay, adjacent to Highway 37, which connects Highways 101 and 80. The wetlands, consisting mostly of farmed baylands, tidal marshes, and bay flats, surround the Petaluma River and the mouth of the river that meets the San Pablo Bay (Figure WAKE-E-2). At the entrance to the river, there is a swinging railroad bridge and a wetland bird sanctuary. Potential California clapper rail nesting areas were identified in a slough on both sides of the channel as shown on Figure 3.5-12 in Section 3.5, Biology (Jules Evens, personal communication).

This site was used to evaluate both wake wash impacts to wetlands and potential impacts from inundation of clapper rail nests.

There is currently no ferry service impacting this site. Alternatives 1 and 2 include service to a North Bay terminal such as Port Sonoma. Alternative 3 does not include service to these locations. The routes would involve a long transit in the shallow and narrow channel, which leads to the Petaluma River. The proposed vessel would be 350 passenger, 35+ knots.

2.1 IMPACTS TO SHORELINE

The potential impacts to the physical shoreline were evaluated using the decision tree presented in Section 3.3.2 of the Wake Wash Assessment Section (Figure 3.3-5). The ferry route would be

within 1,500 m of the potentially sensitive shoreline, and the route could not be adjusted to be more than 1,500 m from the shore.

The significant wave height for wake waves was calculated via the method described in Appendix WAKE-B. As discussed in Appendix WAKE-B, the height of individual waves in the wake wash wave train attenuate at a rate inversely proportional to the cube root of the ratio of distances. The wave height attenuation is given by the following equation:

$$\frac{H_2}{H_1} = \sqrt[3]{\frac{d_1}{d_2}}$$

where H_1 = Wave height measured

H_2 = Wave height at location of concern

d_1 = Distance of measurement from vessel line of travel

d_2 = Distance of location of concern from vessel line of travel

Although the route would require a 350-passenger/35+kt vessel, the vessel would likely have to be slowed to about 10 kts in the approach to a terminal for navigational purposes. Therefore the calculations were done for 10-kt speed. Wake wave height for a 350-pax vessel traveling 10 kts at 300 m is 24.8 cm. Based on a distance of 50 m from the route to the shoreline, the calculated wake wave height at the shoreline would be 45 cm. This is larger than the 16- cm significance criterion.

Wind-driven wave characteristics were calculated for the site, as described in Appendix WAKE-A. Monthly average significant wave height is 1.3 m and the monthly maximum significant wave height is 1.6 m. The calculated wake wave height is less than half the average for the site (63 cm). Therefore, no significant impacts would be anticipated.

2.2 IMPACTS TO CLAPPER RAIL

There are reported clapper rail nesting sites in the Petaluma Wetlands (Jules Evens, personal communication). An attempt to evaluate wake wash attenuation in a small slough, which leads to the wetlands, was performed on February 12, 2002. The wash characteristics (wave height and energy) of the *F.T. Provider* used in the study were measured, and were found to be very similar to those of a 149 passenger ferry. Wave height was 28 cm for the *Provider* and 15 for the ferry at 300 m. Energy was 820 J/m for the *Provider* and 800 J/m for the ferry. Although the *Provider* is a smaller and lighter vessel than a ferry, the blunt shape of this trawler hull produces wake energy at 10 kts similar to the energy of a larger but more efficient ferry hull operated at the same speed.

Given the very shallow water in the channel and necessity for slow speed navigation, a direct measure of wash in the slough could not be made. Instead a pressure buoy was positioned as close to the slough as possible in order to measure the wash height and period. The work boat *F.T. Provider* made several runs at maximum allowable speed (10 kts) past the slough as close as possible to the mouth. Through direct observation, no motion was detected in the slough,

suggesting that the wash energy from the *Provider* was spent on the beach of the channel and did not enter the slough. The experiment was documented on videotape.

Based on these results, significant impacts to clapper rail nesting sites would not be anticipated.

3.0 WETLAND –CHINESE COVE (POINT PINOLE)

Point Pinole is at the tip of the Point Pinole Regional Shoreline in the North Bay, a 2,315-acre parkland area that juts out into the San Pablo Bay (Figure WAKE-E-3). Chinese Cove is a wetland area on the eastern side of the point. There is current ferry service from Vallejo to and from San Francisco. This area is a marshy wetland and could be subject to wash from current San Francisco-Vallejo route and additional proposed routes from San Francisco to Benicia (Alternative 1), Antioch (Alternative 1), Pittsburg (Alternatives 1 and 2), and Martinez (Alternatives 1 and 2). The routes would pass at an average of approximately 950 m from the point on northbound trips and at an average 1,950 m (off map it's 3,750) from the cove shoreline on southbound trips. However, only wash from southbound trips was included in this analysis. Because the site is located on the eastern side of the point and is sheltered, wash from northbound trips would not impact the site.

Because the proposed route is more than 1,500 m from the potentially sensitive shoreline, no significant impacts are anticipated.

4.0 SEAL HAUL-OUT - YERBA BUENA

Yerba Buena Island is located adjacent to Treasure Island in the Central Bay, about midway along the Bay Bridge (Figure WAKE-E-4). The southern end of Yerba Buena Island is one of the San Francisco Bay's major seal haul-out sites, which are areas where seals pull themselves from the water to rest. (There is another haul-out site located on the northeastern side of the island, but only the southern site was evaluated for this assessment.) The sea haul-out site at the southern end of Yerba Buena Island is currently subject to the wash from the East Bay ferries that are going to and from the San Francisco Ferry Terminal (Oakland-San Francisco and Harbor Bay-San Francisco). Figure WAKE-E-5 is a photo of the seal haul out habitat on the south shore of Yerba Buena Island. The splash seen on the beach is wake wash from *M.V. Zelinsky* traveling eastbound.

Potential service that could impact this area of Yerba Buena Island includes the existing as well as potential new routes from Oakland Army Base to San Francisco (Alternative 1) and from Harbor Bay to Hunter's Point (Alternative 1).

4.1 IMPACTS TO SHORELINE

No significant impacts to the shoreline are anticipated for this site because the shoreline is rocky. Rocky shorelines can withstand extreme weather events, which exert wave energy many orders of magnitude greater than that in wake wash.

4.2 IMPACTS TO PACIFIC HARBOR SEALS

It is not apparent that increased wave activity would be a disturbance at haul-out sites as seal haul outs are often on exposed rocky sites subject to significant wave energy. Existing evidence (see Biology Section) suggests that seals at haul-out sites are primarily disturbed by changes in vessel patterns or vessels suddenly changing course which invoke a startle response. The potential ferry routes would be approximately ½ kilometer from the Yerba Buena haul-out site and would be unlikely to disturb seals (the NMFS guideline [see Biology Section] for minimum avoidance distance of seals and sea lions to reduce disturbance 30 meters.)

5.0 NARROW CHANNEL - NEW YORK SLOUGH

New York Slough is located in Suisun Bay, which is in the far eastern part of the North Bay (Figure WAKE-E-6). It is a narrow passage near Antioch, with potential industrial activity on the south side. There are currently no ferry routes passing near the slough. Proposed service would use a Mare Island Class vessel (350-pax/35+kts). Although no specific problems have been identified in this area, wake wash from potentially proposed service from San Francisco to Antioch (Alternative 1) and Pittsburg (Alternatives 1 and 2) could be an issue when industrial activity is in progress. Alternative 3 would not have ferry routes passing the slough. The routes would pass approximately 120 m from the shore facilities on the south side of the slough.

The potential impacts to the physical shoreline were evaluated using the decision tree. The ferry routes would pass approximately 120 m from the potentially sensitive shoreline.

The significant wave height for wake waves was calculated as described in the previous section. Wake wave height for a Mare Island Class vessel (350-pax/35-kt) is 27 cm at 300 m. Based on a distance of 120 m from the route to the shoreline, the calculated wake wave height at the shoreline would be 37 cm. This is larger than the 16-cm significance criterion.

Wind-driven wave characteristics were calculated for the site, as described in Appendix WAKE-A. Monthly average significant wave height is 27 cm and the monthly maximum significant wave height is 40 cm. (The relatively small wind-driven waves are due to very limited fetch in the area.) The calculated wake wave height is more than half the average for the site (13.5 cm).

New York Slough has significant traffic from other vessels. Although, it was not included as part of this study, for an actual analysis, wake at the shoreline from other vessels should be measured. If the predicted wake from the ferries smaller than that measured for other vessels, no significant impacts would be anticipated. If it were larger, the analysis would continue and it would need to be evaluated whether wake could be redirected away from sensitive receptors, whether the shoreline could be protected, whether impacts could be mitigated, whether lower wash vessels could be used, or whether operational controls, such as slowing the vessels down would allow the criteria to be met.

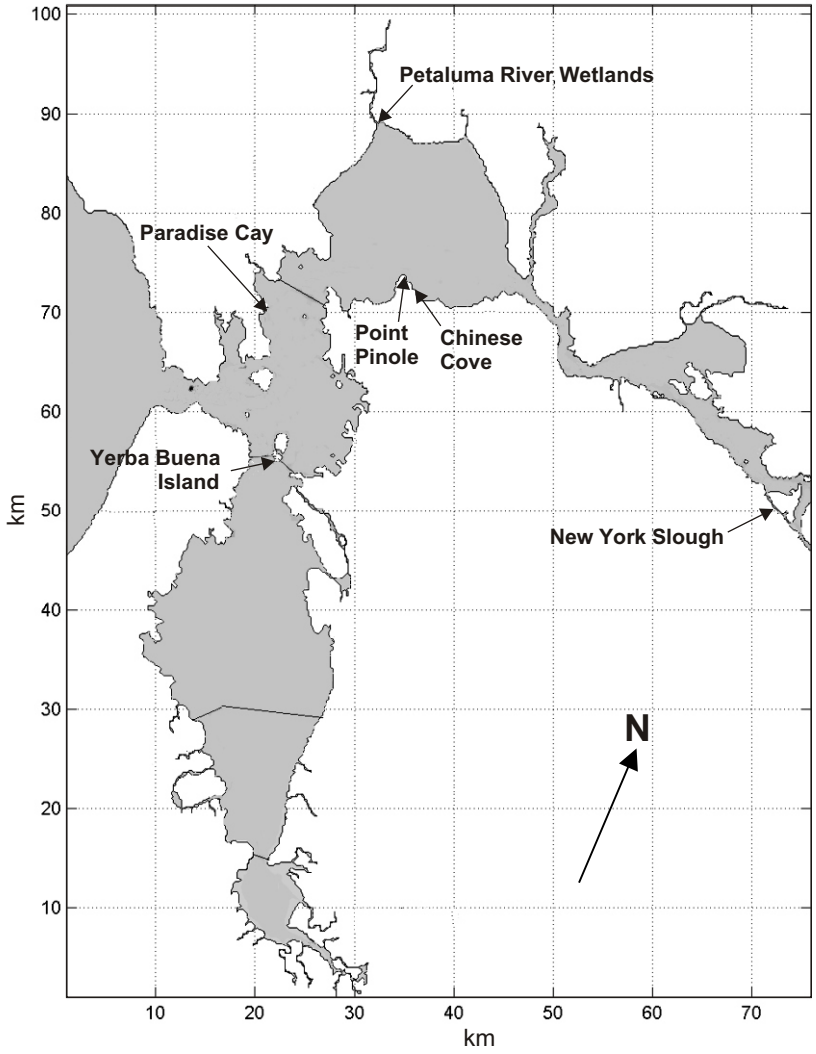
6.0 MARINA - PARADISE CAY

Paradise Cay Marina is located on the eastern side of the Tiburon peninsula (Figure WAKE-E-7). The Larkspur-San Francisco route currently passes the area at a distance of approximately

2,750 meters. Both Mare Island class (350-pax/35+kt) and Spaulding class (725 pax/20-kt) vessels are currently used on this route. The number of ferry transits would be significantly increased under all three alternatives, but only 350-pax/35+kt vessels would be used. When passing the marina at Paradise Cay at service speed, wash from new ferries could cause some movement of moored vessels and floating piers. Individual wave height and energy are the primary factors of concern for impacts to the marina.

Because the proposed route is more than 1,500 m from the potentially sensitive shoreline, no significant impacts are anticipated.

APPENDIX WAKE-E FIGURES



URS	Water Transit Authority Programmatic EIR	Representative Site Locations	Figure WAKE-E-1
	Project No. 43-00066890		

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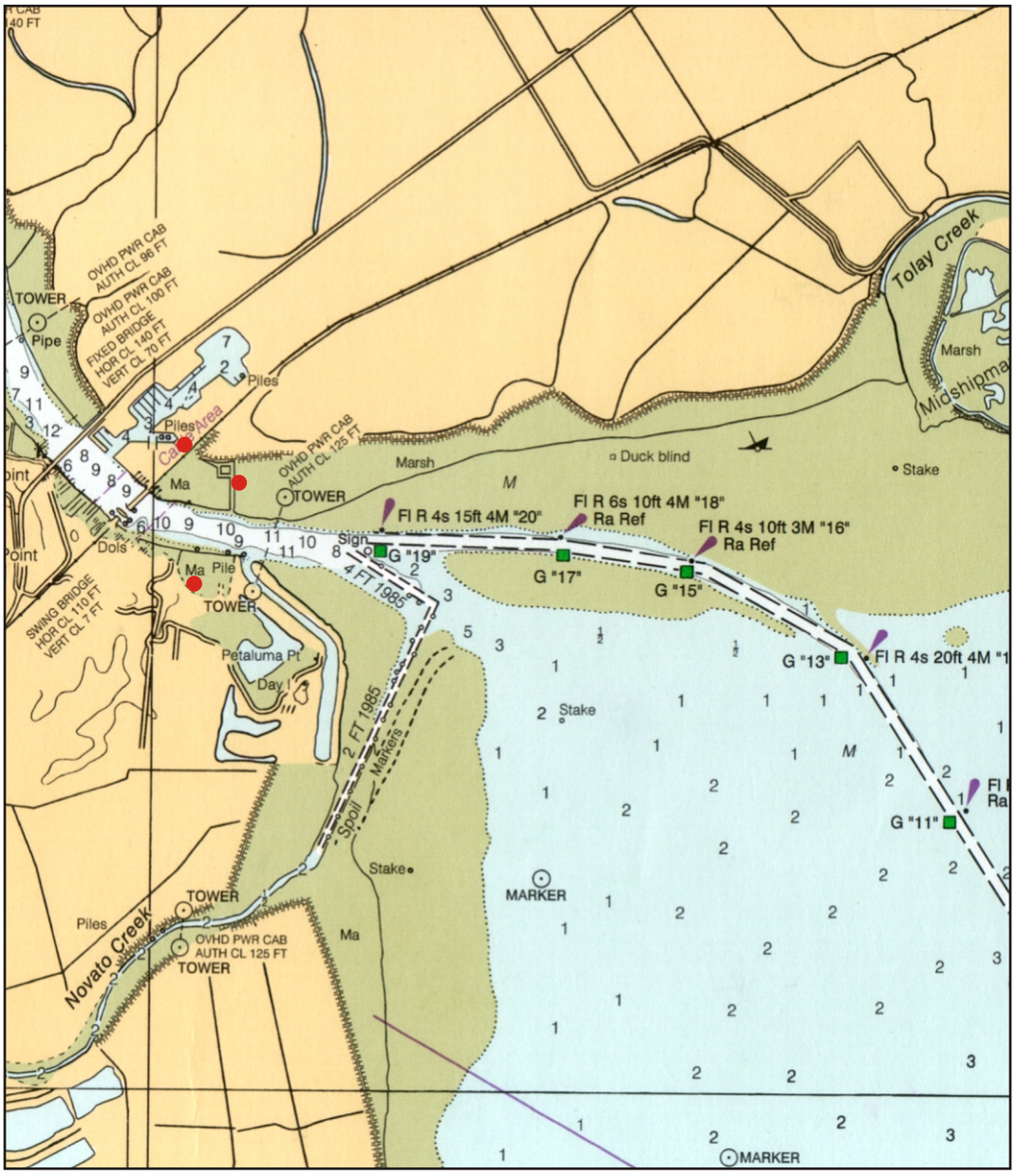

Source:
U.S. Dept of Commerce,
Soundings in Feet, San Pablo Bay, CA 1999

LEGEND

- General Location of Potential Clapper Rail Nest Sites

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Scale in Nautical Miles
1:40,000

URS	Water Transit Authority Programmatic EIR	Map of Petaluma Wetlands – Clapper Rail Nesting Area	Figure WAKE-E-2
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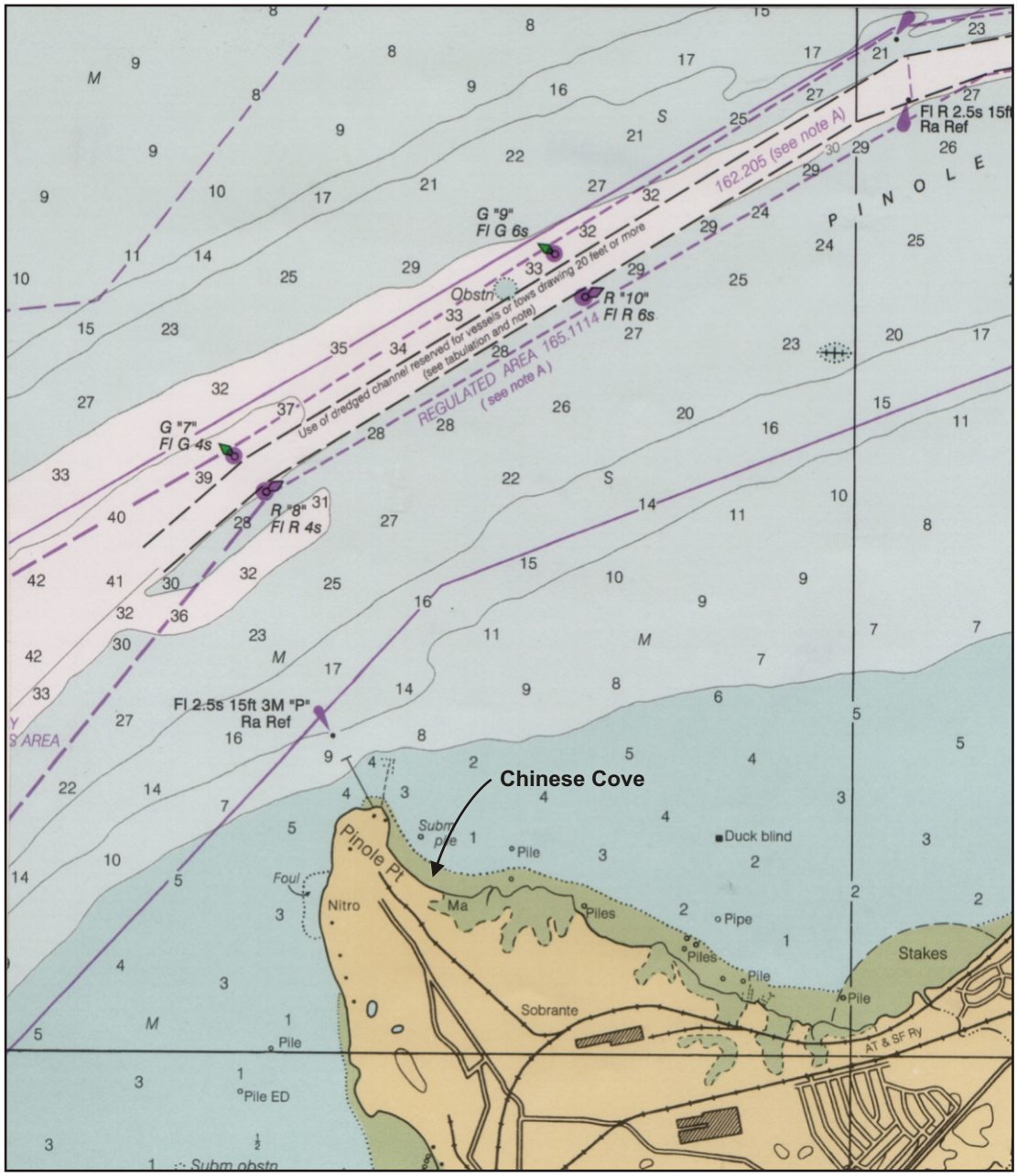

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Scale in Nautical Miles
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URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Map of Pinole Point – Chinese Cove Wetlands	Figure WAKE-E-3

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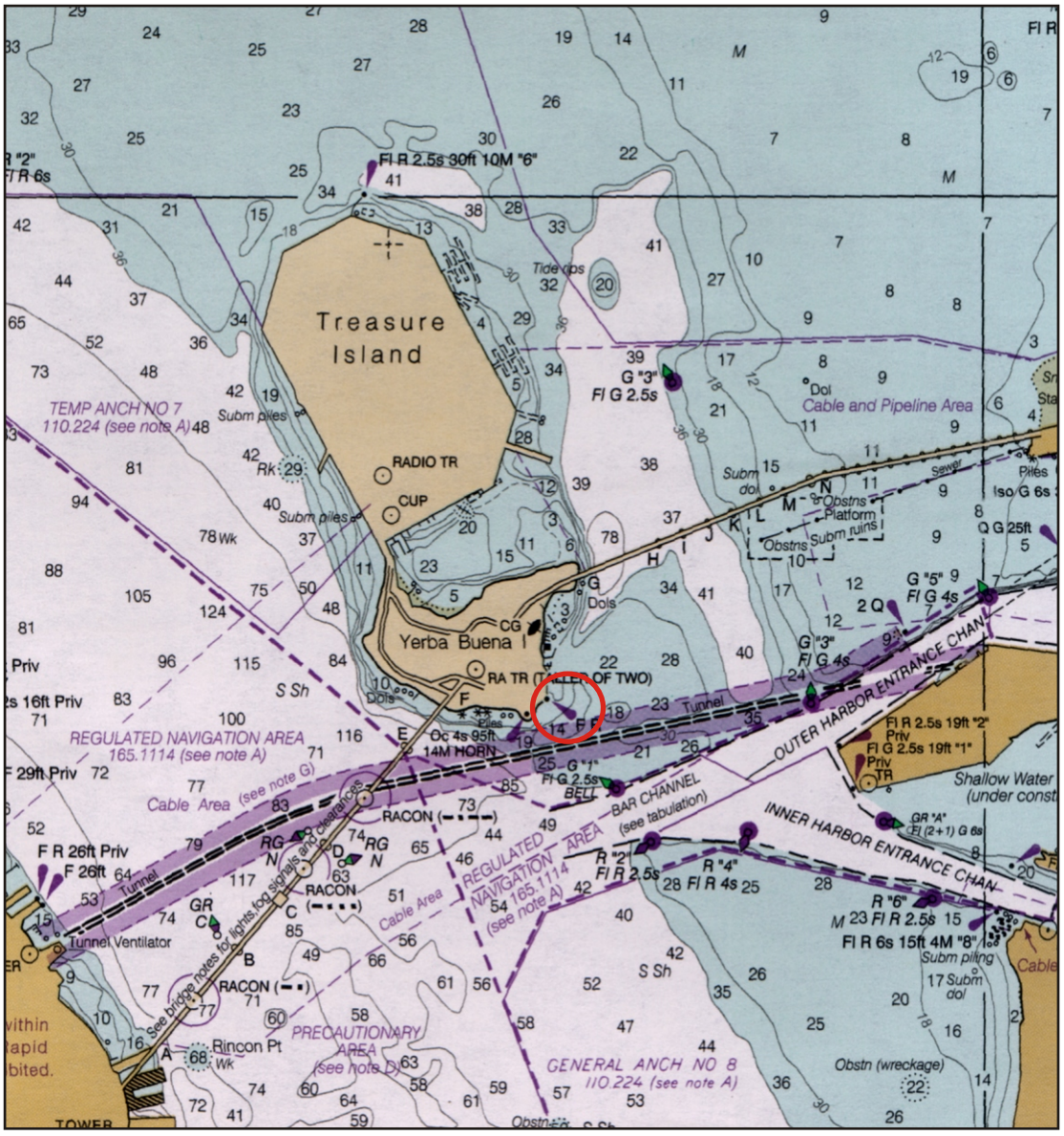

Source:
U.S. Dept of Commerce,
Soundings in Feet, Entrance to San Francisco Bay, CA 2001

LEGEND

Harbor Seal Haul-Out Sites

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Scale in Nautical Miles
1:40,000

URS	Water Transit Authority Programmatic EIR	Map of Yerba Buena – Seal Haul-Out	Figure WAKE-E-4
	Project No. 43-00066890		

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URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Seal Haul-Out at Yerba Buena Island	Figure WAKE-E-5

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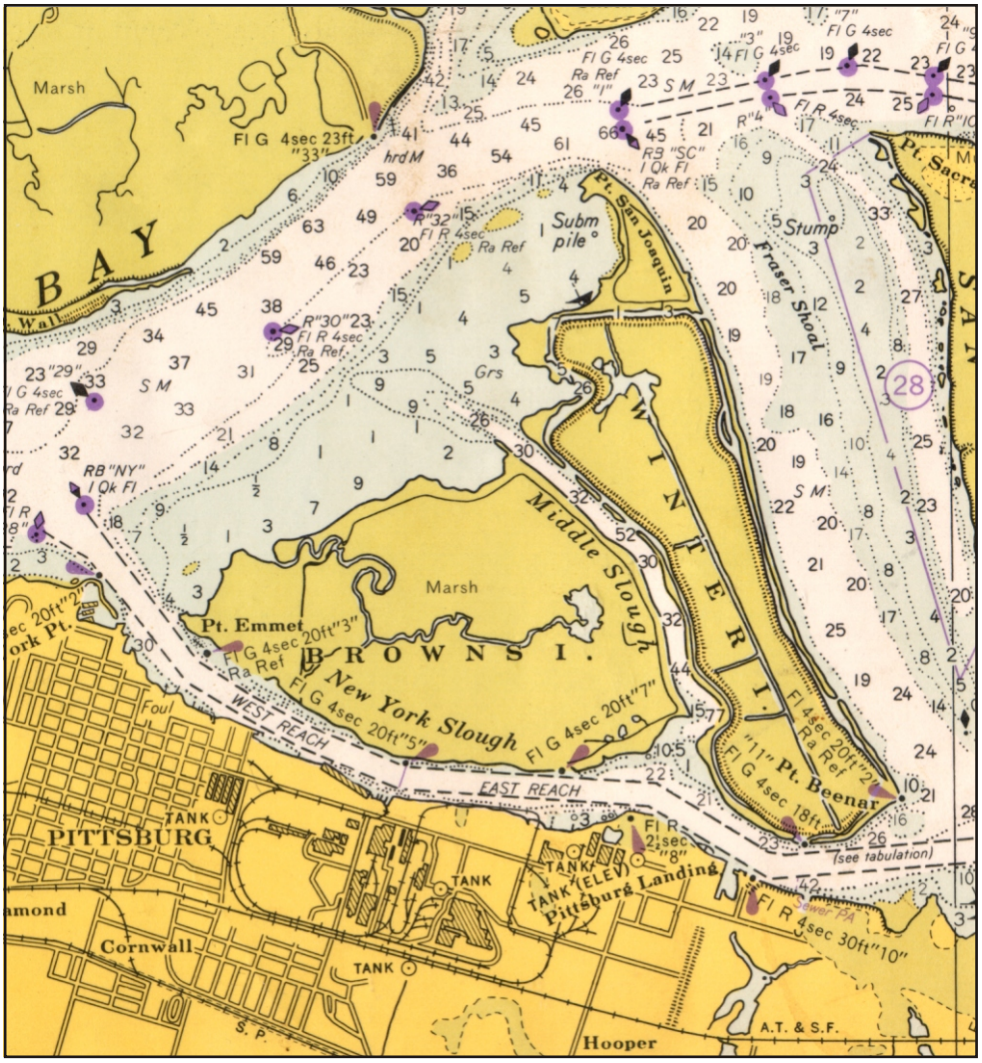

Source:
U.S. Dept of Commerce,
Soundings in Feet, Suisun Bay, CA 1975

Scale in Nautical Miles
1:40,000

URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Map of New York Slough – Narrow Channel	Figure WAKE-E-6

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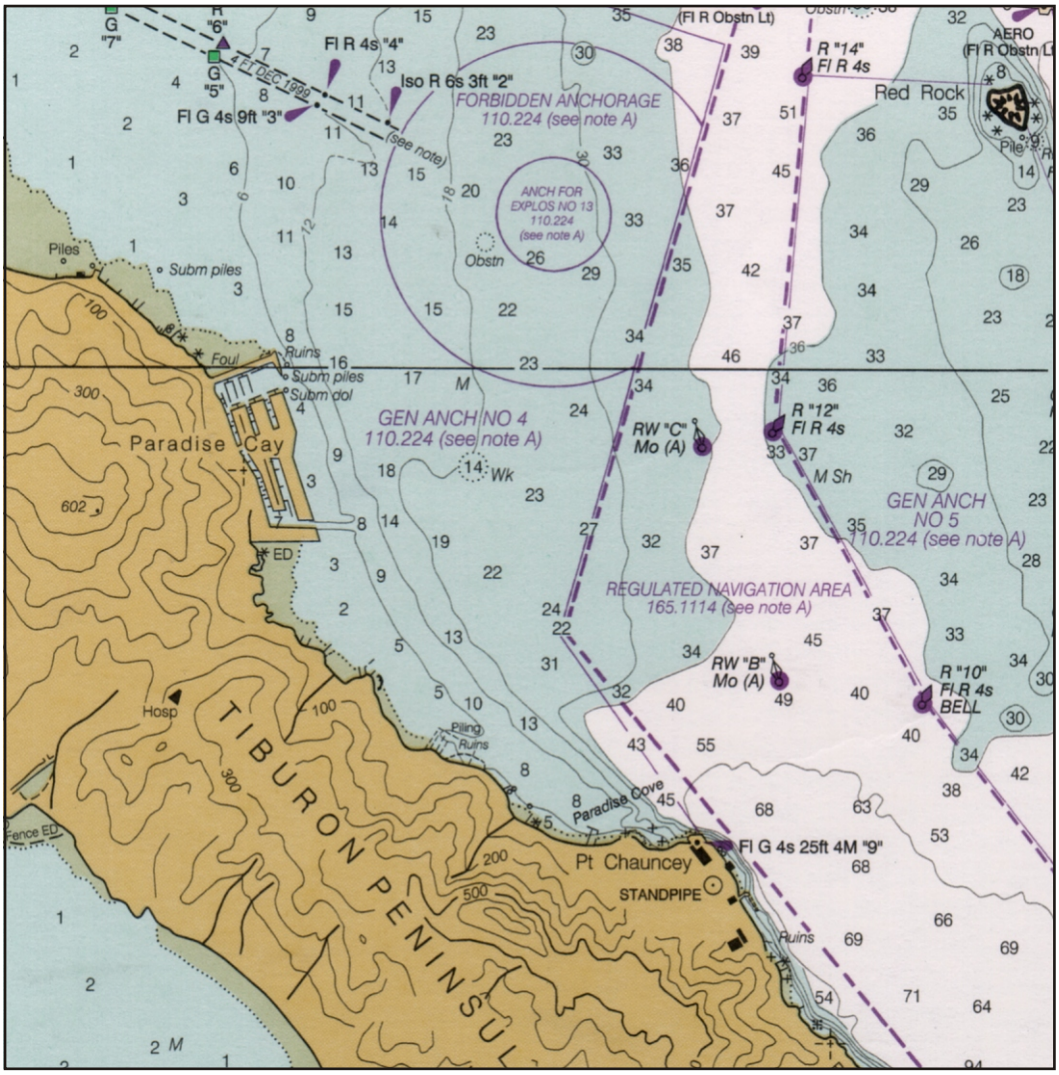

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Soundings in Feet, Entrance to San Francisco Bay, CA 2001

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Scale in Nautical Miles
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URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Map of Paradise Cay – Marina	Figure WAKE-E-7

8/05/02 vsa ...43-00066890.13\WE7_Paradise.cdr

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WAKE-D-2 Comparison of Vessel Wash Height at 300 Meters

1.0 INTRODUCTION

This appendix presents the technical approach used to develop significance criteria for the wake wash assessment. The methodology evaluates the characteristics of wake wash from high-speed vessels in comparison with those of naturally occurring wind waves. A discussion of wake wash is presented in Section 2 of this appendix. The corresponding discussion of the wind wave climate in San Francisco Bay is presented in Appendix WAKE-A. In Section 3 of this Appendix, the significance criteria used in the wake wash impact evaluation are developed.

2.0 INTRODUCTION TO WAKE

Waves occur in the natural environment as the result of energy, usually from wind, transferred to the water surface. Naturally occurring waves transfer significant energy to shorelines, which account for significant variations in shorelines during different seasons.

Vessels with submerged hulls also create waves, referred to as vessel wake or wake wash. Vessel wake results from water pushed aside, or displaced, by the hull and the resistance of the water to hull movement. The displaced water first moves up whereupon gravity acts upon it resulting in the familiar form of an undulating wave with predictable shape and properties. These waves can be approximated mathematically as harmonic waveforms or sinusoidal waves, similar to wind-driven waves as described in Appendix WAKE-A.

The waves move towards the shoreline, where, depending on the water depth and type of shoreline, they may either dissipate harmlessly or may cause undesirable impacts, such as erosion. The detailed characteristics of wake wash when it reaches the shoreline depend on the size and shape of the vessel hull, vessel speed, vessel direction, and water depth (Stumbo, Fox, and Elliot 1999).

If vessel wake results in waves at a shoreline that have significantly greater wave heights or energy compared to natural wind waves, the wake wash can lead to excess re-suspension of shoreline sediments and erosion, or can cause damage to shoreline development. Wake wash is of concern in the Bay Area where wetlands, other sensitive habitat, and marinas are in close proximity to ferry routes.

In areas of sensitive wetlands or tidal mudflats, wake wash can lead to environmental changes by reducing natural sedimentation and hence influence benthic and other organisms (Austin and Bruzzone 1999). Of particular concern in marshlands, are species such as the California clapper rail (*Rallus longirostris obsoletus)*, an endangered species, which is a yearlong resident of emergent salt and tidal marshlands of the Bay (Goals Project 2000; Avocet Research, Collins, and Evens 1992). Disturbances to clapper rail habitat, such as inundation of nests by unexpectedly larger waves, could potentially have a negative impact on the endangered species' survivability during the nesting season.

Fortunately, there are a number of ways to mitigate the potential for wake wash impacts. Operational controls, such as slowing vessels down near sensitive habitats, can be utilized to minimize impacts. For example, existing high-speed ferry service operations out of Larkspur and Vallejo are both subject to speed restrictions in their approach channels. In Larkspur the primary concerns are impacts to Corte Madera marsh and to the marina at Paradise Cay, while in

Vallejo, the concern is for houses and private slips that have been built close to the shoreline along the mouth of the Napa River. Advanced design and technologies also have the potential to create low wake or no-wake vessels. Hovercraft are an example of very low wake vessels. Ferry routes can also be modified to redirect wave energy away from sensitive areas and if, necessary, operational controls such as speed restrictions can be used to limit wake energy.

2.1 WAKE WASH AND VESSEL SPEED

Waves generated by conventional vessels occur in two or more "trains." At slow speed, as a vessel gains speed, the first waves that are seen are the stern "transverse" waves, which appear to be following the ship. As the vessel gains speed, a second set of "divergent" waves form along the bow. The pattern formed by these two wave trains is known as a "Kelvin wave pattern," shown as the top pattern on Figure WAKE-D-1. The waves are moving faster than the vessel that creates them and the speed of the vessel is termed "subcritical." After these waves have traveled some distance from the line of travel, the waves will have formed into one or more sets of waves, usually dominated by the divergent bow waves.

In order to compare vessels of various configurations, size and speeds, several investigators established a standardized distance of 300 meters (~1,000 feet) for taking measurements (Stumbo, Fox, and Elliot 1999). Some investigations have used different distances because of different waterway conditions. Measurements taken reasonably close to 300 meters can be corrected to this distance by some simple calculations (Doctors et al. 2001).

Conventional vessels and ferries travel at subcritical speeds, rarely exceeding 70% of the wave speed. By contrast, high-speed vessels and ferries travel faster than the waves they generated. In order to do so, they have to catch up with the waves, and pass through them. A high-speed vessel uses the greatest amount of power at the critical speed.

The middle portion of Figure WAKE-D-1 shows a vessel traveling at "critical" speed, or the same speed as the waves in the wake. This speed is also called the "hump speed." The wake is a single wave moving out at 90 degrees from the vessel. When the vessel passes through the "hump" and travels faster than the wake waves, it is at "supercritical speed." The wake forms the pattern shown on the lower portion of Figure WAKE-D-1. At this point, increasing speed, and particularly after the vessel reaches hump speed, the transverse waves seem to diminish in size while the divergent waves increase.

Vessels that plane across the surface of the water or are slightly elevated above the water on an air-cushion, such as surface-effect and hovercraft, produce significantly smaller wake wash than comparably sized hulled vessels. Hovercraft only displace a few inches of water under the center of the vessel and therefore create almost no wash. Hovercraft can be used in some situations, where engine noise is not an issue, to mitigate wake wash impacts.

Before the development of high-speed ferries, the amount of wake wash a vessel generates was considered to be directly proportional to speed. While this relationship is generally true for conventional and large vessels with large displacement hulls, such as tankers that travel at subcritical speeds, the opposite is often true with lightweight vessels such as high speed ferries (Stumbo, Fox, and Elliot 1999). High-speed ferries traveling at their design operational speeds

are planing on the water so they displace less water than they do at slower speeds. Therefore, they create less wake.

Figure WAKE-D-2 shows the wake wash height (directly proportional to wave energy) for three vessels studies performed by Stumbo, Fox, and Elliot (1999). The hump speed is shown as a vertical arrow. The figure shows a 350-passenger Mare Island class ferry (the Washington State Ferry *Chinook*), the *Bravest,* a 350-passenger light-weight, low-wake, high-speed ferry operating in New York, and the *Slice*, a prototype wave piercing sea-platform with submerged pontoons designed by Lockheed Marine for ferry operations between Hawaiian Islands. The Mare Island class and *Bravest* curves are similar, showing wave height increasing approximately linearly with speed until the hump speed is reached, after which the wake height drops considerably.

It should be noted that for the Mare Island class of vessels, the wake height at operational speeds (34 to 36 knots) is approximately the same as at 12 knots. Therefore, in order to reduce wake wash from that at operation speeds, the vessel speed would need to be 12 knots or lower.

2.2 WAKE DECAY AND DISSIPATION

There are some significant differences between the growth and decay characteristics of wind waves and wake wash waves. Wind-driven waves increase in energy and height as they approach the shoreline because wind is constantly acting on the waves and, hence, adding to the wind wave energy. By contrast, individual wake wash waves obtain their energy from a vessel and then lose height and some energy as they waves propagate away from a vessel. Wake waves disperse over distance, meaning individual waves become smaller in height while the total number of waves in the wave train increases. Some energy from vessel wakes is lost through interaction with wind-driven waves or by friction as the waves travel over great distances. However, the remainder of the wave energy will reach the shoreline, especially if the vessel route is near shore. Those waves that reach the shoreline expend themselves in a predictable manner and the height of the wake waves and the amount of energy that will reach the shoreline can be calculated. A detailed description of this calculation is presented in Appendix WAKE-B.

3.0 DEVELOPMENT OF SIGNIFICANCE CRITERIA

In order to develop a wake wash significance criteria for evaluation of potential impacts to the Bay shoreline and mudflats, the Bay wave data presented in Appendix WAKE-A were analyzed to develop both a vessel wake wash height criterion and shoreline wave height criteria. The vessel wake criterion was needed in order to predict the wake wave height attenuation and energy propagation towards the shoreline. The shoreline wave height criteria enable the potential impacts of vessel wake wave heights and energy to be evaluated.

In the following analysis, a 27-cm wave height criterion (measured at 300 m from the vessel) is developed as the criteria for the vessel wave wake height. Analysis of the shoreline wave heights indicates that a 16-cm wave (6 in) will not cause significant shoreline or mudflat erosion impacts. Based on wave height attenuation calculations, a 27-cm wave will attenuate to 16 cm over a 1,500-m distance in calm conditions and will attenuate much faster under typical wind conditions. Hence, the 16-cm shoreline wave height and 1,500-m distance are used as the shoreline impact significance criteria. These criteria are based on the natural wind waves

resulting from typical wind conditions in the Bay. Extreme wind conditions, which cause the largest wind waves, were not considered.

A similar methodology was used by Washington State Ferries to develop a 28-cm wave height criteria (measured 300 m from vessel) based on a combination of oceanographic and biological considerations. The 28-cm wave height was considered not to cause significant wave damage to the shoreline.

3.1 WAKE CHARACTERISTICS CRITERION

3.1.1 27-cm Vessel Wake Wave Height Criterion

Wind wave heights resulting from average winds were calculated as described in Appendix WAKE-A and are presented in Table WAKE-D-1. Because wave height is a function of wind speed, duration and fetch length, a range of wave heights occurs each month. The wind wave heights shown in Table WAKE-D-1 are the monthly average sustained wind waves and are also the average of the waves with the greatest energy. As these wave occur naturally, the shoreline is in dynamic equilibrium with these levels of wind wave energy.

The average of the sustained wind wave heights that occur regularly on a monthly basis were calculated to range from a minimum of 27 cm at New York Slough to maximum of 1.3 m offshore of Petaluma wetlands. The maximum of the sustained wind wave heights that occur on a monthly basis range from 0.4 m New York Slough to 2.6 m at Yerba Buena.

The minimum of the average sustained winds wave heights is 27 cm (10.6 in). This wave height value is exceeded 100% of the time at 9 of the 15 locations and is exceeded 92% of the time at all of the 15 typical locations evaluated. Because the 27-cm wave height is naturally exceeded a very high percentage to time, it was selected as the criteria for the vessel wake measured at the standard distance of 300m from the vessel. Note that the 27-cm height is not the acceptable shoreline wake wash height even though it naturally occurs at the shoreline and is often exceeded. This criterion is only the vessel wake wash criteria. Wake wash heights at the shoreline will be less than 27-cm at distances greater than 300m because of the wave height attenuation described in Appendix WAKE-B.

The Naval Architects (Kenneth Fox and Stan Stumbo) developing the vessel specification for the Water Transit Authority indicated that the 27-cm (at 300 m) wake wash height criterion is achievable for a 350-px/35-kt high-speed ferry. The Washington State Ferry criterion for a similar vessel is 28 cm measured at 300 m.

3.1.2 16-cm Shoreline Wake Wave Height Criterion

A very conservative estimate of the wave height above which impacts could be considered significant was developed by considering the average daily wind waves arriving at the shoreline. As waves approaching a shoreline, they refract (bend towards the shoreline), shoal and break. Even the smallest waves resuspend a small amount of sediment when they reach the shoreline. However, the sediment rapidly resettles and there is not net movement or loss of sediment.

The naturally occurring wind wave energy was developed for 15 typical shoreline locations as described in Appendix WAKE-A. The data are presented in Table WAKE-D-2 along with daily wind wave energy and wave height calculations. In order to calculate the wave heights below which sediment re-suspension and re-deposition would not be considered significant, average daily energy values were calculated using the monthly data. Assuming waves with a 3-second period arrive throughout the day, the equivalent daily wave heights were calculated as shown on Table WAKE-D-2. These are the height of waves that would arrive every 3 seconds if the waves were all of the same height in order to deliver the daily average wave energy. In reality, the larger waves arriving at the shoreline carry most of the energy (see Table WAKE-D-1). However, the equivalent daily wave heights are a conservative measure of the wave heights with which the sediment is in equilibrium.

The average of the daily equivalent heights is 33 cm removing the extreme high daily values. A conservative value of 50% of this average was selected to be shoreline wave height criteria which is 16 cm rounding down to add further conservatism. As 16-cm is 6.2 inches, this criterion indicates that if the wake wash waves attenuate to a height of 6 inches at the shoreline, significant erosion or other impacts are not expected.

3.1.3 1,500-m Distance Criterion

Short-period waves (waves which take less than 5 seconds to pass a given location) are dispersive, which means that a single wave transforms into many smaller waves. For example a vessel wake train that contains 4 waves when the wake is measured 100 meters from a vessel may have transformed at a distance of 1 km from the vessel route into a train of 15 or more much smaller waves. The dispersive phenomena means that wake wave heights decrease with distance. The attenuation in wave height can be predicted using a cube root rule (see Appendix WAKE-B).

The attenuation calculations indicate a distance of 1,500 m is required for a 27-cm wake height (measured at 300 m) to reduce to a 16-cm wave height measured at the shoreline.

The wave energy in an individual 16-cm wave is 35% of the energy in a 27-cm wave because wave energy is directly proportional to the square of wave height. Therefore with distance, a short-period wave train transforms into one that delivers much smaller packets of energy at the shoreline.

In typical wind conditions, the wake wave height will attenuate faster than that predicted by the attenuation equation because of wind effects which adds further conservatism to the 1,500-m distance criterion. Wake wash waves lose height and energy over distance in comparison with wind waves, which continue to grow. Wake waves lose energy as they travel away from a vessel and are “flattened” by the wind and by interaction with the wind generated waves. The stronger the wind and the smaller the wake wash, the more quickly wake wash energy is lost. The wake waves also lose energy once they begin to be influenced by the bottom. Waves lose energy through friction and the transformation process as they refract, shoal, and eventually break.

3.1.4 Site-Specific Sustained Wind Wave Criterion

Even if the 16-cm and 1,500-m criteria are not met, wake wave impacts may not be significant but comparison with site-specific data is necessary for determination. If predicted wake waves at the shoreline are less than 50% of the average sustained wind wave height on a monthly basis, significant impacts are not anticipated because the wake wash waves would be indistinguishable from the natural variation of the wind driven waves.

3.2 BIOLOGICAL CRITERION – CLAPPER RAIL NEST INUNDATION

The California clapper rail (*Rallus longirostris obsoletus)*, an endangered species, are yearlong residents of emergent salt and tidal marshlands of San Francisco Bay. Based on discussion with Bay Area biologists and representatives of resource agencies, inundation of California clapper rail nests was used as an indicator of potential biological significance for this assessment. If wake wash has the potential to inundate the nests while the young are in them, the impact would be significant.

Clapper rail nests are constructed such that the nest tops are at the maximum water line during the nesting season. Collins, Evens, and Grewell (1994) indicate that clapper rails nest from 100 m to several kilometers inland from the tidal marsh shoreline. During a 1992 study (Advocet Research, Collins, and Evens 1992) one nest was found at a distance of 25 m from the shoreline built on a pile of dredge spoils. The dredge spoil environment is not a natural habitat and, therefore, a distance of 100 m from the marsh fringe is more representative of the closest distance rails will nest to the shoreline in unaltered environments.

The USACE Shore Protection Manual (1984) and FEMA (1988) present methodologies for predicting the decay of waves through marsh and other shoreline vegetation. The most thorough evaluation method is presented as part of the documentation for the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model developed by FEMA (1988). The model includes a method of calculating wave energy dissipation by specific marsh grasses. Input parameters include the type of marsh grass, grass density, height, diameter, as well as other site-specific parameters such as shoreline slope.

Initial evaluation of these methodologies, and field experiments conducted as part of this and other studies, indicates that wave energy attenuates very rapidly in healthy tidal marshes. In a study conducted in 1992 on the Napa River to assess the impact of Navy assault vessels on clapper rails nests, the decay of wake was measured along a small slough and through tidal marsh vegetation (Avocet Research, Collins, and Evens 1992). A 4-m boat was spun during high water to create a wake of approximately 0.6-m high at the entrance of a 3-m wide slough on the Napa River. Instrumentation was placed 24 m along the slough. The wake was measured to decrease by 50 percent within 8 m and to zero within 15 m. The wake decreased approximately twice as rapidly in the emergent vegetation, to 50 percent within 3 m and to zero within 8 m.

Other studies have had similar findings. Knutson et al. (1982) found that wave attenuation in natural *Spartina alterniflora* salt marshes was on the order of 72 percent for a wave with an initial height of 15 cm traveling across 5 m of marsh. Tiner (1985) reported that a 2.4-m fringe of saltmarsh grass reduced wave energy by over 50 percent.

Marsh grasses are very effective at absorbing excess wave energy which is likely why clapper rails locate their nests at least 100 m from marsh fringe. Because clapper rail nests are fixed to marsh vegetation and do not float, they are not able to rise above extreme water levels. Extreme wave and storm events do occur during the spring breeding season and those individuals, which built nests beyond the influence of extreme storm events, would be more likely to survive and successfully raise young. Wake wash from ferries would not add to the extreme event conditions, which could potentially inundate nests within 100 m from the marsh fringe, as it is unlikely vessels would operate at speed during such storm events.

Given the uncertainties in detecting clapper rail nests (Advocet Research, Collins, and Evens 1992) a more conservative distance of 50 m was considered in this assessment. The worst case scenario of an unbroken wake wave entering the marsh fringe during maximum high water was considered. Because of wave breaking and refraction, as discussed below, this situation is unlikely to occur.

As described in Appendix WAKE-E, the wash characteristics (wave height and energy) of the *Provider* were measured, and showed to be very similar to those of a 149-passenger ferry. Wave height was 28 cm for the *Provider* and 15 for the ferry at 300 m. Energy was 820 J/m for the *Provider* and 800 J/m for the ferry. Although the *Provider* is a smaller and lighter vessel than a ferry, the blunt shape of this trawler hull produces wake energy at 10 kts similar to the energy of a larger but more efficient ferry hull operated at the same speed.

On February 12, 2002, wake was created at the entrance to a small slough near the mouth of the Petaluma River, which leads to a possible clapper rail nesting site in the Petaluma Wetlands (Jules Evens, personal communication). Given the very shallow water in the channel and necessity for slow speed navigation, a direct measure of wash in the slough could not be made. Instead a pressure buoy was positioned as close to the slough as possible in order to measure the wash height and period. The work boat *F.T. Provider* made several runs at maximum allowable speed (10 kts) past the slough as close as possible to the mouth. Through direct observation, no motion was detected in the slough, suggesting that the wash energy from the *Provider* was spent on the beach of the channel and did not enter the slough. The experiment was documented on videotape.

The results of this evaluation suggest that wake from passenger ferries near clapper rail nesting sites would not have detrimental impacts on nests located more than 50 m from a healthy marsh fringe. It is possible that wake wash could impact nesting areas less than 50 m from a marsh fringe, under conditions of high wake energy and no wake attenuation (degraded marsh habitat). In areas where a clapper rail expert considers a nest site within 50 m of the marsh fringe could occur, a detailed prediction of the wave propagation through the marsh should be conducted.

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APPENDIX WAKE-D TABLES

Table WAKE-D-1
Monthly Sustained Wind Wave Heights (m) for Selected Locations in San Francisco Bay, 1992-1993

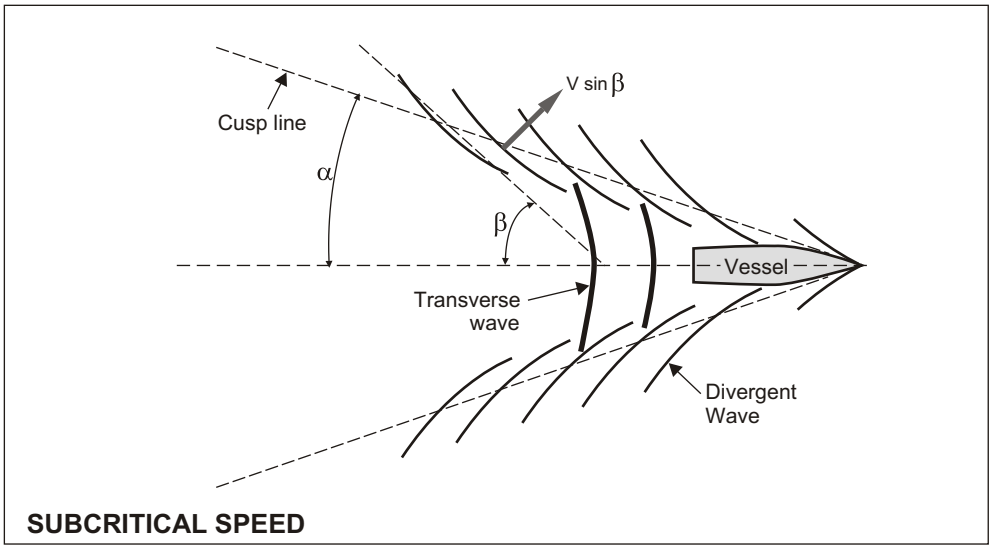
Location	Month												Avg.	Max
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Petaluma Wetlands	1.6	1.5	1.0	1.1	1.3	1.3	1.3	1.4	1.2	1.2	0.88	1.4	1.3	1.6
Hercules (Martinez)	0.86	0.84	0.96	0.96	1.1	1.1	0.94	0.85	0.74	0.69	1.0	0.90	0.91	1.1
Gallinas Creek	0.82	0.96	0.59	0.52	0.55	0.31	0.21	0.26	0.21	0.86	0.64	0.79	0.56	1.0
Corte Madera Marsh	1.6	0.84	0.78	0.99	0.69	0.58	0.29	0.20	0.46	0.99	0.49	0.89	0.73	1.6
Paradise Cay	1.6	1.1	1.0	1.2	0.77	0.62	0.28	0.24	0.44	0.96	0.50	0.87	0.80	1.6
Sausalito	1.3	1.1	1.0	0.76	0.76	0.60	0.33	0.33	0.31	0.96	0.49	0.84	0.73	1.3
Yerba Buena	0.94	1.4	2.6	1.4	1.0	0.82	0.55	0.63	0.91	0.72	0.64	0.94	1.04	2.6
Oyster Point	0.87	0.82	0.56	0.70	0.51	0.51	0.34	0.25	0.25	0.59	0.52	0.79	0.56	0.9
Redwood City Channel	0.64	0.64	0.42	0.34	0.31	0.31	0.37	0.28	0.25	0.25	0.37	0.52	0.39	0.6
Coyote Creek	0.36	0.39	0.41	0.41	0.42	0.40	0.45	0.44	0.42	0.37	0.40	0.36	0.40	0.5
Alameda Creek	0.89	0.84	0.90	0.90	0.93	0.91	1.0	0.99	0.93	0.78	0.87	0.85	0.90	1.0
San Leandro Channel	1.2	0.83	0.89	0.97	1.0	1.1	1.2	0.95	0.83	0.62	1.0	0.86	0.95	1.2
Berkeley	0.62	0.82	1.2	0.64	0.68	0.68	0.68	0.62	0.58	0.49	0.68	0.68	0.69	1.2
Point Pinole	1.1	0.77	0.78	0.86	1.1	0.99	0.87	0.78	0.77	0.61	1.1	1.0	0.89	1.1
New York Slough	0.36	0.40	0.27	0.28	0.22	0.21	0.21	0.22	0.18	0.32	0.22	0.36	0.27	0.4

Table WAKE-D-2
Monthly Wave Energy (MJ/m) Reaching the Shore for Selected Locations in San Francisco Bay, 1992-1993

Location	Monthly Wave Energy (MJ/m) Reaching the Shore														Daily Average Energy (KJ/m)	Average Wave Height (cm)[1]
	Month												Avg.	Max		
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec				
Petaluma Wetlands	197.7	268.1	298.5	157.7	1178	1541	2444	2907	1671	528.0	56.2	463.3	975.9	2907	32,102	94
Hercules (Martinez)	393.4	106.6	164.7	606.0	288.7	391.3	87.6	58.7	61.9	70.2	279.3	357.7	238.8	606.0	7,856	47
Gallinas Creek	599.7	212.5	52.4	7.6	12.3	1.0	0.5	2.0	1.6	26.3	198.6	545.5	138.3	599.7	4,550	35
Corte Madera Marsh	114.9	201.6	81.7	29.6	29.7	7.8	0.7	0.5	1.7	23.1	24.0	137.4	54.4	201.6	1,789	22
Paradise Cay	159.2	232.6	111.4	37.0	48.4	11.8	3.2	1.9	3.7	29.8	34.8	165.1	69.9	232.6	2,300	25
Sausalito	56.0	111.6	86.3	45.4	71.4	48.5	33.5	23.2	21.3	30.1	15.4	66.6	50.8	111.6	1,670	21
Yerba Buena	90.2	129.3	128.5	124.8	175.7	143.5	104.2	88.1	65.4	59.9	43.3	91.1	103.7	175.7	3,410	31
Oyster Point	77.7	108.5	32.0	20.3	24.7	8.1	5.0	3.9	4.8	10.9	34.8	121.5	37.7	121.5	1,239	19
Redwood City Channel	38.7	36.5	14.1	10.2	12.6	10.7	10.6	8.9	10.0	8.8	19.4	48.3	19.1	48.3	627	13
Coyote Creek	10.0	9.2	35.7	73.8	75.8	91.9	102.8	121.7	104.5	51.6	34.9	12.0	60.3	121.7	1,985	23
Alameda Creek	100.0	88.6	239.1	550.9	634.8	823.0	798.6	860.4	682.8	316.8	236.3	129.8	455.1	860.4	14,970	64
San Leandro Channel	77.7	111.7	186.2	438.9	512.2	688.1	512.3	348.4	202.2	114.7	79.5	119.1	282.6	688.1	9,296	51
Berkeley	30.9	52.4	122.0	239.5	268.2	325.5	258.6	209.0	162.2	103.8	59.1	31.8	155.3	325.5	5,107	38
Point Pinole	1021	251.6	184.4	490.9	397.0	540.0	256.6	153.3	131.6	110.8	435.7	877.9	404.2	1021	13,297	61
New York Slough	3.5	6.0	4.0	4.3	5.6	7.0	10.7	13.8	7.9	2.6	1.9	7.7	6.2	13.8	205	8

Notes:
1) Based on 3 second period

APPENDIX WAKE-D FIGURES



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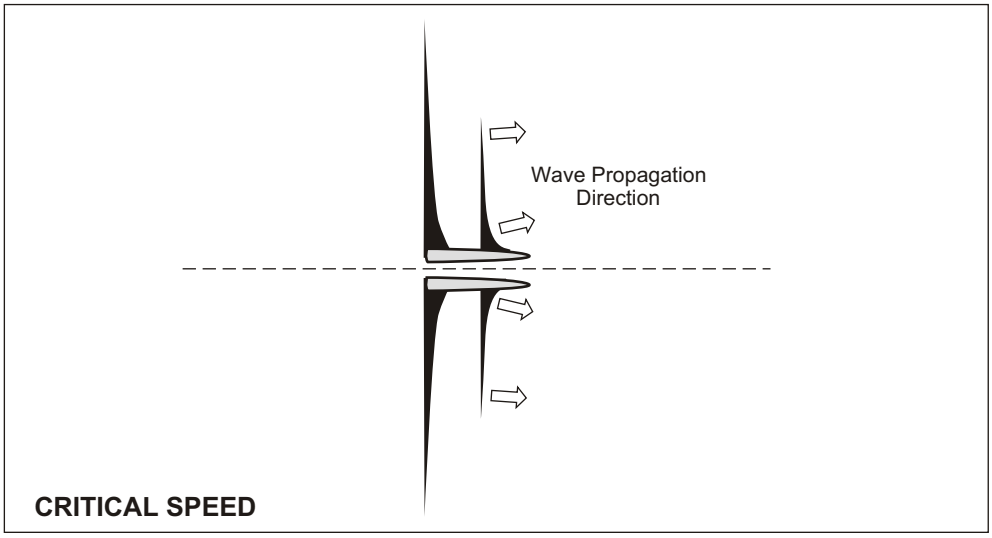

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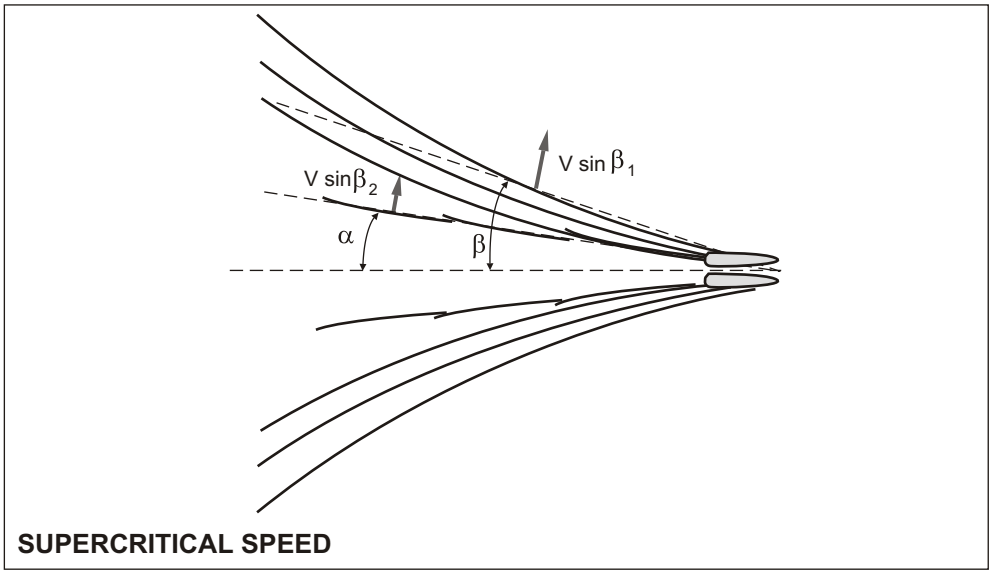

SUPERCRITICAL SPEED

Source: Stumbo et. al., 1999

URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Vessel Wake Diagram	Figure WAKE-D-1

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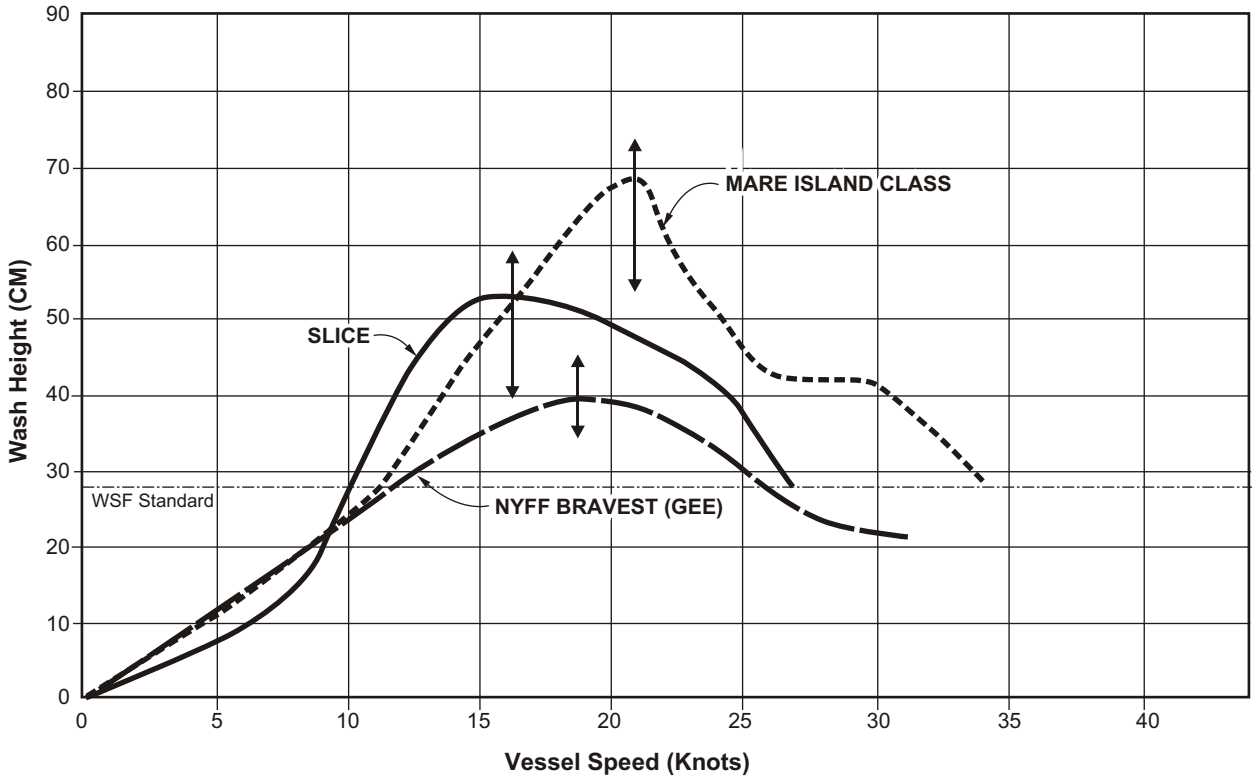

Source: Modified from Stumbo et. al., 1999

URS	Water Transit Authority Programmatic EIR Project No. 43-00066890	Comparison of Vessel Wash Height at 300 Meters	Figure WAKE-D-2

8/16/02 vsa ...43-00066890.13\WD2_comparison.cdr

Wake Wash Regulations Worldwide C-1

1.0 United States: Washington State Ferries.....C-1
2.0 Europe.....C-2
2.1 Denmark.....C-2
2.2 Italy.....C-3
2.3 United Kingdom.....C-3
3.0 New Zealand.....C-3
4.0 References.....C-4

There are currently no federal, state, or local wave wash regulations. However, a search of information available on the internet was conducted to identify legislative criteria or operational guidelines for wave wash generated from high-speed ferries around the world.

For the majority of areas, specific criteria for wake wash generated from high-speed ferries were not identified within legislation, regulations, or guidelines. However, the issue is assessed in some areas during the Environmental Impact Assessment process (in particular in Denmark, Australia, New Zealand, Italy, and United Kingdom). The following sections summarize available information on worldwide wake wash regulations.

1.0 UNITED STATES: WASHINGTON STATE FERRIES

The Washington State Ferries (WSF) system currently operates two high-speed catamaran passenger-only ferries, the *Chinook* and *Snohomish*, from Bremerton to Seattle. The route passes through Rich Passage, which is approximately 3 miles long and ½ mile wide at the narrowest point. Before going out for bid for the high-speed catamarans, WSF performed a wake study (Hartman 1990) to determine the minimum design criteria that would not cause significant harm to the shoreline. The criteria that were developed were based on the wake generated by the existing WSF passenger-only monohulls running at 12 knots (Long 1999). These criteria were chosen because ferry system shoreline experts stated this level of wake would not harm the Rich Passage shoreline, and did not generate complaints from property owners (Long 1999). The goal was to make vessel operation "relatively imperceptible on the Rich Passage shoreline." The established WSF criteria for measured wake wash in the Rich Passage area are:

- Wave Height: 28 centimeters;
- Energy Density: 2,450 joules per meter; and
- Measurement: 300 meters from the wake centerline (in deep water).

The *Chinook* began service in May 1998 and the ferry was generally run at 34-35 knots. A second high-speed ferry, the Snohomish, was scheduled to begin service in September 1999. In April 1999, Bainbridge Island landowners along Rich Passage filed a lawsuit, charging that wake wash from the ferries was damaging their waterfront bulkheads, eroding beaches, and harming marine life.

In August 1999, as a result of the lawsuit, WSF was ordered to reduce the speed of the ferries to 12 knots in the vicinity of Rich Passage. While the court did not find that the *Chinook* operations had caused impacts to the shoreline, it stated that operations had the potential for affecting the environment. The judge's ruling stated that WSF did not perform an Environmental Impact Study under the State Environmental Protection Act (SEPA).

The slowdown increased the commute time from 30 to 50 minutes, which is the same as the time for existing 16-knot vehicle/passenger ferries, which also make the Bremerton - Seattle run (Long 1999). WSF, the county, and a commuter group filed an appeal stating that the SEPA does not apply, and has never been applied to marine vessels (Long 1999). In addition, the appeal stated that the court improperly weighed the interests of the private property owners over

public interests. The decision was appealed and the court-ordered slowdown was lifted in April 2000 (Kucera vs. State).

The *Snohomish* began operations in November 1999. In 2000 and 2001, a wave action study was performed to form the basis for further recommendations (RPWAST 2001). Ten study sites (along the Seattle-Bremerton route) and three reference sites were monitored for one year. Overall, the reference sites experienced little physical change in terms of erosion or accretion. Biological changes, in terms of abundance, were variable. Some of the study sites showed no evidence of POFF wave impacts. One stretch of shoreline, however, experienced substantial erosion.

Starting October 1, 2001, state ferry officials enacted a slowdown to 12 kts in a section of Rich Passage, lengthening the crossing by 10 minutes (Pritchett 2001). The slowdown did not extend the entire length of Rich Passage as the previous slowdown had, but was based on the results of the Rich Passage Wave Action Study (RPWAST 2001).

2.0 EUROPE

2.1 DENMARK

In 1997, the Danish Maritime Authority issued a governmental order (Order No. 307) on "the Approval of the Safe Navigation of High-Speed Ferries" (DMA 1997). The order requires shipping companies to present documentation to the fact that the waves generated by the high-speed ferry do not constitute an unnecessary risk to navigation safety and to leisure activities in coastal areas based on the following calculation for maximum wave height:

$$H_h = 0.5 \sqrt{(4.5/T_h)}$$

Where:

- H_h is the maximum wave height (m) of the generated long periodic waves, measured in water 3 m deep and in calm water;
- T_h is the average generated wave period of the long periodic waves, measured in seconds;
- "Coastal areas" are areas where water depths do not exceed 3 meters; and
- "High-speed ferry" are defined as high-speed craft capable of a maximum speed of 3.7 x $V^{0.1667}$ m/s or more, where V is the displacement corresponding to the design waterline (m^3), corresponding to the definition in the International "High-speed Craft Code" (IMO Resolution MSC.36(63)).

For example, the height of a long periodic wave with an average wave frequency of 9 seconds may not exceed 0.35 m when measured in calm water 3 m deep. The criteria are based on theoretical and experimental research based on bathymetry of Danish waters.

The Danish Maritime Authority's approval has to be obtained before a shipping company establishes a high-speed ferry route operating in a Danish port, or puts a new high-speed ferry into service on an existing route. The shipping company is required to present documentation to the effect that the limit value calculated is not exceeded on the route in question, illustrated for

example by results of model tests, full-scale measurements, or numerical simulation. The documentation shall be prepared by recognized institutes, including an institute in other EU Member States and in countries which are covered by the EEA agreement, and which gives appropriate and satisfactory guarantees of a technical, professional and independent nature. However, the documentation may be based on other information representing at least the same degree of accuracy.

2.2 ITALY

Two studies on the impact of wave wash associated with high-speed ferries were noted during the study for this EIR, which may provide the basis for development of criteria in the future. These studies comprised the Low Impact Urban Transport Water Omnibus (LUITO) Project by the Maritime Research Institute Netherlands for use in Venice, Italy and funded by the European Union.

The objectives of the LUITO Project, which was completed in 1999, were to design and develop a novel urban waterbus for use on the Venice waterways; and extension, application, and validation of the latest tools for predicting and minimizing wave wash (MRIN 2002).

2.3 UNITED KINGDOM

In the United Kingdom, the Maritime and Coastguard Agency, is currently working with Marinetech South Limited on the Ships Wash Impact Management (SWIM) Research Project Collaboration. The objectives of the SWIM Project, which is due for completion in 2003, are:

- Development of validated techniques for predicting "near-field" wave generation, identifying the impact of hull form, trim, speed and water depth on wash characteristics;
- Enhancement of methods for predicting wash propagation from "near-field" to "far-field" validation against model and full scale data;
- Development of methodologies to quantify ecological impacts of wash, addressing littoral stress and seabed particle resuspension and key safety implications; and
- Proposal of guidelines for managing wash impacts, addressing ship design and operation factors as well as regulatory procedures based on understanding of wash effects (Maritime and Coastguard Agency (UK) 2002).

The project is supported by the Maritime Safety Committee of the International Marine Organization (IMO).

3.0 NEW ZEALAND

In 1994, 35-knot fast ferries began operating on the Marlborough Sounds in New Zealand (MDC 2002). Soon after they began operating, the Marlborough District Council (MDC) received numerous complaints about the effects of wake wash. Several environmental groups made unsuccessful attempts to halt fast ferry operations. There were also safety concerns. In response to the concerns, the Maritime Safety Authority and Marlborough District Council established measures for voluntary trial by all ferries during the 1999/2000 summer (MDC 2002). The

council also had a formal risk assessment performed. Based on the results, the council determined that the level of risk from fast ferry operations was higher than considered appropriate and that some remedial action was necessary.

The Danish Hydraulic Institute was retained to determine whether the Danish ferry criteria would be appropriate for the area. Based on results of a continuing ferry wash monitoring program, and various reports and consultations, the council approved a bylaw imposing an 18-knot speed restriction on high-speed craft. The Navigation Bylaw 2000 became operative in December 2000. It includes an exemption if ferry operators can demonstrate that waves generated by their vessels will not exceed prescribed levels (MDC 2002).

In December 2001, the MDC released a "Draft Variation Discussion Document" on proposed controls for high-speed vessels to be included in an updated "Marlborough Sounds Resource Management Plan" (MDC 2001). The options were released for public comment in December 2000.

Comments received from an initial discussion document released in December 2000 (MDC 2000) were considered in the development of the proposed option. A second public comment period ended in February 2002. Seven options were considered, including no action, central governmental controls (national policy), economic incentives for operators, and local regulatory controls. The proposed control was a regulatory option with two parts. Based on anecdotal evidence, the 18-knot bylaw reduced erosion in the Sounds (MDC 2001). The MDC also noted that wake from slower vessels could also be environmentally detrimental. Therefore, a trigger level of 15 knots would be established for travel on the existing national transportation route (inner Queen Charlotte Sound and Tory Channel). Vessels proposing travel at speeds greater than 15 knots would require a wake assessment based on the Bylaw methodology. Those meeting the criteria would be granted a "Resource Consent" to operate.

In order to reduce the area in the coastal environment that could be affected by shipping activity, MDC also proposed to encourage operators to restrict travel to within the existing national transportation route, suggesting it may be necessary to prohibit travel outside of this route at speeds greater than 15 knots.

4.0 REFERENCES

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Wake Wash Measurement Methodology B-1

1.0 Wake Wash Measurements B-1
2.0 Wake Decay and Dissipation B-2
3.0 Wake Attenuation Calculations B-3
4.0 References B-4

Characteristics of wake waves reaching a shoreline can be calculated based on measured wake parameters for specific vessels. The following sections present a description of the wake assessment methodology used for this study.

1.0 WAKE WASH MEASUREMENTS

The wake wash characteristics of existing conventional and high-speed ferry vessels operating on the six services in San Francisco Bay were measured over a three-day period in February 2002 for this assessment. The weather during the field measurements was unusually calm, with essentially no wind.

Measurements were made of the following vessels at the eight listed locations:

Location	Vessels Measured
East of Alcatraz	*Mendocino, Zelinsky, Mare Island, Del Norte, Intinoli, San Francisco, Solana* – Pusher Tug, *Sonoma, Scarlet Trader* – Tanker
Paradise Cay (210 m from breakwater)	*Sonoma, Mendocino*
Oakland	*Tokyo Express* – Container Ship, Tug, *Encinal*, (entrance to Estuary) Tug, *Bay Breeze*
South of Carquinez Strait	*Intintoli, Mare Island*
Petaluma	USACE Boat, Fishing Boat, *Provider* (in Petaluma Channel)
Larkspur Channel	*Marin, Mendocino*
East of San Mateo (near Coyote Point Marina)	*Provider*
South of Yerba Buena	*Encinal*

A video was made of the wake of some of the ferries. The wake of the *Provider* (50-ft work boat from which measurements were made) was also recorded as it traveled towards a slough leading to clapper rail breeding habitat on the Petaluma Channel.

Wave heights and periods of vessel wash were measured using a submerged pressure measuring/recording instrument package that measures pressure 4 times per second and records data to computer memory. The instrument package was anchored to the bottom, in up to 200 feet of water, and suspended from a buoy that was held 6 to 10 feet below the surface of the water by a taut line to the anchor. A marker buoy on the surface was used for location and recovery. After the data was gathered, custom software converted the pressure readings to wave

heights as a function of time, enabling measurements and plots to be made of wave patterns passing over the buoy.

The actual distance to the vessel being observed was measured using a laser rangefinder accurate to ± 1.0 meter. All data that was consistent and repeatable was analyzed. Each run's data was normalized to a distance off centerline of travel of 300 meters and, where possible, any multiple run data for each speed or vessel was averaged.

2.0 WAKE DECAY AND DISSIPATION

There are some significant differences between the characteristics of wind waves and the wake wash waves. Whereas wind-driven waves increase in energy with fetch as they approach the shoreline, individual wake wash waves slowly lose energy with distance of travel, becoming smaller in height and longer in wavelength, while the total number of waves in the wave train increases. Wind waves occur nearly continuously, in random form, at various levels of intensity, direction, and sustained length. Vessel waves occur in a single train, usually lasting for 3 to 10 minutes with each passing, at predictable levels of intensity, direction and sustained length. The profile of a typical vessel wave over its life at a given point will show 2 to 6 significant waves, nearly identical in form, followed by several of diminishing intensity.

Some energy from vessel wakes dissipates in the Bay in reaction to wind-driven waves or by friction as the waves travel over great distances. However, the remainder of the wave energy will reach the shoreline, especially if the vessel route is near shore. Those waves that reach the shoreline expend themselves in a predictable manner. As waves move towards the shore, they encounter the sloping near-shore bottom. When a wave reaches a depth of about 1.3 times the wave height, the wave collapses or breaks (USACE 1984). Breaking results in a dissipation of wave energy, which can be the cause of erosion.

Wave parameters include:

H = Wave Height (m)

λ = Wavelength (m)

T = Wave Period (s) the time that it takes a given point on a wave (say the crest) to pass a fixed point

F = Wave Frequency (1/s) – the reciprocal of wave period.

C = Wave Celerity (m/s) - the apparent speed of advance of a wave perpendicular to a line passing through the peak of the wave.

The degree of impact from wake wash to a shoreline (or passing vessel, etc.) is a function of the amount of energy in the wash that is expended when the waves hit the shoreline. The total wave energy (E_{total}) in one wavelength per unit crest can be defined as:

$E_{total} = \rho g H^2 \lambda / 8$

where ρ = density of water (1,025 kg/m^3 for saltwater and 1,000 kg/m^3 for fresh water), and g = the gravitational constant (9.8 m/s^2)

Energy Density (E) is the average of the energy along the length of the wave:

$$E = E_{total}/\lambda = \rho g H^2/8 \quad (1)$$

Wavelength and wave period (T) are related as:

$$\lambda = gT^2/2\pi \quad (2)$$

Substituting for λ based on equation 2 yields:

$$E = \rho g^2 H^2 T^2/16\pi \quad (3)$$

Equation 3 allows wave energy reaching the shoreline to be calculated based on deeper water measurements of wave height and period.

3.0 WAKE ATTENUATION CALCULATIONS

Wave height attenuation is important as it is the highest or tallest waves, which carry the greatest energy and hence have the greatest potential to do the damage. The height of the tallest wave can be compared with the height of natural wind-generated waves to assess whether erosion is likely and also to estimate the height of the tallest wave approaching a marsh fringe.

In analyzing each of the potentially wake wash sensitive areas, several factors were considered. For dispersive vessel-generated waves, the following characteristics are important:

- The height of each wave in the wave train attenuates with distance proportional to the inverse cube root of the distance from the sailing line.
- The period of each wave in the wave train remains constant.
- The energy of each individual wave in a wave train attenuates with distance, but the total energy in the wave train remains constant.

In deep water, as the distance from a vessel line of travel increases, while the period of a ship-generated wave stays constant with increasing distance, the height of individual waves in the wake wash wave train attenuate at a rate inversely proportional to the cube root of the ratio of distances. The wave height attenuation is given by equation 4:

$$\frac{H_2}{H_1} = \sqrt[3]{\frac{d_1}{d_2}} \quad (4)$$

where H_1 = Wave height measured

H_2 = Wave height at location of concern

d_1 = Distance of measurement from vessel line of travel

d_2 = Distance of location of concern from vessel line of travel

This relationship holds true for relatively short changes in distances. There is a great deal of discussion among those working with wake wash evaluations as to the exact attenuation factor

for long distances, for example attenuation over 2 kilometers. The above relationship, however, remains a good approximation with less than 10% error even at such distances.

Energy attenuation in the highest individual wave in the train can be calculated from the scaled wave height and measured parameters by equation 5:

$$E_2 = E_1 (H_2/H_1)^2 \quad (5)$$

where H_1 = wave height measured

H_2 = wave height at location of concern

E_1 = wave energy measured

E_2 = wave energy at location of concern

If there is no attenuation of wake wash waves by wind waves (flat calm), the total energy in a wake wash wave train is conserved for long distances. As distance from the sailing line is increased and the wash height decreases, dispersion creates a higher number of these waves of lesser height. Though the total energy is largely conserved, the wave train takes longer to pass a given point the farther the point is from the sailing line.

4.0 REFERENCES

USACE, 1984. Shore Protection Manual, U.S. Army Engineer Waterways Experiment Station Coastal Engineering Research Center.

Wind-Driven Wave Energy Calculation Methodology 1

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WAKE-A-3 Monthly Wind Rose Plots for Years 1992-1993 at San Francisco International Airport
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WAKE-A-5 Monthly Wind Rose Plots for Years 1992-1993 at San Pablo Bay
WAKE-A-6 Map of Wave Station Locations Used for Wave Calculations

Wind-driven wave energy was calculated for various Bay area locations from available wind data. This technique, termed "hindcasting," provides estimates of wave characteristics, such as wave height and energy, using empirical equations based on past meteorological conditions. Because there are no comprehensive measurements of waves in San Francisco Bay, wave hindcasting was conducted using computer models for 15 representative locations throughout the Bay. Analysis of wind data from Oakland and San Francisco airports indicates that the 1992-1993 year was a typical or representative wind year for winds that have occurred over the last 20 years. Therefore, the 1992-1993 wind records from these airports and data from a wind station in San Pablo Bay were used in this analysis.

The following sections present an introduction to wind-driven waves and describes the hindcasting methodology, which is based on the equations derived in the Shore Protection Manual (USACE 1984).

1.0 INTRODUCTION TO WIND-DRIVEN WAVES

Wind blowing over water produces a shear force at the water's surface, which generates waves. The size of the waves depends predominantly on the velocity of the wind, wind direction, the distance over which the wind blows ("fetch"), and the depth of the water.

Waves can be described by a combination of the wave height, the wave period or the time for a wave to pass, the speed of the wave, the length of the wave, and direction. Measures commonly used to describe waves include the significant wave height (H_s), mean wave period (T_m), wavelength (λ), and celerity (C). Significant wave height is the average of the highest third of wave heights measured at a point over some period of time. Mean wave period is the average time between the passage of two successive wave crests past a given point. Wavelength is the distance between two successive wave crests. Celerity is the speed at which the wave is traveling. Wave direction is the direction *from* which a wave is traveling. These parameters are illustrated on Figure WAKE-A-1.

The energy in a wave is a combination of the potential energy due to the change in the position of the water from a still water level and the kinetic energy due to the movement of water within a wave. The energy per unit area (E) in a wave of height H is given by:

$$E = \rho g H^2 / 8$$

where ρ is the density of seawater and g is the acceleration due to gravity.

Once waves have been generated and they are traveling towards a shallow area, such as a mudflat or beach, the waves will be influenced by the depth of water beneath the waves. At one extreme, when the water depth is less than approximately 1.3 times the wave height, the wave will break, dissipating its energy. At intermediate depths, the wave will "feel" the bottom and begin to bend (refract). It is often convenient to measure water depth in terms of the wavelength. "Deep" water, in which the bottom does not influence wave dynamics, is generally taken to be twice the wavelength. Water depths in the Bay are shown on Figure WAKE-A-2.

2.0 WIND ESTIMATES

Typical wind conditions (i.e., wind speed and direction) were calculated from measured wind data in and around San Francisco Bay. The selection criteria for the measured wind data is listed below:

- Hourly observations spanning multiple years
- Wind measurements from all regions of the Bay (i.e., South Bay, Central Bay, and North Bay)
- All wind measurements must be collected during coincident time periods

Using the above selection criteria, three different wind stations during the years 1992 and 1993 were selected. The three wind stations—San Francisco International Airport (SFO), Oakland International Airport (OAK), and San Pablo Bay—represent measurements for the South Bay, Central Bay, and North Bay, respectively. For the purposes of this study, the South Bay was defined as the area south of the Oakland Bay Bridge, the Central Bay was the region north of the Oakland Bay Bridge and south of Point San Pablo (located near the Richmond Bridge), and the North Bay was the region north of Point San Pablo and extending up towards the Delta. The wind stations are shown on Figure WAKE-A-2.

The length of the records collected was restricted to 1992 and 1993 due to the limited availability of wind measurements for San Pablo Bay. Wind data from SFO and OAK were collected from the National Climatic Data Center (NCDC). San Pablo Bay wind data was retrieved from the United States Geological Survey (USGS) ANIMAR database. Multiple years of wind measurements were obtained to ensure a more accurate assessment of "typical" monthly wind conditions.

Once all of the wind data was collected, the data for each wind station was separated into 12 data packets, each packet representing data measurements for one of the 12 months. Wind rose plots for each wind station for each month are shown in Figures WAKE-A-3 through WAKE-A-5 for SFO, OAK, and San Pablo Bay, respectively. The data packets, or monthly wind data files, were further separated into 24 different files, each file representing one of the 24 wind directions, or "bins" (360 degrees ÷ 15 degrees per bin = 24 bins). At this point in the analysis, data from each of the three wind stations has been separated into 288 different files, each file representing a particular wind direction for a particular month (12 months × 24 bins = 288 files per wind station). The mean wind speed for each of the 288 files for each station was calculated and used as the wind input parameter for the wave height and wave period calculations. Tables WAKE-A-1 through WAKE-A-3 list the mean wind speed and percent occurrence for each month for each bin for SFO, OAK, and San Pablo Bay, respectively.

A similar process was performed to determine the maximum wind speeds during each month for each wind station. Maximum wind speeds were used to determine the maximum amount of energy found in a single wave during the course of one month. The maximum wind speed was selected from each wind direction bin for every month. Results of the maximum wind speed analysis for SFO, OAK, and San Pablo Bay are listed in Tables WAKE-A-4 through WAKE-A-6, respectively.

3.0 FETCH LENGTH ESTIMATES

The fetch is defined as the distance over water the wind blows in the wave generating area. Fetch is commonly calculated as the distance between the point of interest and the nearest land point in the windward direction. Within San Francisco Bay, fetch length ranges from 0 to 50 kilometers depending on the wind direction. Fetch length may be restricted by land mass obstructions between the water and the wind. This "shading" by land mass obstructions is common between the Oakland Bay Bridge and the Richmond Bridge due to the presence of Treasure Island, Angel Island, and Alcatraz Island. For the purposes of this study, fetch was defined as the unobstructed distance between the point of interest and the nearest land point in the windward direction.

4.0 WAVE GROWTH ESTIMATES

The first step in the wave growth calculations was to calculate the adjusted wind speed based on neutral stability at a 10-meter elevation for each of the three wind stations shown in Figure WAKE-A-2. Since winds measured at SFO and OAK were recorded at the 10-meter elevation, no adjustment was necessary. The San Pablo Bay winds, however, were measured near the water surface and were adjusted accordingly using Equation 1 shown below:

$$U(10) = U(z)\left(\frac{10}{z}\right)^{1/7} \quad (1)$$

where U(10) = adjusted wind speed at 10-meter elevation in m/s
z = height of recorded wind speed in meters

Once the wind speed is determined at a 10-meter elevation, the wind-stress factor, U_A, was calculated using Equation 2.

$$U_A = 0.71 \cdot U(10)^{1.23} \quad (2)$$

where U_A = wind-stress factor in m/s
U(10) = adjusted wind speed at 10-meter elevation in m/s

The term "shallow water" refers to the ratio of the water depth over wavelength (h/L), which is called the relative depth (Kinsman 1965). Shallow water has a small relative depth. That is, the water depth is much smaller than the wavelength. Water at the Golden Gate, the deepest part of San Francisco Bay, may be considered "shallow" if very long waves are running on the surface.

Water depth affects wave generation. For a given set of wind and fetch conditions, wave heights will be smaller and wave periods shorter if generation takes place in shallow water rather than deep water. The SPM (USACE 1984) addresses shallow water wave predictions of wave height and wave period using Equations 3 and 4 shown below:

$$\frac{gH}{U_A^2} = 0.283 \cdot \tanh\left[0.530\left(\frac{gd}{U_A^2}\right)^{3/4}\right] \tanh\left\{\frac{0.00565\left(\frac{gF}{U_A^2}\right)^{1/2}}{\tanh\left[0.530\left(\frac{gd}{U_A^2}\right)^{3/4}\right]}\right\} \quad (3)$$

$$\frac{gT}{U_A^2} = 7.54 \cdot \tanh\left[0.833\left(\frac{gd}{U_A^2}\right)^{3/8}\right] \tanh\left\{\frac{0.0379\left(\frac{gF}{U_A^2}\right)^{1/3}}{\tanh\left[0.833\left(\frac{gd}{U_A^2}\right)^{3/8}\right]}\right\} \quad (4)$$

where g = acceleration of gravity in m/s^2
H = wave height in meters
U_A = wind-stress factor in m/s
d = average depth across the fetch in meters
F = fetch in meters
T = wave period in seconds

These equations were used for each of the winds listed in Tables WAKE-A-1 through WAKE-A-6. A significant limitation of this method is that the winds are assumed to blow for an infinite period of time and that the waves develop instantaneously. In reality, waves take some time to develop and this time is often referred to as the duration. According to the SPM (USACE 1984), duration may be computed using the following expression:

$$\frac{gt}{U_A} = 537 \cdot \left(\frac{gT}{U_A}\right)^{7/3} \quad (5)$$

where t = duration in seconds

Fortunately, the mean wind speeds used in this analysis often occur for hours at a time. The maximum sustained wind speeds, on the other hand, usually last one to two hours at a time, but it can be shown that the resulting wave heights and wave periods calculated during this analysis are within the confines of Equation 5. Therefore, this justifies the use of fetch-limited, shallow water equations.

Once the wave height was calculated, the energy density, $\bar{E}$, was calculated via the Airy theory (i.e., all waves propagate in the same direction) as discussed in SPM (USACE 1984), Dean and

Dalrymple (1984), and Le Mehaute (1976). The energy density is the total average energy per unit surface area of the wave. Energy density is calculated using Equation 6 shown below:

$$\overline{E} = \frac{\rho g H^2}{8} \tag{6}$$

where $\overline{E}$ = energy density in J/m
ρ = density of seawater in kg/m^3

Once the energy density was calculated, the next step in the analysis was to determine the rate at which the wave energy propagated into the shoreline, or the energy flux. To accomplish this, the group velocity of the wave field was calculated. Group velocity, as defined in SPM (USACE 1984), is function of wavelength, L, which is calculated using Equation 7.

$$L = \frac{gT^2}{2\pi}\tanh\left(\frac{2\pi d}{L}\right) \approx \frac{gT^2}{2\pi}\sqrt{\tanh\left(\frac{4\pi^2 d}{Tg}\right)} \tag{7}$$

where L = wave length in m

Once the wave length was calculated, the group velocity, C_g, was determined via Equation 8 shown below:

$$C_g = \frac{L}{2T}\left(1 + \frac{4\pi d/L}{\sinh\left(4\pi d/L\right)}\right) \tag{8}$$

where C_g = group velocity in m/s

Finally, using the energy density, $\overline{E}$, and the group velocity, C_g, the amount of energy flux, or wave power, as described in SPM (USACE 1984) was determined using Equation 9.

$$\overline{P} = \overline{E}C_g \tag{9}$$

where $\overline{P}$ = energy flux in J/s

Energy flux was calculated for every wind direction bin for every month. Using the percent occurrence, or frequency, of each wind condition, the amount of energy reaching the shoreline on a monthly basis in terms of Joules per meter shoreline was determined.

For the maximum energy found in a single wave, Equations 1 through 5 are used to determine the wave height and wave period. However, instead of calculating the energy flux of the wave field as was done using Equations 6 through 9, the energy in one wavelength per unit crest width was calculated using Equation 10 shown below as described in SPM (USACE 1984):

$$E = \frac{\rho g H^2 L}{8} \tag{10}$$

where E = energy in one wavelength in J/m

5.0 RESULTS

Table WAKE-A-7 presents the monthly wave energies reaching the shoreline for selected locations within the Bay. The locations are shown on Figure WAKE-A-6. Each monthly value represents the total energy from all 24 wind directions for that particular month. The amount of wave energy reaching the shoreline is highly variable depending on location within the Bay and the time of year. The average monthly wave energy, or the second column from the right in Table WAKE-A-7, differs by as much as two orders of magnitude depending on location within the Bay. The difference is mostly due to fetch limitations, but is also dependent on wind speed.

Table WAKE-A-8 lists the maximum wave energy found in a single wave per unit wavelength for selected locations within the Bay. The maximum value represents the greatest amount of energy across all 24 wind directions. Much like the monthly wave energy reaching the shore, the maximum wave energy found in a single wave differs by more than two orders of magnitude depending on location in the Bay. Again, these differences are mostly due to fetch limitations, but wind speed also plays a significant role. Table WAKE-A-9 lists the significant wave heights for selected locations within the Bay.

6.0 REFERENCES

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APPENDIX WAKE-A TABLES

Table WAKE-A-1

Mean Monthly Wind Speed (m/s) and Percent Occurrence for the Given Wind Direction at SFO, 1992-1993

Bin (degrees)	Wind Parameter	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	*Mean Wind Speed (m/s)*	4.0	2.8	3.0	4.5	3.4	3.1	3.2	3.4	3.2	3.0	4.9	3.8
	% Occurrence	3.3	1.3	0.6	0.9	0.6	0.4	0.7	0.8	0.7	0.9	2.2	2.2
15 to 30	*Mean Wind Speed (m/s)*	3.3	3.3	2.7	3.4	3.5	3.5	3.5	3.2	3.4	2.7	3.8	3.0
	% Occurrence	6.0	2.7	1.4	0.6	1.0	1.0	1.1	1.0	1.5	2.4	1.7	2.9
30 to 45	*Mean Wind Speed (m/s)*	3.0	3.3	2.9	3.0	3.7	3.2	3.3	3.4	3.3	2.9	2.8	3.4
	% Occurrence	9.9	3.9	3.0	1.9	1.2	2.6	2.9	1.4	2.8	4.1	3.1	5.0
45 to 60	*Mean Wind Speed (m/s)*	3.0	2.9	3.2	2.8	3.6	3.6	3.4	3.2	3.4	2.7	3.1	3.8
	% Occurrence	3.5	2.2	1.9	0.9	1.1	1.0	1.2	1.5	1.0	1.4	2.3	3.4
60 to 75	*Mean Wind Speed (m/s)*	3.8	3.6	2.9	2.9	3.4	3.2	3.2	3.2	2.9	2.7	4.2	3.8
	% Occurrence	6.9	4.0	2.9	2.3	1.7	1.1	1.3	0.9	1.6	2.3	4.7	7.4
75 to 90	*Mean Wind Speed (m/s)*	4.0	3.1	2.9	3.4	3.3	3.4	2.9	4.0	3.6	2.0	3.1	3.4
	% Occurrence	3.6	1.4	0.7	0.4	0.6	0.2	0.1	0.1	0.1	0.2	1.4	3.2
90 to 105	*Mean Wind Speed (m/s)*	3.8	3.7	3.3	2.9	3.8	2.8	2.6	2.4	3.0	2.9	3.2	3.8
	% Occurrence	5.0	4.3	2.9	0.9	0.6	0.4	0.4	0.3	0.7	1.9	2.8	3.9
105 to 120	*Mean Wind Speed (m/s)*	3.6	3.5	3.5	2.8	3.7	1.3	1.8	0.0	2.7	1.6	3.0	4.2
	% Occurrence	2.0	2.6	0.6	0.4	0.5	0.1	0.1	0.0	0.1	0.2	1.3	2.0
120 to 135	*Mean Wind Speed (m/s)*	3.8	4.2	3.3	4.1	4.3	4.0	2.4	2.6	2.6	2.7	3.1	4.4
	% Occurrence	5.7	9.3	3.4	1.1	1.2	0.4	0.3	0.4	0.6	1.4	4.7	8.7
135 to 150	*Mean Wind Speed (m/s)*	3.6	4.8	3.8	3.9	3.6	4.2	2.7	2.7	2.4	3.3	3.2	4.0
	% Occurrence	4.1	5.5	2.4	0.6	0.8	0.4	0.2	0.1	0.4	1.4	4.0	6.4
150 to 165	*Mean Wind Speed (m/s)*	3.4	3.8	3.5	4.7	3.7	3.1	3.1	3.1	2.3	2.6	2.6	3.7
	% Occurrence	7.1	10.3	4.7	1.7	2.7	0.7	0.2	0.1	0.4	3.0	5.5	7.7
165 to 180	*Mean Wind Speed (m/s)*	3.6	3.8	3.1	3.7	4.2	3.9	4.0	2.1	2.8	3.4	2.5	4.5
	% Occurrence	2.7	4.1	3.4	1.1	1.5	0.4	0.2	0.3	0.8	1.7	2.1	3.8
180 to 195	*Mean Wind Speed (m/s)*	3.6	4.6	3.6	4.1	5.2	4.7	3.1	4.0	3.0	3.2	2.4	4.8
	% Occurrence	7.2	8.0	5.7	2.6	4.4	2.1	1.0	0.9	0.7	3.7	3.3	7.4
195 to 210	*Mean Wind Speed (m/s)*	4.2	4.5	3.9	2.7	5.2	3.2	6.2	3.9	3.4	3.7	3.0	4.7
	% Occurrence	4.0	3.6	2.7	1.6	3.5	1.2	0.4	1.2	0.4	2.1	2.3	3.4
210 to 225	*Mean Wind Speed (m/s)*	4.3	3.7	3.7	4.3	5.6	5.1	4.1	5.0	2.8	3.4	2.3	5.1
	% Occurrence	5.1	4.4	5.4	3.4	5.4	2.3	2.2	2.4	1.6	6.1	5.8	5.8
225 to 240	*Mean Wind Speed (m/s)*	3.4	3.7	3.7	3.7	5.4	4.9	4.7	4.0	3.4	3.5	2.3	4.5
	% Occurrence	2.1	2.8	3.0	2.2	2.9	1.6	1.5	1.6	1.6	4.3	3.1	3.2
240 to 255	*Mean Wind Speed (m/s)*	3.6	3.8	3.4	3.8	4.9	4.5	4.2	4.5	3.7	3.3	2.5	3.3
	% Occurrence	4.9	7.5	6.3	5.7	7.9	5.9	4.1	5.4	6.2	9.5	7.7	5.1
255 to 270	*Mean Wind Speed (m/s)*	4.2	4.3	4.2	4.5	5.5	5.8	5.6	5.4	4.9	4.0	2.7	4.7
	% Occurrence	1.5	2.4	4.2	3.4	5.3	5.4	4.4	5.8	5.5	3.3	2.7	1.7
270 to 285	*Mean Wind Speed (m/s)*	5.2	5.4	5.2	6.7	7.1	7.8	7.6	6.4	5.8	5.1	5.0	5.2
	% Occurrence	2.6	6.6	15.0	24.4	19.5	26.9	22.4	19.8	15.3	9.5	9.3	3.6
285 to 300	*Mean Wind Speed (m/s)*	5.6	4.8	6.0	7.0	7.3	8.2	7.1	6.9	6.1	5.0	5.6	5.2
	% Occurrence	2.4	4.2	11.8	19.0	11.4	14.9	12.2	10.1	11.9	9.3	7.3	2.3
300 to 315	*Mean Wind Speed (m/s)*	5.0	4.7	5.3	6.1	6.6	6.6	6.4	6.9	6.5	5.7	5.8	5.4
	% Occurrence	5.6	6.5	14.7	22.2	22.1	24.6	34.7	37.3	37.4	24.2	15.2	6.2
315 to 330	*Mean Wind Speed (m/s)*	3.4	3.2	3.8	5.1	6.0	6.7	6.7	7.1	7.0	5.6	4.6	4.9
	% Occurrence	1.2	0.7	1.1	1.3	2.4	3.6	5.2	5.4	5.2	3.8	2.0	1.3
330 to 345	*Mean Wind Speed (m/s)*	2.8	2.5	2.8	4.0	5.2	5.7	4.8	5.0	4.5	3.7	3.6	3.8
	% Occurrence	1.7	1.1	1.6	1.1	1.6	2.3	2.7	1.9	2.6	2.4	2.7	2.4
345 to 360	*Mean Wind Speed (m/s)*	3.9	2.7	3.1	4.9	5.0	3.6	3.7	3.6	4.5	3.1	4.5	4.1
	% Occurrence	2.1	0.6	0.6	0.5	0.3	0.5	0.5	1.2	0.8	0.8	2.8	1.1

Table WAKE-A-2

Mean Monthly Wind Speed (m/s) and Percent Occurrence for the Given Wind Direction at OAK, 1992-1993

Bin (degrees)	Wind Parameter	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	*Mean Wind Speed (m/s)*	4.8	3.3	2.5	2.7	2.5	4.0	0.0	2.7	2.4	4.2	4.9	3.8
	% Occurrence	1.8	0.9	0.3	0.2	0.1	0.5	0.0	0.1	0.2	0.2	2.9	2.1
15 to 30	*Mean Wind Speed (m/s)*	4.2	3.2	2.9	2.1	2.7	3.4	2.8	1.8	2.3	3.2	3.5	3.5
	% Occurrence	3.6	1.5	0.9	0.2	0.1	0.5	0.2	0.5	0.4	0.4	4.3	3.5
30 to 45	*Mean Wind Speed (m/s)*	4.1	2.8	3.4	2.3	2.7	6.2	2.7	2.5	2.2	2.2	3.3	3.8
	% Occurrence	7.2	4.1	1.5	1.0	0.4	0.4	0.1	0.7	0.4	1.6	4.8	7.7
45 to 60	*Mean Wind Speed (m/s)*	3.9	3.3	2.4	5.3	2.5	2.2	0.0	0.0	2.7	2.8	3.1	3.8
	% Occurrence	4.7	1.7	0.4	0.6	0.1	0.2	0.0	0.0	0.1	0.7	2.8	4.3
60 to 75	*Mean Wind Speed (m/s)*	3.9	3.2	2.9	2.7	2.6	2.1	1.3	1.6	2.8	2.5	2.9	3.1
	% Occurrence	8.2	3.8	2.2	1.1	0.5	0.4	0.1	0.1	0.5	1.9	5.0	6.1
75 to 90	*Mean Wind Speed (m/s)*	3.6	3.4	3.1	2.6	2.7	0.0	0.0	0.0	2.7	2.2	3.2	3.3
	% Occurrence	3.4	2.3	1.2	0.3	0.2	0.0	0.0	0.0	0.1	0.8	2.5	2.7
90 to 105	*Mean Wind Speed (m/s)*	3.6	4.0	3.8	3.1	3.1	2.3	2.7	2.5	2.4	2.8	2.9	3.5
	% Occurrence	7.4	5.5	3.2	1.5	1.8	0.7	0.1	0.3	0.6	1.9	4.0	6.0
105 to 120	*Mean Wind Speed (m/s)*	4.2	4.5	4.1	3.0	3.3	3.1	0.0	4.0	3.4	2.4	3.4	4.0
	% Occurrence	3.1	5.3	1.9	1.0	1.1	0.1	0.0	0.1	0.2	1.5	3.5	5.9
120 to 135	*Mean Wind Speed (m/s)*	4.9	6.3	4.9	5.1	5.1	8.3	2.0	2.3	2.2	3.7	3.6	5.1
	% Occurrence	8.4	12.8	5.2	1.8	2.0	0.2	0.3	0.4	0.5	2.4	5.6	12.4
135 to 150	*Mean Wind Speed (m/s)*	5.9	6.2	5.4	6.5	5.6	6.2	3.7	2.7	4.3	5.2	4.1	6.3
	% Occurrence	5.4	8.9	3.8	1.8	1.3	0.5	0.3	0.1	0.2	1.9	2.6	5.9
150 to 165	*Mean Wind Speed (m/s)*	4.9	5.4	5.8	4.5	5.1	4.4	1.8	2.9	2.6	4.8	3.3	4.9
	% Occurrence	5.3	8.7	6.1	1.4	3.2	0.6	0.2	0.1	1.4	2.4	2.8	6.1
165 to 180	*Mean Wind Speed (m/s)*	3.5	5.3	4.2	5.2	6.4	4.3	3.8	4.5	3.6	2.9	2.5	4.0
	% Occurrence	1.6	2.4	2.2	0.7	1.4	0.6	0.1	0.1	0.2	0.8	0.8	1.6
180 to 195	*Mean Wind Speed (m/s)*	4.1	5.1	3.9	3.5	4.6	3.4	3.8	3.1	2.5	3.7	2.8	3.9
	% Occurrence	2.9	3.8	4.8	1.8	3.1	1.8	1.2	1.0	0.8	2.6	2.9	4.9
195 to 210	*Mean Wind Speed (m/s)*	3.9	3.8	4.5	3.6	4.7	4.0	3.5	3.6	3.8	2.9	3.3	4.0
	% Occurrence	2.8	2.7	3.6	2.2	1.8	2.1	2.5	1.0	1.6	2.8	2.0	1.2
210 to 225	*Mean Wind Speed (m/s)*	2.9	4.4	4.2	4.7	4.5	4.8	3.9	4.1	3.3	3.5	3.2	3.7
	% Occurrence	1.9	3.2	5.9	5.3	6.7	4.3	3.6	5.4	4.1	3.9	2.9	2.9
225 to 240	*Mean Wind Speed (m/s)*	2.6	4.2	5.2	5.1	5.4	4.9	4.5	4.6	4.2	4.1	3.1	4.1
	% Occurrence	1.2	2.4	3.0	4.4	4.3	3.8	3.5	4.6	3.7	2.6	1.7	2.0
240 to 255	*Mean Wind Speed (m/s)*	3.2	4.6	4.6	5.3	5.1	5.3	5.0	4.5	4.3	4.0	3.8	3.5
	% Occurrence	3.1	6.4	11.7	16.7	15.6	17.0	13.0	14.8	13.5	13.7	8.4	4.0
255 to 270	*Mean Wind Speed (m/s)*	3.5	4.4	4.8	5.2	5.5	5.7	5.3	4.6	4.6	4.0	3.9	3.2
	% Occurrence	2.3	4.0	7.8	12.2	12.2	14.0	12.1	9.6	10.4	10.7	5.6	2.8
270 to 285	*Mean Wind Speed (m/s)*	4.4	4.7	4.7	5.3	5.5	5.8	5.2	5.0	4.7	4.2	4.3	4.4
	% Occurrence	6.8	8.0	18.0	23.7	26.0	27.1	26.8	24.2	24.5	21.9	12.7	5.0
285 to 300	*Mean Wind Speed (m/s)*	4.3	4.1	4.3	5.2	5.3	5.8	5.4	5.2	4.9	4.3	4.6	4.7
	% Occurrence	3.8	3.1	5.4	8.6	7.7	9.5	12.1	13.6	11.8	8.4	4.7	2.7
300 to 315	*Mean Wind Speed (m/s)*	4.0	4.1	4.2	4.6	5.3	5.8	5.4	5.2	4.5	4.0	4.1	4.8
	% Occurrence	4.9	3.9	5.5	6.0	5.6	7.1	11.2	12.6	12.7	7.8	6.5	4.2
315 to 330	*Mean Wind Speed (m/s)*	3.8	3.0	3.4	4.3	4.4	4.5	5.1	3.7	3.8	3.6	4.0	3.8
	% Occurrence	2.6	1.7	1.6	3.5	1.3	3.1	3.9	4.5	4.5	3.0	3.7	1.6
330 to 345	*Mean Wind Speed (m/s)*	3.4	3.3	3.3	3.6	3.8	4.2	4.0	3.2	3.5	3.0	3.7	3.6
	% Occurrence	4.3	1.7	2.6	2.8	1.9	3.9	5.6	4.5	5.5	4.8	6.0	3.1
345 to 360	*Mean Wind Speed (m/s)*	4.0	2.9	2.9	2.8	3.1	3.5	3.8	3.2	3.0	3.5	3.8	2.8
	% Occurrence	3.2	1.4	1.2	1.0	1.6	1.7	3.1	1.6	2.3	1.3	1.4	1.3

Table WAKE-A-3

Mean Monthly Wind Speed (m/s) and Percent Occurrence for the Given Wind Direction at the San Pablo Bay Station, 1992-1993

Bin (degrees)	Wind Parameter	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	*Mean Wind Speed (m/s)*	4.6	2.3	2.2	4.0	1.8	4.8	0.0	0.0	1.4	2.0	3.5	2.6
	% Occurrence	3.9	2.0	1.7	0.3	0.3	0.1	0.0	0.0	0.2	0.7	4.9	3.2
15 to 30	*Mean Wind Speed (m/s)*	2.7	2.3	2.3	1.9	2.3	0.0	0.0	0.0	0.3	1.2	2.7	2.2
	% Occurrence	2.6	2.0	1.1	0.1	0.3	0.0	0.0	0.0	0.1	0.7	2.6	2.3
30 to 45	*Mean Wind Speed (m/s)*	2.7	2.2	2.7	2.1	0.5	0.7	0.0	0.0	0.0	1.6	2.6	3.3
	% Occurrence	3.1	1.8	1.6	0.1	0.1	0.1	0.0	0.0	0.0	0.7	2.0	1.9
45 to 60	*Mean Wind Speed (m/s)*	5.0	2.8	2.3	0.9	1.2	0.0	0.0	0.3	0.9	2.6	3.7	6.0
	% Occurrence	7.9	3.1	0.9	0.1	0.3	0.0	0.0	0.1	0.1	0.7	3.9	11.0
60 to 75	*Mean Wind Speed (m/s)*	6.8	4.6	3.7	4.5	0.0	0.0	0.0	0.0	0.0	4.2	5.6	7.1
	% Occurrence	25.5	9.4	2.2	0.3	0.0	0.0	0.0	0.0	0.0	1.4	8.9	22.4
75 to 90	*Mean Wind Speed (m/s)*	6.8	5.4	4.6	4.4	3.8	0.0	0.0	0.0	0.6	5.1	6.1	6.0
	% Occurrence	17.9	13.4	2.8	0.5	0.3	0.0	0.0	0.0	0.1	1.5	10.2	8.7
90 to 105	*Mean Wind Speed (m/s)*	3.6	2.8	3.4	3.1	2.7	2.2	0.0	0.0	1.9	3.1	3.7	3.8
	% Occurrence	2.8	3.6	1.3	0.1	0.3	0.3	0.0	0.0	0.1	0.6	3.0	3.4
105 to 120	*Mean Wind Speed (m/s)*	2.5	2.2	2.3	2.5	2.6	0.0	0.0	0.0	0.0	1.4	2.5	2.7
	% Occurrence	1.9	3.1	1.3	0.1	0.9	0.0	0.0	0.0	0.0	0.8	1.5	2.7
120 to 135	*Mean Wind Speed (m/s)*	2.8	3.1	2.2	2.5	3.4	0.1	1.5	1.0	1.6	2.0	2.4	3.0
	% Occurrence	1.9	4.4	2.1	0.3	0.9	0.1	0.1	0.1	0.1	1.3	2.4	1.9
135 to 150	*Mean Wind Speed (m/s)*	3.3	4.1	4.2	2.0	3.3	0.9	1.5	2.0	1.3	2.3	2.1	3.5
	% Occurrence	2.2	4.5	1.7	0.7	0.9	0.1	0.1	0.3	0.2	1.2	2.4	2.7
150 to 165	*Mean Wind Speed (m/s)*	5.8	4.9	4.3	4.0	3.5	2.6	1.9	1.1	1.4	4.0	2.7	6.8
	% Occurrence	2.9	6.1	2.7	0.7	1.1	0.3	0.1	0.2	0.2	2.0	1.3	5.5
165 to 180	*Mean Wind Speed (m/s)*	4.9	5.1	4.6	5.8	5.0	5.4	5.6	6.5	6.6	4.1	3.3	6.4
	% Occurrence	3.3	5.6	3.7	1.5	0.9	0.7	0.6	1.9	1.5	2.6	1.7	5.6
180 to 195	*Mean Wind Speed (m/s)*	5.1	4.2	5.2	5.0	7.9	8.2	8.2	7.8	7.2	5.6	4.0	5.4
	% Occurrence	3.0	5.6	6.3	2.8	8.7	13.1	21.6	30.5	21.9	10.8	2.6	3.3
195 to 210	*Mean Wind Speed (m/s)*	4.2	4.1	4.4	5.3	7.0	6.8	6.8	6.7	5.8	5.0	3.4	6.0
	% Occurrence	2.6	3.8	8.4	4.7	16.9	19.2	26.7	28.3	24.3	14.6	3.8	2.8
210 to 225	*Mean Wind Speed (m/s)*	3.9	3.7	5.0	4.8	6.6	6.5	6.5	6.2	4.7	4.6	3.6	4.8
	% Occurrence	1.9	5.3	10.5	10.1	20.6	17.6	18.8	12.4	13.3	13.8	3.2	1.9
225 to 240	*Mean Wind Speed (m/s)*	3.1	3.5	4.0	4.1	6.1	5.5	5.7	5.4	4.5	3.6	2.8	3.9
	% Occurrence	1.6	5.0	7.4	9.0	12.0	10.1	12.6	8.2	9.5	7.2	3.3	1.3
240 to 255	*Mean Wind Speed (m/s)*	3.5	3.7	3.2	4.2	5.0	5.6	5.8	4.8	4.6	3.2	3.4	3.6
	% Occurrence	1.6	3.3	6.4	9.5	9.7	9.2	9.7	6.1	7.5	7.3	3.1	1.3
255 to 270	*Mean Wind Speed (m/s)*	5.2	4.2	3.9	5.2	5.3	6.5	5.5	4.9	4.2	3.3	4.2	3.9
	% Occurrence	1.6	4.1	7.7	11.4	9.1	12.2	5.6	4.8	8.3	7.7	4.3	1.9
270 to 285	*Mean Wind Speed (m/s)*	3.0	3.9	4.2	5.5	6.0	7.1	6.0	4.3	3.9	3.3	4.1	4.4
	% Occurrence	1.3	4.8	10.9	21.8	9.0	10.2	3.2	4.2	5.1	10.0	5.9	2.4
285 to 300	*Mean Wind Speed (m/s)*	3.0	3.0	3.6	4.7	5.4	5.4	3.3	4.2	3.4	3.0	3.6	3.8
	% Occurrence	2.3	2.1	6.9	13.5	3.6	4.0	0.7	1.3	4.0	5.3	7.8	2.5
300 to 315	*Mean Wind Speed (m/s)*	3.6	2.5	3.4	5.0	4.6	4.7	1.7	2.6	2.1	2.2	3.5	3.5
	% Occurrence	2.2	1.5	6.0	7.9	2.7	1.6	0.1	0.6	1.4	3.0	6.8	2.9
315 to 330	*Mean Wind Speed (m/s)*	2.6	2.1	2.6	3.4	2.6	3.1	1.5	1.6	1.9	1.8	2.6	2.9
	% Occurrence	1.5	1.5	2.8	2.1	0.4	0.3	0.1	0.2	0.9	2.4	3.5	2.6
330 to 345	*Mean Wind Speed (m/s)*	2.6	1.6	1.9	2.8	3.7	2.8	2.6	1.7	1.9	2.0	2.7	3.9
	% Occurrence	1.5	1.1	1.3	1.3	0.5	0.1	0.1	0.3	0.9	1.6	3.5	2.7
345 to 360	*Mean Wind Speed (m/s)*	3.7	1.8	1.8	3.1	3.4	4.8	1.8	2.1	1.0	1.7	4.1	3.4
	% Occurrence	2.9	2.9	2.2	1.1	0.5	0.6	0.1	0.5	0.3	2.2	7.5	3.2

Table WAKE-A-4

Maximum Monthly Wind Speed (m/s) for the Given Wind Direction at SFO, 1992-1993

Bin (degrees)	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	10.3	4.5	5.8	7.2	4.0	4.5	4.0	4.9	4.0	4.0	13.9	13.0
15 to 30	10.3	7.2	3.6	4.9	6.7	4.9	5.8	4.9	5.8	4.0	7.2	4.9
30 to 45	10.3	10.3	4.9	5.8	4.9	4.5	6.3	4.9	4.5	4.5	5.8	8.0
45 to 60	10.3	6.7	7.6	3.6	4.5	4.5	4.0	4.0	4.9	4.0	6.3	9.4
60 to 75	12.5	9.4	4.9	4.0	4.5	4.0	4.0	4.5	4.5	4.0	8.0	8.0
75 to 90	9.4	7.2	4.9	4.0	4.0	4.0	3.1	4.0	4.0	2.7	6.7	6.3
90 to 105	11.2	9.4	6.3	4.5	5.8	3.6	3.1	2.7	4.0	6.3	7.2	6.3
105 to 120	6.7	7.2	4.9	4.0	5.8	1.3	1.8	0	2.7	1.8	4.5	7.2
120 to 135	9.4	9.8	8.0	7.2	6.7	5.8	4.0	3.1	3.6	4.5	6.3	11.2
135 to 150	9.4	11.2	7.2	6.7	7.2	7.2	3.1	2.7	3.1	5.8	6.3	9.4
150 to 165	10.3	8.0	7.6	9.4	6.7	5.8	4.0	3.1	3.1	8.0	6.3	10.3
165 to 180	9.8	11.2	5.8	6.3	8.0	8.5	7.2	2.7	4.9	8.5	7.2	10.3
180 to 195	16.5	17.4	7.6	10.3	13.4	10.3	7.2	7.2	7.2	10.7	8.0	15.2
195 to 210	14.8	14.3	8.0	8.0	13.0	7.6	9.4	9.4	8.5	10.3	8.0	13.0
210 to 225	13.0	12.5	9.4	9.8	14.8	9.8	9.4	10.3	7.2	9.8	7.2	13.4
225 to 240	14.8	11.2	8.0	9.4	10.7	11.2	9.4	9.8	8.0	8.5	6.3	11.6
240 to 255	11.6	12.5	7.6	8.5	11.2	9.8	9.4	8.0	10.3	9.4	7.2	13.4
255 to 270	10.7	11.2	8.5	11.6	11.6	10.3	13.0	13.0	11.6	8.0	10.3	7.6
270 to 285	17.9	12.5	13.4	14.8	15.2	17.0	17.9	14.3	12.5	9.4	15.2	11.2
285 to 300	14.8	9.8	14.3	14.8	14.8	15.2	14.3	13.9	12.5	10.3	14.3	12.5
300 to 315	11.2	12.5	13.4	13.4	13.9	13.0	15.2	14.8	13.9	11.6	13.0	11.2
315 to 330	6.3	4.5	7.2	7.6	10.7	12.5	10.7	12.5	11.2	10.7	9.4	10.7
330 to 345	4.5	3.6	4.0	6.7	8.9	8.9	8.0	7.6	9.4	7.6	9.4	8.0
345 to 360	10.3	3.6	4.0	8.9	6.7	4.9	5.8	4.9	6.7	4.9	9.4	9.8

Table WAKE-A-5

Maximum Monthly Wind Speed (m/s) for the Given Wind Direction at OAK, 1992-1993

Bin (degrees)	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	15.2	4.5	3.6	2.7	2.7	10.3	0	3.6	2.7	4.5	11.2	9.4
15 to 30	11.2	6.3	4.9	2.2	2.7	7.6	3.1	2.7	2.7	4.9	8.5	7.6
30 to 45	15.2	4.9	7.6	4.5	3.6	10.3	2.7	3.1	2.7	2.7	6.7	10.3
45 to 60	8.0	7.2	2.7	23.2	2.7	2.7	0	0	2.7	6.3	4.9	8.5
60 to 75	8.5	9.4	4.9	4.0	3.6	2.7	1.3	1.8	3.1	3.6	4.9	4.9
75 to 90	11.2	8.0	4.0	3.1	2.7	0	0	0	2.7	2.7	6.7	4.9
90 to 105	8.5	9.4	6.7	4.5	4.9	3.6	2.7	3.1	2.7	4.5	6.3	6.7
105 to 120	10.3	8.5	7.6	4.5	4.9	3.1	0	4.5	4.0	4.0	6.7	10.3
120 to 135	11.2	14.3	10.3	10.3	10.3	10.3	2.7	3.6	3.1	11.2	6.3	11.6
135 to 150	23.2	11.6	11.2	14.3	10.3	8.0	4.9	2.7	7.2	14.3	7.6	13.0
150 to 165	11.6	13.9	13.0	10.3	10.3	8.5	2.7	4.0	4.0	12.5	7.2	11.2
165 to 180	9.4	11.2	7.6	9.4	9.8	9.4	4.9	4.5	4.0	4.0	3.1	10.7
180 to 195	10.3	15.2	11.2	7.6	11.2	8.0	6.3	4.5	3.6	8.0	4.0	10.3
195 to 210	10.3	13.0	27.7	6.7	10.7	9.4	6.7	4.9	10.3	6.3	7.6	10.3
210 to 225	6.3	9.4	8.9	9.4	12.5	10.3	8.0	9.4	8.5	6.7	6.3	9.8
225 to 240	3.6	9.4	23.2	9.4	10.3	9.4	11.6	10.3	7.6	7.6	6.3	9.4
240 to 255	4.9	13.0	8.0	11.2	11.2	11.2	10.3	10.3	10.3	8.0	9.4	10.3
255 to 270	8.5	10.3	11.2	11.2	11.2	10.3	10.3	9.4	8.5	7.6	9.4	10.3
270 to 285	10.3	13.0	10.3	10.3	11.2	11.2	10.3	10.3	9.4	8.5	11.2	9.4
285 to 300	7.6	8.0	9.4	10.3	10.3	10.7	11.2	10.3	9.8	7.6	9.4	11.2
300 to 315	7.2	10.7	7.6	8.0	10.3	10.3	10.7	10.7	8.5	7.6	9.4	10.7
315 to 330	9.4	4.5	6.7	8.5	7.6	9.4	12.5	7.2	7.2	6.7	8.0	7.6
330 to 345	7.6	6.3	4.9	7.6	8.0	10.3	10.3	9.4	6.3	7.2	10.3	9.4
345 to 360	11.2	6.3	4.0	5.8	6.3	6.3	5.8	6.3	4.9	7.2	7.6	4.9

Table WAKE-A-6

Maximum Monthly Wind Speed (m/s) for the Given Wind Direction at the San Pablo Bay Station, 1992-1993

Bin (degrees)	January	February	March	April	May	June	July	August	September	October	November	December
0 to 15	12.1	5.2	4.2	5.7	2.8	6.6	0	0	2.1	3.2	11.6	5.5
15 to 30	8.6	7.4	4.6	2.1	3.7	0	0	0	0.3	2.1	7.2	4.3
30 to 45	5.9	4.8	4.8	2.1	0.5	0.7	0	0	0	3.9	4.8	7.5
45 to 60	11.8	6.2	4.4	0.9	2.2	0	0	0	0.9	5.2	8.2	10.3
60 to 75	13.6	8.5	6.3	7.1	0	0	0	0	0	7.7	10.5	12.2
75 to 90	12.3	9.9	8.0	7.1	5.1	0	0	0	0.6	6.7	10.6	13.4
90 to 105	9.9	7.2	5.6	3.1	4.4	3.8	0	0	2.7	5.8	8.2	6.9
105 to 120	6.0	4.5	5.8	2.8	5.7	0	0	0	0.0	2.4	4.4	8.0
120 to 135	7.4	7.9	5.6	3.9	5.3	0.1	1.5	1.0	1.9	4.1	4.5	6.7
135 to 150	9.3	10.0	7.3	4.4	6.1	0.9	1.5	2.7	1.5	8.4	4.8	9.3
150 to 165	12.7	14.7	8.9	8.3	7.4	4.3	1.9	1.3	1.7	13.3	6.5	13.3
165 to 180	12.2	14.0	9.3	12.7	8.2	9.7	8.6	11.3	10.0	10.4	6.7	10.9
180 to 195	15.0	14.1	9.2	9.9	11.8	11.7	11.8	12.5	11.0	11.1	8.1	12.6
195 to 210	8.6	14.3	10.1	10.9	12.7	11.5	11.3	12.1	10.7	10.3	7.0	11.2
210 to 225	12.5	7.9	9.6	9.3	12.8	13.3	14.4	13.1	10.1	9.7	7.1	9.3
225 to 240	5.9	10.5	7.4	10.4	12.9	11.8	10.6	11.1	10.4	9.3	5.5	8.1
240 to 255	9.5	9.4	6.9	7.7	10.2	10.3	9.3	10.3	11.3	6.9	8.4	8.4
255 to 270	11.3	10.5	9.9	10.0	10.5	11.6	9.7	10.3	10.5	7.3	11.7	8.4
270 to 285	5.3	9.8	10.0	10.9	13.1	12.4	11.0	10.0	8.0	7.8	12.2	9.1
285 to 300	5.5	7.5	10.0	9.4	8.4	9.7	5.4	8.4	7.8	7.3	8.4	8.2
300 to 315	7.7	6.0	8.7	10.0	8.6	8.1	1.7	4.5	7.0	4.0	8.3	7.8
315 to 330	6.8	4.7	5.9	6.2	4.7	4.6	1.5	2.2	3.4	4.6	6.1	7.9
330 to 345	6.9	3.4	3.4	9.4	7.5	4.7	2.6	3.5	3.0	4.1	6.7	9.7
345 to 360	10.3	3.5	4.7	8.3	7.5	6.5	2.1	3.6	1.4	3.0	12.8	11.5

Table WAKE-A-7

Monthly Wave Energy (MJ/m) Reaching the Shore for Selected SF Bay Locations, 1992-1993

Location	Month												Monthly	Monthly
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Average	Max
Petaluma Wetlands	197.7	268.1	298.5	157.7	1178.0	1541.0	2444.8	2906.6	1670.8	528.0	56.2	463.3	975.9	2906.6
Hercules	393.4	106.6	164.7	606.0	288.7	391.3	87.6	58.7	61.9	70.2	279.3	357.7	238.8	606.0
Gallinas Creek	599.7	212.5	52.4	7.6	12.3	1.0	0.5	2.0	1.6	26.3	198.6	545.5	138.3	599.7
Corte Madera Marsh	114.9	201.6	81.7	29.6	29.7	7.8	0.7	0.5	1.7	23.1	24.0	137.4	54.4	201.6
Paradise Cay	159.2	232.6	111.4	37.0	48.4	11.8	3.2	1.9	3.7	29.8	34.8	165.1	69.9	232.6
Sausalito	56.0	111.6	86.3	45.4	71.4	48.5	33.5	23.2	21.3	30.1	15.4	66.6	50.8	111.6
Yerba Buena	90.2	129.3	128.5	124.8	175.7	143.5	104.2	88.1	65.4	59.9	43.3	91.1	103.7	175.7
Oyster Point	77.7	108.5	32.0	20.3	24.7	8.1	5.0	3.9	4.8	10.9	34.8	121.5	37.7	121.5
Redwood City Channel	38.7	36.5	14.1	10.2	12.6	10.7	10.6	8.9	10.0	8.8	19.4	48.3	19.1	48.3
Coyote Creek	10.0	9.2	35.7	73.8	75.8	91.9	102.8	121.7	104.5	51.6	34.9	12.0	60.3	121.7
Alameda Creek	100.0	88.6	239.1	550.9	634.8	823.0	798.6	860.4	682.8	316.8	236.3	129.8	455.1	860.4
San Leandro	77.7	111.7	186.2	438.9	512.2	688.1	512.3	348.4	202.2	114.7	79.5	119.1	282.6	688.1
Berkeley	30.9	52.4	122.0	239.5	268.2	325.5	258.6	209.0	162.2	103.8	59.1	31.8	155.3	325.5
Point Pinole	1020.9	251.6	184.4	490.9	397.0	540.0	256.6	153.3	131.6	110.8	435.7	877.9	404.2	1020.9
New York Slough	3.5	6.0	4.0	4.3	5.6	7.0	10.7	13.8	7.9	2.6	1.9	7.7	6.2	13.8

Table WAKE-A-8

Maximum Energy in a Single Wave (kJ/m) for Selected Locations in SF Bay, 1992-1993

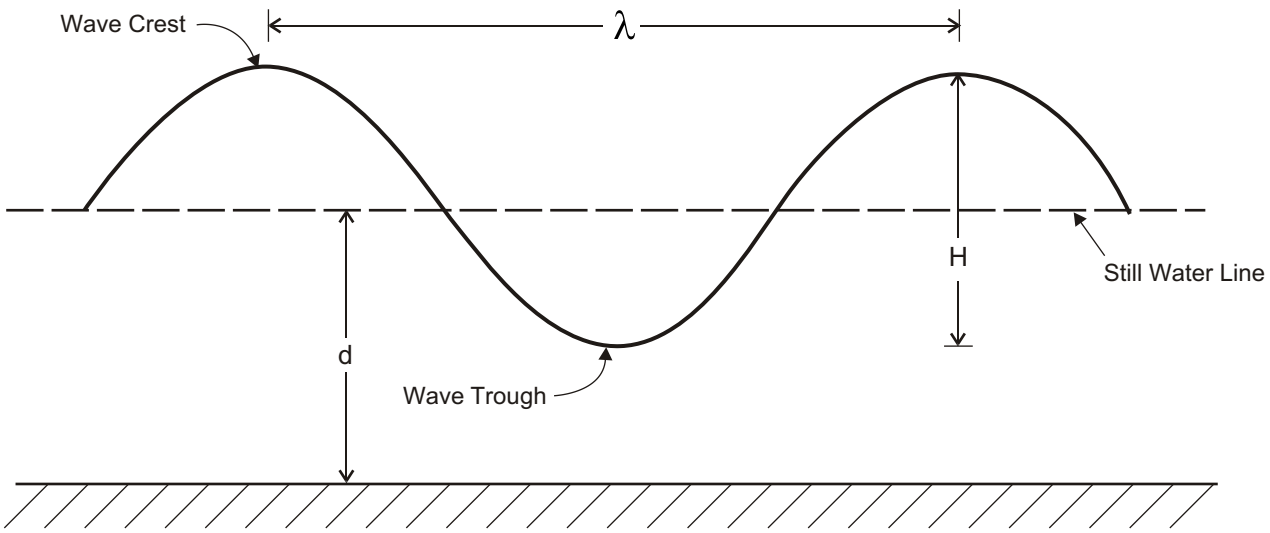
Location	Monthly Maximum in a Single Wave												Monthly	Monthly
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Average (kJ/m)	Maximum
Petaluma Wetlands	99.7	85.6	27.5	33.8	54.2	53.0	54.2	63.0	45.0	46.1	19.1	64.3	53.8	99.7
Hercules (Martinez)	14.5	14.6	22.3	23.1	31.5	27.4	20.0	15.4	11.0	9.0	26.2	17.8	19.4	31.5
Gallinas Creek	11.8	17.6	5.4	3.5	5.0	0.9	0.2	0.4	0.3	13.4	7.3	13.5	6.6	17.6
Corte Madera Marsh	88.5	14.5	11.9	23.8	8.9	5.1	0.8	0.2	2.8	23.8	3.4	17.9	16.8	88.5
Paradise Cay	86.0	31.5	25.8	42.0	12.6	6.8	0.7	0.5	2.6	23.2	3.8	16.7	21.0	86.0
Sausalito	39.9	31.6	25.6	12.0	12.0	6.4	0.8	0.8	0.9	22.8	3.5	15.8	14.3	39.9
Yerba Buena	23.8	70.2	386.3	54.4	30.4	16.1	5.2	6.8	21.6	11.3	8.0	23.8	54.8	386.3
Oyster Point	16.8	15.3	5.2	10.0	4.0	4.0	1.1	0.5	0.5	6.2	4.0	13.4	6.8	16.8
Redwood City Channel	7.1	7.1	2.1	1.2	0.8	0.8	1.6	0.7	0.5	0.5	1.3	3.9	2.3	7.1
Coyote Creek	1.2	1.5	1.7	1.7	1.8	1.6	2.2	2.1	1.8	1.3	1.6	1.2	1.6	2.2
Alameda Creek	20.5	15.8	19.0	19.0	20.7	20.5	26.3	24.3	20.7	13.4	17.3	17.9	19.6	26.3
San Leandro	37.9	14.8	17.9	23.1	25.0	33.3	37.9	21.3	14.8	6.8	25.0	16.3	22.8	37.9
Berkeley	6.3	13.5	29.6	6.8	8.3	8.3	8.0	6.3	5.2	3.3	8.3	8.0	9.3	29.6
Point Pinole	28.9	11.0	11.0	14.4	25.1	21.3	14.8	11.0	10.9	5.9	29.3	25.1	17.4	29.3
New York Slough	0.9	1.2	0.4	0.4	0.2	0.2	0.1	0.1	0.1	0.7	0.2	0.9	0.5	1.2

Table WAKE-A-9

Monthly Maximum Wave Heights in Meters for Selected Locations in SF Bay, 1992-1993

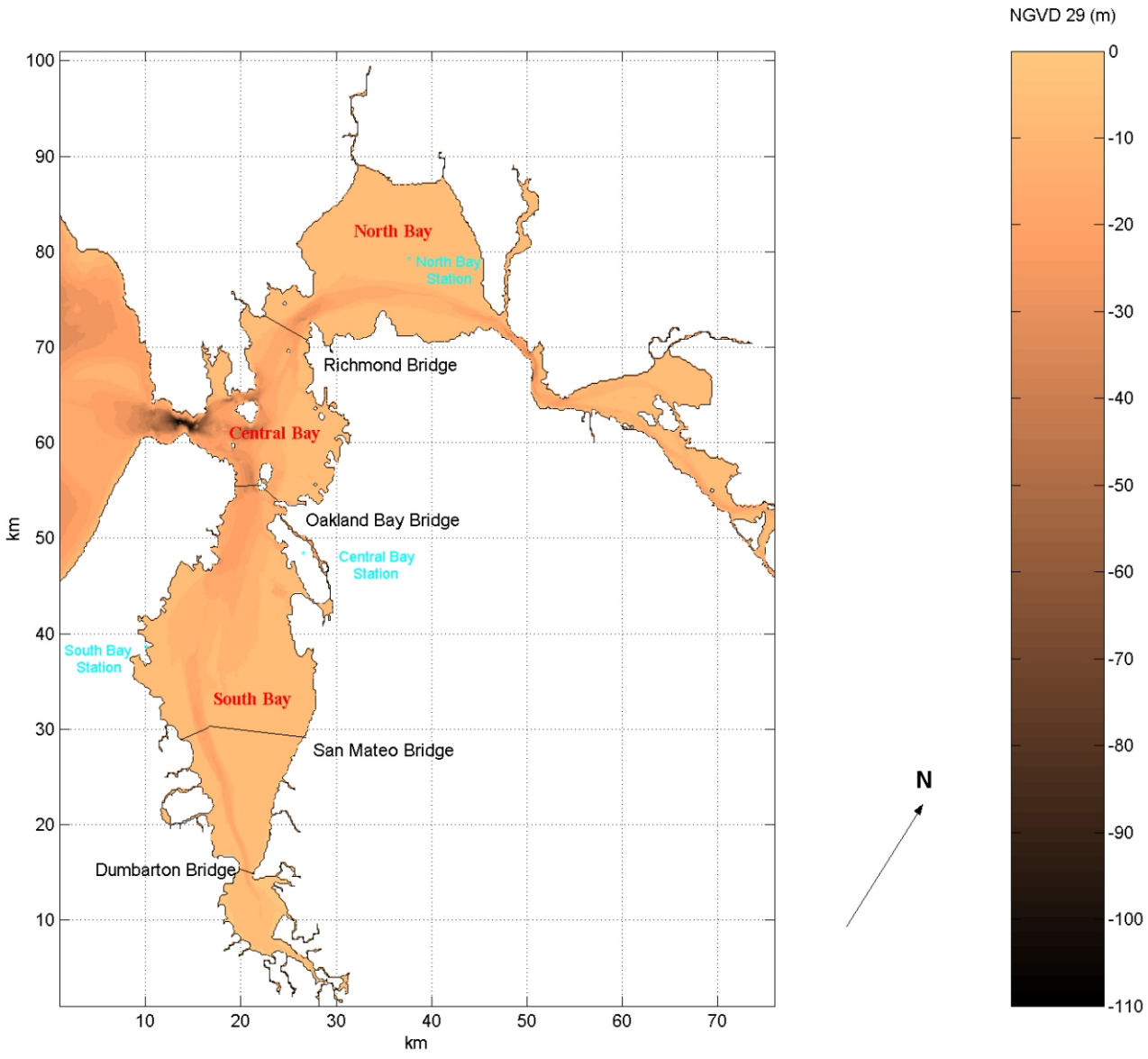
Location	Monthly Maximum Wave Height in meters												Avg	Max
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec		
Petaluma Wetlands	1.6	1.5	1.0	1.1	1.3	1.3	1.3	1.4	1.2	1.2	0.88	1.4	1.3	1.6
Hercules	0.86	0.84	0.96	0.96	1.1	1.1	0.94	0.85	0.74	0.69	1.0	0.90	0.91	1.1
Gallinas Creek	0.82	0.96	0.59	0.52	0.55	0.31	0.21	0.26	0.21	0.86	0.64	0.79	0.56	1.0
Corte Madera Marsh	1.6	0.84	0.78	0.99	0.69	0.58	0.29	0.20	0.46	0.99	0.49	0.89	0.73	1.6
Paradise Cay	1.6	1.1	1.0	1.2	0.77	0.62	0.28	0.24	0.44	0.96	0.50	0.87	0.80	1.6
Sausalito	1.3	1.1	1.0	0.76	0.76	0.60	0.33	0.33	0.31	0.96	0.49	0.84	0.73	1.3
Yerba Buena	0.94	1.4	2.6	1.4	1.0	0.82	0.55	0.63	0.91	0.72	0.64	0.94	1.04	2.6
Oyster Point	0.87	0.82	0.56	0.70	0.51	0.51	0.34	0.25	0.25	0.59	0.52	0.79	0.56	0.9
Redwood City Channel	0.64	0.64	0.42	0.34	0.31	0.31	0.37	0.28	0.25	0.25	0.37	0.52	0.39	0.6
Coyote Creek	0.36	0.39	0.41	0.41	0.42	0.40	0.45	0.44	0.42	0.37	0.40	0.36	0.40	0.5
Alameda Creek	0.89	0.84	0.90	0.90	0.93	0.91	1.0	0.99	0.93	0.78	0.87	0.85	0.90	1.0
San Leandro	1.2	0.83	0.89	0.97	1.0	1.1	1.2	0.95	0.83	0.62	1.0	0.86	0.95	1.2
Berkeley	0.62	0.82	1.2	0.64	0.68	0.68	0.68	0.62	0.58	0.49	0.68	0.68	0.69	1.2
Point Pinole	1.1	0.77	0.78	0.86	1.1	0.99	0.87	0.78	0.77	0.61	1.1	1.0	0.89	1.1
New York Slough	0.36	0.40	0.27	0.28	0.22	0.21	0.21	0.22	0.18	0.32	0.22	0.36	0.27	0.4

APPENDIX WAKE-A FIGURES



URS	Water Transit Authority Project No. 43-00066890.10	Wave Parameter Diagram	Figure WAKE-A-1

7/23/02 vsa ...43-00066890.10\WA1_wave.cdr



URS	Water Transit Authority Project No. 43-00066890.10	San Francisco Bay Water Depth in meters at Mean Lower Low Water (MLLW) relative to NGVD 1929	Figure WAKE-A-2

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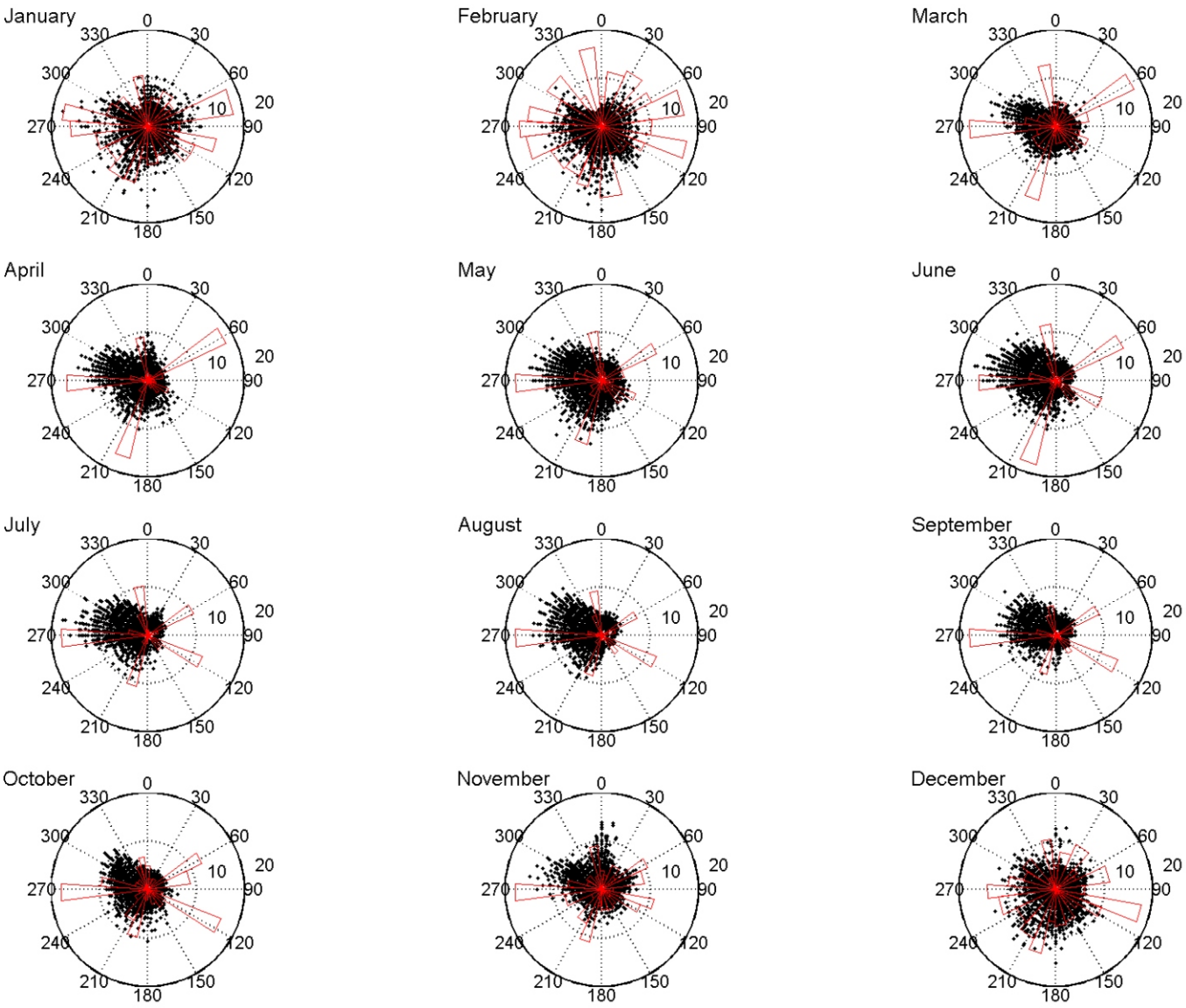
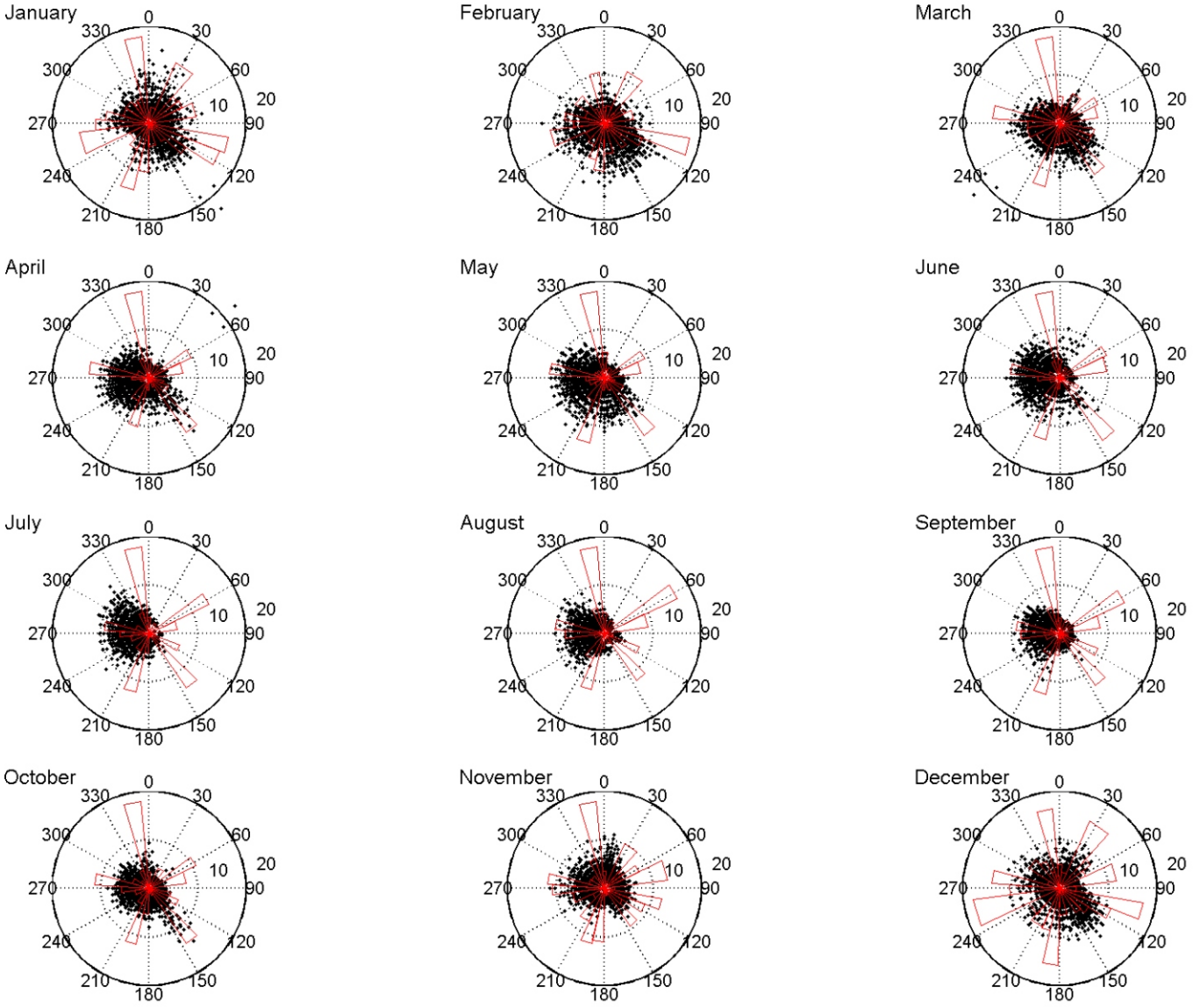


Relative percent frequency of wind direction is illustrated as red lines. Individual wind speed in meters per second along with the corresponding wind direction is shown as black points. (Data Source: NCDC)

URS	Water Transit Authority Project No. 43-00066890.10	Monthly wind rose plots for years 1992-1993 at San Francisco International Airport	Figure WAKE-A-3

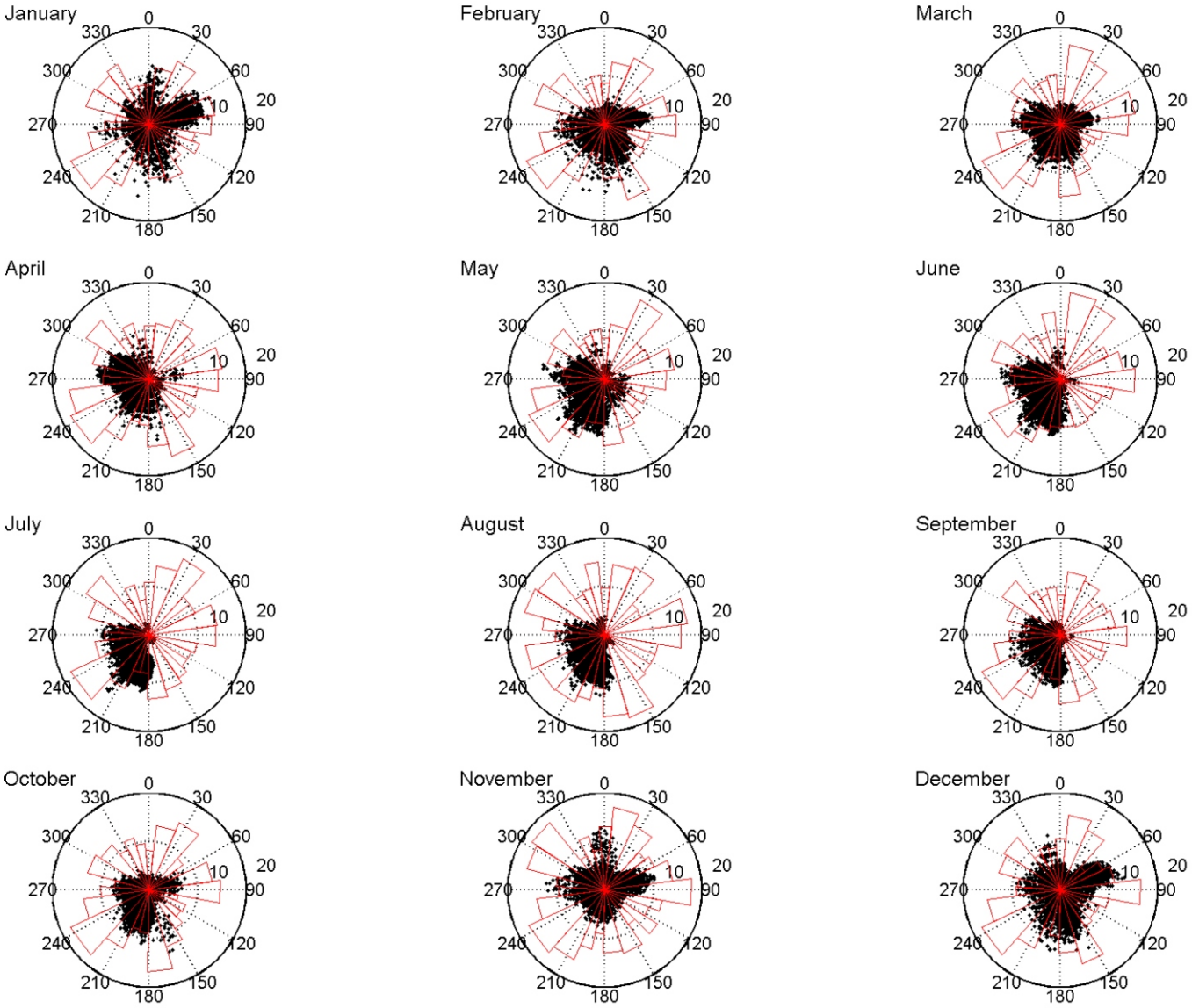
7/23/02 vsa ...43-00066890.10\WA3_windrose1.cdr



Relative percent frequency of wind direction is illustrated as red lines. Individual wind speed in meters per second along with the corresponding wind direction is shown as black points. (Data Source: NCDC)

URS	Water Transit Authority Project No. 43-00066890.10	Monthly wind rose plots for years 1992-1993 at Oakland International Airport	Figure WAKE-A-4

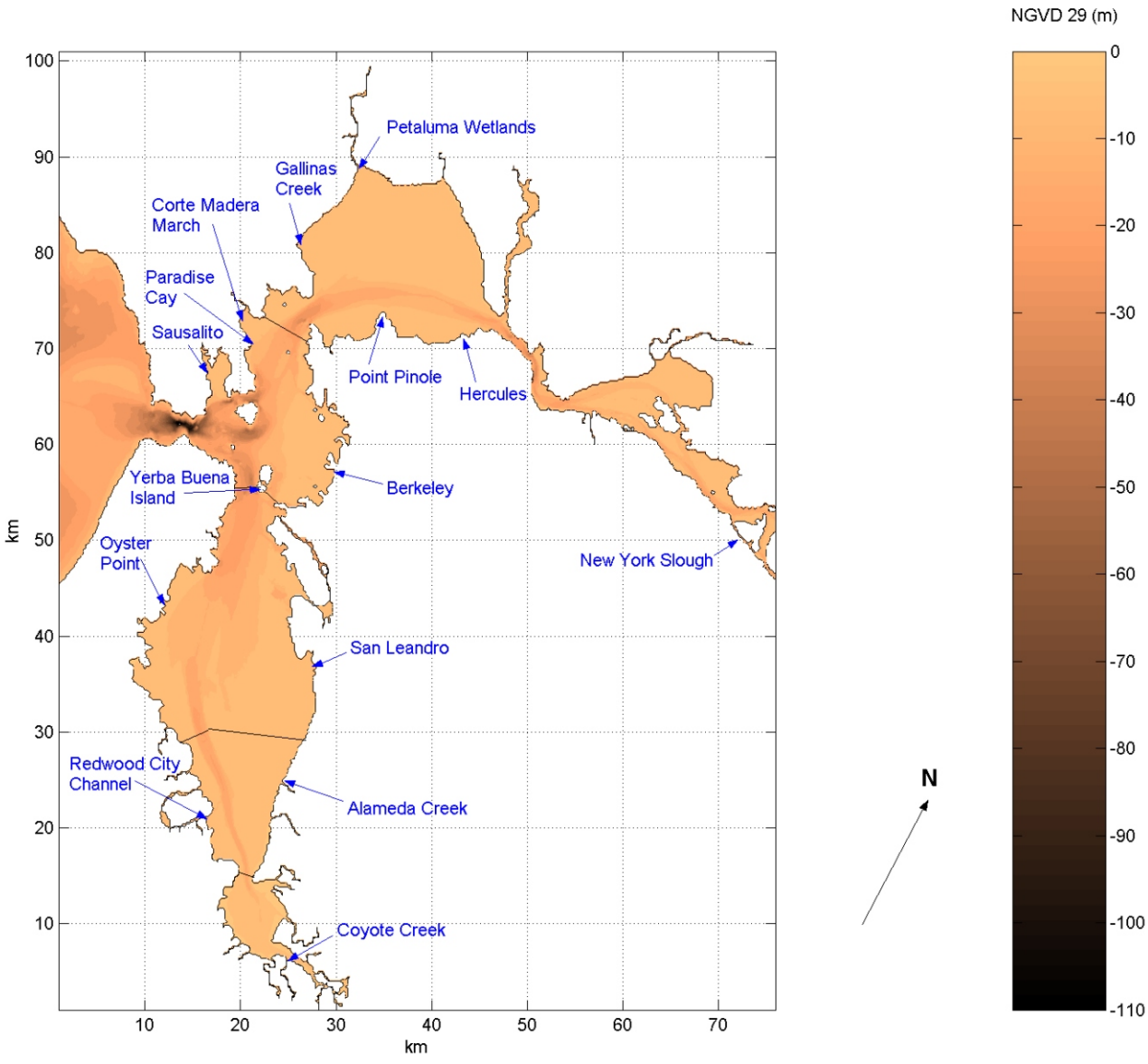
7/23/02 vsa ...43-00066890.10\WA4_windrose-oak.cdr



Relative percent frequency of wind direction is illustrated as red lines. Individual wind speed in meters per second along with the corresponding wind direction is shown as black points. (Data Source: NCDC)

URS	Water Transit Authority Project No. 43-00066890.10	Monthly wind rose plots for years 1992-1993 at San Pablo Bay	Figure WAKE-A-5

7/23/02 vsa ...43-00066890.10\WA5_windrose-sfo.cdr



URS	Water Transit Authority Project No. 43-00066890.10	Map of wave station locations used for wave calculations	Figure WAKE-A-6

7/23/02 vsa ...43-00066890.10\WA6_wave.cdr

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WAKE-B
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Wake Wash Regulations Worldwide

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WAKE-D
Wake Wash Significance Criteria Development

APPENDIX
WAKE-E
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BAAQMD Independent Analysis

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AIR-C
Emissions for Alternatives 1 Through 4

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Shipwreck Index and Overview of Cultural Resources in the Study Area

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Energy Calculations – Proposed Project

APPENDIX
ENRG-B
Energy Calculations – Alternatives 1 Through 4

Energy Calculations 1

1.0 Energy Calculations for Transit Modes Other Than Ferries.....1
2.0 Energy Calculations for Ferries 1

Tables

ENRG-B-1 Bay Area Consumption for Cars, Trucks, and Passenger Rail in 2025
ENRG-B-2 Ferry Energy Consumption for Alternative 1
ENRG-B-3 PMT Values for Ferries

1.0 ENERGY CALCULATIONS FOR TRANSIT MODES OTHER THAN FERRIES

Energy consumption for automobiles, trucks, public buses, and transit rail vehicles were calculated using projected vehicle miles traveled (VMT), a factor that converts VMT to British thermal units (Btus) by transit mode and the estimated number of passengers per vehicle type. Because this is a comparative analysis that evaluates the difference between the No Project and alternative (Alternative 4) and each of the first three alternatives, this method provides a suitable means of determining whether there is a substantial impact in energy consumption by alternative.

VMT data for the project alternatives is provided in the Section 3.12 (Transportation) of the program Environmental Impact Report for this project. The passenger per vehicle data for automobiles, buses, and rail transit modes are based on the Metropolitan Transportation Commission (MTC) travel forecast model and are shown in Table ENRG-B-1.

Daily energy consumption per passenger mile traveled (PMT) for each of the above transit modes and for all of the project alternatives is shown in Table ENRG-B-1. Energy consumption per PMT is calculated by adding the total energy consumed for all transit modes (except for ferries) and dividing this value by the total PMT for all transit modes (except for ferries). PMT is calculated by multiplying the VMT value for the particular mode of transit and the appropriate load factor. Total energy consumed is calculated by multiplying the appropriate energy factor with the VMT value.

2.0 ENERGY CALCULATIONS FOR FERRIES

Energy consumption for ferries was calculated using predicted power outputs of the ferry engines, planned running times and distances of the ferry services, and estimated patronage. Ferry energy was analyzed by power output of the engines. This is the only available and complete energy consumption data of the current ferries and the predicted procured ferries for Alternatives 1, 2, and 3. This information simplifies parts of this energy analysis in terms of which fuel source and engine technology would be used because "transmission" (i.e., how many gallons of fuel would be consumed per Btu of engine output) and fuel consumption for future planned ferry engines is not known. Daily energy consumption by the ferries was calculated by multiplying the power output of the ferries by the running time of the anticipated ferry schedules for each project alternative.

For the Alternative 4, average power outputs were assumed for each route, based on the current ferries in use on these routes[1]. Characteristics of the current ferries are available in the working document, "New Technologies and Alternative Fuels," prepared for Water Transit Authority by JJMA (JJMA 2002). For Alternatives 1, 2, and 3, two ferry fleets were assumed. One fleet would consist of estimated 400-passenger ferries with a maximum power output of 5,966 kW. The other fleet would consist of estimated 149-passenger ferries with a maximum power output of 2,163 kW. These two fleets would have a maximum service output of 5,369 kW and 1,946 kW, a slow speed power output of 424 kW and 284 kW, and an idling output of 107 kW and 111

[1] For the Larkspur ferry route, only the newer catamaran vessels used on this route were assumed to be used for the no project alternative. The monohull boats used on this route were constructed in the 1970's and will be taken out of commission by 2025.

kW, respectively. It was estimated that the ferries would operate at service speed for 76 percent of the time of each run and at slow speed for 24 percent of the time (Hutchison 2002). Deadhead time, which is the time spent by a ferry traveling from its berthing dock to a ferry terminal at the beginning and end of each day, was also calculated and factored into the calculation of energy consumption. The anticipated ferry schedules are listed in Appendix AIR-1 in this report.[2] The ferry schedules were divided into peak and off-peak hours. Peak hours are the 6 hours (3 hours in the morning and 3 hours in the evening) where ferry patronage volume is expected to be the highest. Off-peak hours are the 9 hours of ferry service where patronage volumes are expected to be lower than peak hour times. Table ENRG-B-2 gives an example of the estimated daily energy consumption under Alternative 1.

Average daily PMT for the ferries was calculated by multiplying the passenger per run factor by the predicted VMT. This factor, shown in Table ENRG-B-3 for the different project alternatives, is calculated by dividing the estimated daily patronage by the number of ferry trips. The predicted VMT was calculated using information regarding the anticipated ferry routes, schedules, and distances covered during an average daily ferry service. Table ENRG-B-3 shows the estimated average daily PMT for the different project alternatives.

[2] This energy analysis did not account for the ferry service that would occur at the Oakland Airport and the San Francisco because available transit models did not produce patronage estimates for these routes. The GGNRA Circle Route was also not analyzed. The reduction of road-based PMT energy consumption for these recreation routes would not have a measurable effect in changing the energy consumption of transit in the Bay Area.

Table ENRG-B-1
Bay Area Energy Consumption for Cars, Trucks, Buses, and Passenger Rail In 2025

		Auto	Small Truck	Medium Truck	Large Truck	Bus	Light Rail	BART	Commuter Rail	Total
Alternative 1	Total Bay Area VMT	177,573,856	4,387,888	329,661	1,710,635	333,497	19,256	31,391	8,507	**184,394,691**
	Load Factor (persons/vehicle)	1.17	1.00	1.00	1.00	52.99	108.38	1,040.71	963.91	**-**
	Total Passenger Miles Traveled	207,761,412	4,387,888	329,661	1,710,635	17,671,965	2,087,013	32,668,803	8,199,995	**274,817,371**
	Energy Consumption (Btu/day)	1,105,574,828,010	27,318,990,514	8,656,903,634	44,921,275,021	12,306,039,300	194,485,600	2,266,430,200	839,640,900	**1,202,078,593,179**
	Energy Consumption per PMT (Btu/PMT)	5,321	6,226	26,260	26,260	696.4	93.19	69.38	102.4	**4,374**
Alternative 2	Total Bay Area VMT	177,618,525	4,387,888	329,661	1,710,635	333,497	19,256	31,391	8,507	**184,439,360**
	Load Factor (persons/vehicle)	1.17	1.00	1.00	1.00	55.79	110.39	1,052.92	971.36	**-**
	Total Passenger Miles Traveled	207,813,675	4,387,888	329,661	1,710,635	18,604,195	2,125,606	33,052,084	8,263,327	**276,287,071**
	Energy Consumption (Btu/day)	1,105,852,937,991	27,318,990,514	8,656,903,634	44,921,275,021	12,306,039,300	194,485,600	2,266,430,200	839,640,900	**1,202,356,703,160**
	Energy Consumption per PMT (Btu/PMT)	5,321	6,226	26,260	26,260	661.5	91.50	68.57	101.6	**4,352**
Alternative 3	Total Bay Area VMT	177,811,385	4,387,888	329,661	1,710,635	329,050	19,256	31,391	8,507	**184,627,773**
	Load Factor (persons/vehicle)	1.17	1.00	1.00	1.00	57.52	110.57	1,061.23	980.67	**-**
	Total Passenger Miles Traveled	208,039,320	4,387,888	329,661	1,710,635	18,927,393	2,129,149	33,312,983	8,342,568	**277,179,596**
	Energy Consumption (Btu/day)	1,107,053,680,158	27,318,990,514	8,656,903,634	44,921,275,021	12,141,938,217	194,485,600	2,266,430,200	839,640,900	**1,203,393,344,245**
	Energy Consumption per PMT (Btu/PMT)	5,321	6,226	26,260	26,260	641.5	91.34	68.03	100.6	**4,342**
Alternative 4	Total Bay Area VMT	177,851,516	4,387,888	329,661	1,710,635	323,225	19,256	31,391	8,507	**184,662,079**
	Load Factor (persons/vehicle)	1.17	1.00	1.00	1.00	58.70	110.75	1,061.52	952.07	**-**
	Total Passenger Miles Traveled	208,086,273	4,387,888	329,661	1,710,635	18,974,168	2,132,620	33,322,155	8,099,280	**277,042,681**
	Energy Consumption (Btu/day)	1,107,303,536,626	27,318,990,514	8,656,903,634	44,921,275,021	11,927,002,500	194,485,600	2,266,430,200	839,640,900	**1,203,428,264,995**
	Energy Consumption per PMT (Btu/PMT)	5,321	6,226	26,260	26,260	628.6	91.20	68.02	103.7	**4,344**

Source: JJMA 2002; Outwater 2002; Hutchison 2002

Table ENRG-B-2
Ferry Energy Consumption for Alternative 1

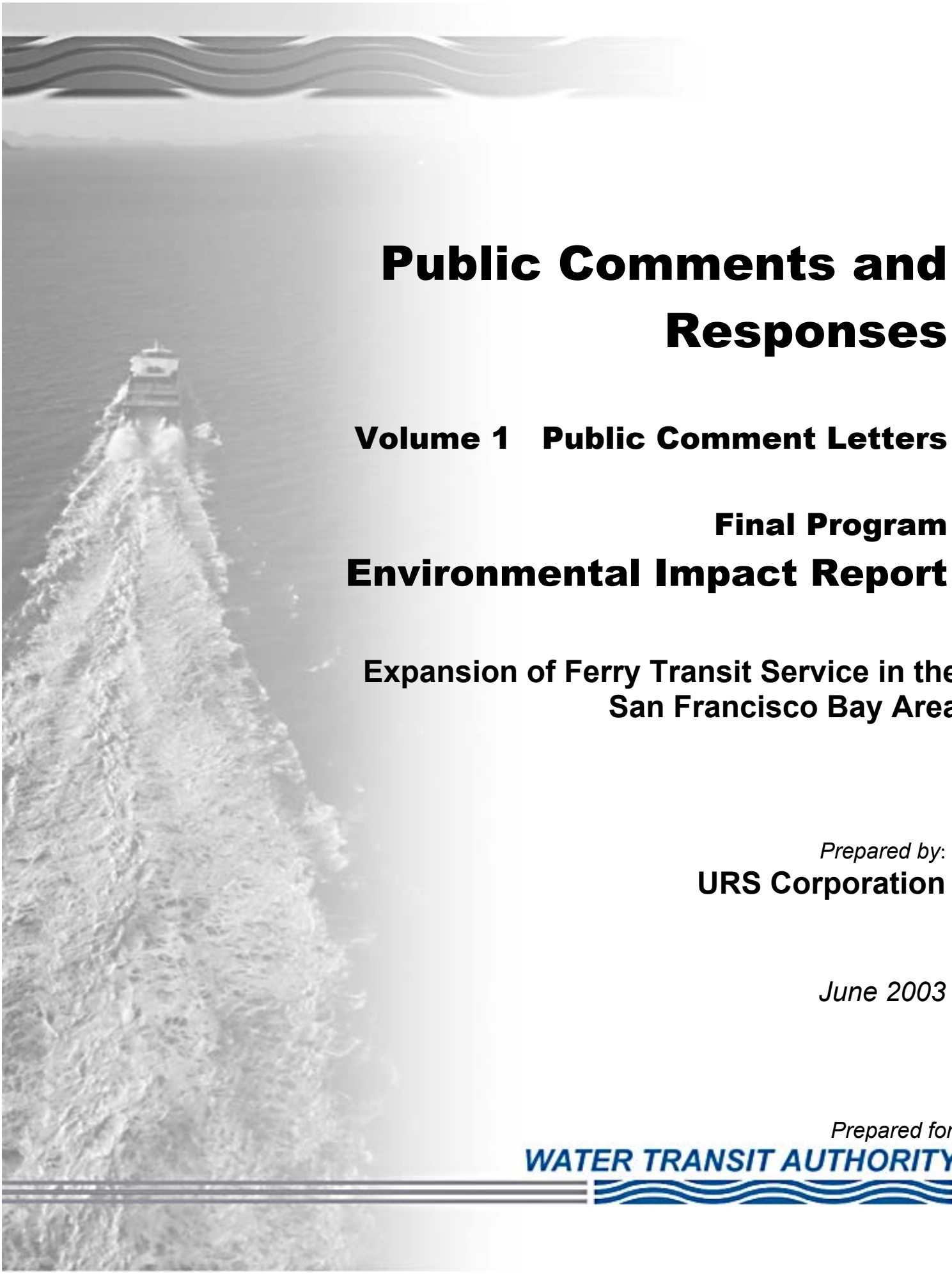
Peak Hours (including Deadhead hours)	400-Passenger Ferry	Transit Hours at Service Speed (hr/day)	203
		Power Rating at Service Speed (kW)	2,605
		Energy used at Service Speed (kWh/day)	530,045
		Transit Hours at Slow Speed (hr/day)	64
		Power Rating at Slow Speed (kW)	206
		Energy used at Slow Speed (kWh/day)	13,236
		Idling Hours (hr/day)	63
		Power Rating at Idle (kW)	165
		Energy used at Idle (kWh/day)	10,375
		Total Energy Used (kWh/day)	553,657
	149-Passenger Ferry	Transit Hours at Service Speed (hr/day)	293
		Power Rating at Service Speed (kW)	1,128
		Energy used at Service Speed (kWh/day)	330,299
		Transit Hours at Slow Speed (hr/day)	92
		Power Rating at Slow Speed (kW)	89
		Energy used at Slow Speed (kWh/day)	8,232
		Idling Hours (hr/day)	105
		Power Rating at Idle (kW)	71
		Energy used at Idle (kWh/day)	7,487
		Total Energy Used (kWh/day)	346,018
	Peak Hours Total		**899,675**
Off-Peak Hours	400-Passenger Ferry	Transit Hours at Service Speed (hr/day)	253
		Power Rating at Service Speed (kW)	2,605
		Energy used at Service Speed (kWh/day)	660,046
		Transit Hours at Slow Speed (hr/day)	80
		Power Rating at Slow Speed (kW)	206
		Energy used at Slow Speed (kWh/day)	16,483
		Idling Hours (hr/day)	86
		Power Rating at Idle (kW)	165
		Energy used at Idle (kWh/day)	14,152
		Total Energy Used (kWh/day)	690,680
	149-Passenger Ferry	Transit Hours at Service Speed (hr/day)	427
		Power Rating at Service Speed (kW)	1,128
		Energy used at Service Speed (kWh/day)	481,732
		Transit Hours at Slow Speed (hr/day)	135
		Power Rating at Slow Speed (kW)	89
		Energy used at Slow Speed (kWh/day)	12,006
		Idling Hours (hr/day)	160
		Power Rating at Idle (kW)	165
		Energy used at Idle (kWh/day)	26,428
		Total Energy Used (kWh/day)	520,166
	Off-Peak Hours Total		**1,210,846**
Total Daily Energy Usage (kW-hr/day)			**2,110,521**
Total Daily Energy Usage (Btu/day)			**7,203,209,218**

Source: JJMA 2002; Hutchison 2002

Table ENRG-B-3
PMT Values for Ferries

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
VMT per Day	57,530	29,373	11,436	1,566
Passengers per Run Factor	17.1	21.5	37.6	151
Total Patronage per Day	49,210	46,295	25,385	23,238
PMT per Day	984,023	630,431	430,074	236,461

Source: Outwater 2002



Public Comments and Responses

Volume 1 Public Comment Letters

Final Program
Environmental Impact Report

Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:
URS Corporation

June 2003

Prepared for:
WATER TRANSIT AUTHORITY

Message

EIR 1

Tristan Bettencourt

From: Melanie [jann@watertransit.org]
Sent: Monday, September 09, 2002 2:52 PM
To: Tristan Bettencourt; cproud@CH2M.com
Subject: RE: Hovercraft Re: Questions on EIR

Tristan,

Please print and log with EIR.

-----Original Message-----
From: cproud@CH2M.com [mailto:cproud@CH2M.com]
Sent: Monday, September 09, 2002 9:26 AM
To: jann@watertransit.org
Subject: FW: Hovercraft Re: Questions on EIR

Melanie,

Please pull out Terri Shore's comment below and log it in.

Thanks,

Chris

-----Original Message-----
From: Steve Castleberry [mailto:castleberry@watertransit.org]
Sent: September 05, 2002 10:01 AM
To: cproud@ch2m.com
Subject: FW: Hovercraft Re: Questions on EIR

Chris - sorry about the wrong email address. I did this once to Mike Davis and gave him a heart attack as he thought I knew something he didn't.

-----Original Message-----
From: Steve Castleberry [mailto:castleberry@watertransit.org]
Sent: Thursday, September 05, 2002 9:59 AM
To: 'jeff_zimmerman@urscorp.com'; 'ian_austin@urscorp.com'; 'cproud@urscorp.com'
Subject: FW: Hovercraft Re: Questions on EIR

ok you guys, you can come out of the closet as secret hovercraft lovers as Teri Shore has busted you.

I don't think its a big deal to change "hovercraft" to "no draft vessel" so lets add this to our list of comments even though we are not yet in the comment period. I am pretty sure Teri will include this comment in her formal submittal anyway. (Ian, are there any other no-draft vessels other than hovercraft?). Chris, can you add this question to our list of comments.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111

415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: Steve Castleberry [mailto:castleberry@watertransit.org]
Sent: Thursday, September 05, 2002 9:52 AM
To: 'Teri Shore'
Cc: 'Veronica'
Subject: RE: Hovercraft Re: Questions on EIR

Teri - thanks for your email. I don't have any problem changing references to hovercraft to "low or no draft vessels". You obviously know more about hovercraft than I do as I have been using that term interchangeably with no draft vessels. However, I also use "Kleenex" rather than "tissue", so I guess I am not the best one to make that call.

FYI - the EIR listed low draft vessels for Gnoss Field, but I don't believe it will be necessary for Port Sonoma. If anything does happen at Port Sonoma, I believe the terminal will have to be on the Petaluma River, which is already dredged. I believe the bigger issues at Port Sonoma will be wave impacts and impacts of landside construction (such as parking lots) on existing wetlands areas. Either way, it is a site with lots of challenges.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

> -----Original Message-----
> **From:** Teri Shore [mailto:tshore@bluewaternetwork.org]
> **Sent:** Wednesday, September 04, 2002 1:47 PM
> **To:** castleberry@watertransit.org
> **Cc:** sanchez@watertransit.org; Russell Long; culnane@watertransit.org
> **Subject:** Hovercraft Re: Questions on EIR
>
> Hi Steve,
>
> Thanks for your quick response response. I am still sorting through the EIR, and I hope to have a list of questions to you by Friday. If not, I will get them to you as soon as possible.
>
> Regarding Hovercraft, it concerns me that an unstudied technology is being mentioned numerous times as a mitigation for reducing impacts to wetlands and other shallow habitat. The WTA studied surface-effect, low-wake and other technologies, but never Hovercraft. It seems to be getting slipped in by the consultants who clearly appear to favor it. It does not make sense for the WTA to propose a mitigation that needs future study when many other technologies have been studied at great expense already.
>
> I've seen Hovercraft specifically mentioned about 10 times so far, and in only one location does the EIR mention that this type of vessel may have environmental constraints. I understand that Moffett and some of the other sites that might require a low-draft or no-draft vessel are not included in the first 10 years of the plan. But Hovercraft is listed as a mitigation for Port Sonoma, which will be studied in the first 10 years. 1
>
> Bluewater recommends that a study of Hovercraft be conducted and added to the EIR technical

appendices before EIR certification (which could be accomplished by JJMA through Clean Marine). Once studied, Hovercraft is almost certain to be eliminated due to noise, pollution, fuel use, uncomfortable ride and high operational costs. This it why it needs to be addressed now and not allowed to move forward to the next stage as a potential mitigation.

1

If WTA cannot accomplish this for some reason, then the word "Hovercraft" should be removed (or replaced with the more generic descriptions such as low-draft or no-draft vessel). Hovercraft is a very specific type of craft with very specific problems.

I came up with this analogy: Proposing Hovercraft for the Bay's senstive waterways is like proposing helicopter transport to reduce traffic in Yosemite Valley.

Thanks,

Teri

----- Original Message -----
From: Steve Castleberry
To: sanchez@watertransit.org ; 'Teri Shore'
Cc: ian_austin@urscorp.com
Sent: Wednesday, September 04, 2002 12:01 PM
Subject: RE: Questions on EIR

Teri - I will be in the office Friday but am booked with meetings all day. If you would like to forward any questions by email, I can try to tackle them before the hearings next week.

Regarding hovercraft, I am not sure if I exactly understand your concern. Let me see if I can clarify the intent of its discussion in the document. Whenever we mention hovercraft, it is intended to only to be a mitigation for future study. I couldn't find anyplace in the EIR where we use hovercraft as the only mitigation to reduce a significant impact to less than significant. The only way a hovercraft (or any vessel for that matter) could be cleared under this document is if it met the air quality, noise, and wake criteria that were specified as mitigations.

I don't believe this document "clears" hovercraft for future use (nor is it intended to). As you know, there are unanswered questions about noise impacts of hovercraft as well as operations and maintenance concerns. Further, the only routes where it was suggested for future consideration in the EIR are not routes that are being recommended as part of the Implementation Plan (Moffett Field, Gnoss Field, Airport service). However, if you believe the document is unclear as to whether hovercraft would require additional study, you can include that comment on the document and we will clarify the point as part of the response to comments in the final EIR.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: Veronica Sanchez [mailto:sanchez@watertransit.org]
Sent: Tuesday, September 03, 2002 11:31 AM
To: Teri Shore
Cc: Steve Castleberry

Subject: FW: Questions on EIR

Teri: I am forwarding Steve a copy of your email with inquiry on hovercraft and your desire to meet with him before the next EIR meeting. I don't know what his schedule is for this Thursday and/or Friday when he usually plans on coming into town. Via this message, I'll have Steve answer you back directly on your meeting request and the hovercraft question.

Thanks,-VS
-----Original Message-----
From: Teri Shore [mailto:tshore@bluewaternetwork.org]
Sent: Tuesday, September 03, 2002 11:24 AM
To: sanchez@watertransit.org
Subject: Re: Questions on EIR

Hi Veronica,

I'm getting a pretty long list of questions. Any chance Steve might be down here before next week's hearing so we can meet?

One thing I don't understand is why URS has mentioned Hovercraft for mitigations in numerous places when Clean Marine never reviewed Hovercraft; and I see no information anywhere in the EIR or appendices that even describe or discuss Hovercraft. It's like it was pulled out of a hat.

Teri

----- Original Message -----
From: Veronica Sanchez
To: Teri Shore
Sent: Thursday, August 29, 2002 2:27 PM
Subject: Questions on EIR

I talked with Steve Castleberry about your interest in bouncing questions as you read the EIR. He is glad to work with you on this. He advises that most efficient way for him to do this is for you to send questions via email to him at his regular email address.

He picks up emails daily or several times during the day. It you need to have real time conversations with him, you might want to suggest good times to talk in your email.

Hope that helps,-VS

==========
Veronica Sanchez
Manager, Community and Government Relations
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY (WTA)
120 Broadway
San Francisco, CA 94111
(415)291-3377 x. 3182
Fax: 291-3388
sanchez@watertansit.org

EIR 2

Tristan Bettencourt

From: Melanie [jann@watertransit.org]
Sent: Monday, September 09, 2002 9:29 AM
To: castleberry@watertransit.org
Cc: Steven Morrison; Chris Proud; Tristan Bettencourt
Subject: RE: Report on Noise and Air Pollution in EIR

Steve C,

Tristan and Karen will be keeping of log of comments and the actual hard copies of the EIR and IOP respectively. Please forward those comments accordingly. Chris and I are still working out the routing procedure for these comments once they are logged.

~Melanie

-----Original Message-----
From: Steve Castleberry [mailto:castleberry@watertransit.org]
Sent: Monday, September 09, 2002 9:03 AM
To: 'Melanie'; cproud@ch2m.com; jeff_zimmerman@urscorp.com; Ian_austin@urscorp.com
Subject: FW: Report on Noise and Air Pollution in EIR

Gang - here are our first set of comments on the EIR. Looks like a pretty thorough review. Melanie/Chris, can you log these in. Thanks.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: GEORGEELLMAN@cs.com [mailto:GEORGEELLMAN@cs.com]
Sent: Monday, September 09, 2002 7:38 AM
To: castleberry@watertransit.org
Subject: Report on Noise and Air Pollution in EIR

Steve, below are my comments on the air pollution and noise sections of the Draft EIR. I hope they are understandable and are useful.

George Ellman

----------Comments from George Ellman, TAC member, retired biochemist,emeritus faculty member at UCSF.

Section 3.6 Air Quality; (It wasn't clear until I had read 2/3 of the way through this section that a glossary called Acronyms... was included at the end of the article. If not there, add IOP and WTA. All these terms could be grouped somewhere in the EIR and mentioned in the Table of Contents??) 1

3.6-9; Particulate Matter. You might list a few of the chemical compounds that 2

3/25/03 vsa \28066519 WTA\comment letters\EIR-002.cdr

are known to be carried in these particles. As far as I know, these materials are contained within the particles as well as on their surface. 2

3.6-10 Toxic Air Contaminants; a table of "unit risk factors"would be illustrative of the hazards associated with each agent. Or at least give an example. 3

3.6-11 Particulate Matter; suggest changes in the first sentence: ".....showed large respirable particles (2.5 to 10 micrometers) when inhaled can aggravate....." 4

Revision of Existing Standards; 4th sentence: "....will present....in May 2002." This is September. Has it been presented? If so, revise the sentence. 5

Diesel Particulate Matter; 3rd Sentence; Change to".....particles emitted contain chemicals...." The next sentence should have a period after "...diameter)." The next sentence should read "The particles are inhaled into the lungs."It might also be noted that the non-particulate gaseous emissions from diesel engines also contain significant hazardous materials. 6

3.6-12 Impact assessment methodology; In the 2nd paragraph, "The total emissions were compared.....overall increase or decrease from the No Project Alternate." 7

Vehicle Emissions; 1st sentence; "....miles traveled expected for the year 2025..." Next sentence could be shortened by stating that the 2025 emissions are expected to be about 80%of the present emission levels. 8

3.6-13 Significance criteria; This definition is unclear; the key word is "higher". How much higher is the important question. Is a 0.1%increase supposed to be significant? Is 0.5%? 2%? Without some specification, the reader is left to wonder. The second paragraph gives the rationale for lumping ferry emissions with the existing or contemplated levels of the other components in the air; carbon and nitrogen oxides, etc. In fact, what is needed is a comparison of what the CONCENTRATION of these components would be with and without ferries. If these concentrations rise to toxic levels it is clear that they are an environmental impact and must be mitigated. It is not the production rate alone that determines the concentration. The rate of disposition of each of these components is a major factor. The unit risk numbers clearly point out the importance of atmospheric concentrations over time. Why not make use of them. 9

3.6-14 Impacts; I have tried to reproduce the numbers in this table and find I am unable to do so. Please give a detailed example of what numbers were used and how the calculations were made. If these numbers are correct, Alternate 3, the enhancement of existing ferry runs seems to have the least problems for the atmosphere. I find that result intuitively correct; it is the project with the least modifications of the system. It will be easiest program for the public interested in clean air to accept. 3.6-16 Table at top of page is weird: some data is given as"Net decrease", but there is no number given? Why not? Show the calculations. Impact A-2; the projects reduce the amount of vehicle miles travelled by at most 0.16%. Because automobiles are such a major factor in causing air pollution, even this small effect may be important. 10 11

3.6-19 Impact A-7; What proportion of PM2.5 gets into the water? What portions get directly into the air? 12

Tables: Isn't there some way these tables can be turned 90 degrees so one doesn't have to turn the entire volume just for these few tables? 13

I note that Table 3.6-4 gives the Emissions in tons per day,whereas Tables 3.6-5,6 and 7 give the data in pounds per day. They could all be in one unit or the other; I suggest tons per day. The accuracy of the numbers in 3.6-5,6, and 7 is also questionable. These are projections far into the future; to claim accuracy to 3 or even 4 significant figures is unreasonable. Two significant figures is plenty. These tables could be simplified by omitting all the data except for Total Vehicle Emissions. The cold starts data is interesting, but irrelevant for this study. 14 15

Section 3.11 Noise;

3.11-1 Last sentence 2nd Paragraph; "SPLs in air and water cannot be readily compared." 3rd Para. "The distribution of frequency content...." 16

3.11-4 At end of 2nd Para. "500 to 20,000 Hz." At end of page;discussion of why two 60 dB sounds comes only to 63 dB. Show the details of this calculation. Just showing the result is not sufficient. 17

3.11-5 Top of page; last part of the paragraph;"increase to be just perceived. Under Wildlife give a reference or two to the material. Under Physiological Effects; "to damage hearing ability." Give Reference. 18

3.11-6 " Noise data of existing ferries...virtually nonexistent.." is hard to believe. How much effort was expended on this point? In the middle of the paragraph "-96 dBA" is mentioned. It isn't a minus sign is it? How about using a :? 19 20

3.11-7 Discussion of noise levels at terminal; my guess is that the major source of noise at the Ferry Bldg. in SF is the road in front of the site. 21

3.11.2.2 Impact Noi-1; Show the calculations that lead to the conclusions that passengers are unlikely to be at risk for hearing damage. Literally thousands of people per day could be exposed to elevated noise levels. If the crews are likely to suffer, how can we be sure that the passengers will not? Statements that "Impacts to passengers are not expected to be significant." need to be backed up by easily understood calculations. 22

3.11-12 3rd dot; "These receptors could experience the noise from 10% of the ferry trips." Or does this mean that 10% of the population involved would be sensitive to the level of sound produced? 23

3.11-15 3rd Para. 3rd Sentence; "the endangered salt marsh....." 3.11-16 2nd line: delete "extremely". 2nd Para; for sea otters, there must be some data from the Monterey area. Call the Monterey Bay Aquarium.3rd Para. Discussion of underwater sound pressure levels: what can we expect from ferries? Are they likely to produce significant underwater noises? 24 25 26

Of all the figures presented, I found 3.11-4 most helpful. 3.1-7 is interesting because it does not include automobiles, trains or ferries; surely they are land use elements; and noisy at that. 27 28

2002\wtatac.txt □

EIR 3

EIR 3



August 16, 2002

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

Re: **Critical Comments on Administrative Draft Implementation and Operations Plan (IOP)**

As you indicated to Maurice Palumbo of our staff at the August 15, 2002 Water Transit Authority (WTA) meeting, the following critical staff comments on the above referenced document are provided for your consideration before its release to the general public.

IOP Financial Plan (2005 – 2015)

Pages 8 and 53 make reference to a ten-year $665 million budget to implement various components of a regional water transit network. We understand this budget includes estimated amounts for new vessels, new terminals, and operating costs. However, we also believe the IOP should acknowledge that the budget presented is not comprehensive and the possibility that additional off-site capital expenditures, such as remote access improvements (e.g., roadway widening and traffic signals), may be necessary at certain ferry terminal sites. For example, improvements to roadways leading to Larkspur and Sausalito terminals will likely be needed to support the passenger volumes projected by WTA. 1

San Quentin and Larkspur Ferry Terminals

The IOP should clarify the relationship between the existing Larkspur Ferry Terminal (LFT) and a possible new ferry terminal site at San Quentin. The IOP should cite whether the San Quentin terminal would replace LFT or co-exist with LFT. For example, should San Quentin become the passenger terminal, would LFT be retained as a storage, maintenance, and administration facility? Also, the document should clarify whether passenger forecasts for the Larkspur - San Francisco ferry route presented in Exhibit 8 are the same for a terminal location at San Quentin or the existing terminal. 2 3

San Francisco Ferry Terminal (SFFT)

The Concept Alternatives for a new SFFT, illustrated in Exhibits 19 and 20, were discussed at length at the August 14th Board meeting. We believe the IOP should recognize that these concepts completely remove existing Golden Gate ferry facilities. These facilities, which exist under a long-term lease between District and Port of San Francisco, include hydraulic ramps and gangways. District ferries are designed to match these facilities. The WTA concepts use 4

conventional fixed ramp and float. District high-speed ferries would not be able to serve WTA terminals without modification. Even if vessels could be converted to use conventional floats, District hydraulic berths at LFT would have to be removed and replaced to match the WTA facilities. Therefore, WTA concepts for SFFT would have major impacts on District terminals and vessels and this should be noted in the IOP, and the expense should be included in the WTA budget. 5

District appreciates the opportunity to provide these critical comments on WTA's Draft IOP. Additional comments on the IOP may be provided by District during the public review process. Please call me at (415) 257-4475, or Mr. Palumbo, Principal Planner, at (415) 257-4431 if you have questions.

Very truly yours,

Alan R. Zahradnik
Planning Director

ARZ:gj
c: Celia G. Kupersmith
Denis J. Mulligan
Rebecca Wessling
Maurice P. Palumbo
a:f:\AA\ferry\WTA IOP Comments.082.doc

By facsimile: (415) 291-3388

EIR 4

To: Tom Bertken, CEO
Water Transit Authority
120 Broadway
San Francisco, CA. 94111

September 5, 2002

I am unable to attend the public hearing in my county so I am writing you with my requests for the new ferry plan.

First I am requesting that any plan will exclude the wetland areas including Port Sonoma, Berkeleys Gilman site and Moffett Field as these areas are far too fragile. There should be no new dredging in these areas 1 2

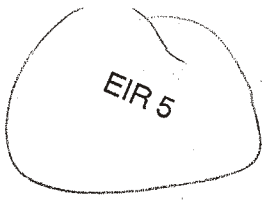
Secondly we must insist that all new ferries are 85% cleaner than federal law requires so that we insure that we do not add to the nitrogen opide problem. 3

We should also charge fees for any new parking lots and keep them to a minimum. 4

I hope that we can expand our choice of transportation around the Bay in a way that we can all feel proud of.

Sincerely yours,

Bonnie Gray
75 Avon Rd
Mill Valley, CA.
94941



August 16, 2002

Steve Morrison
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Steve,

The following comments include suggested language changes in the draft IOP presented during the public comment section on Aug. 15, 2002, and additional more general comments. Bluewater Network also plans to provide more extensive comments when the final IOP and draft programmatic EIR is released.

My comments are broken out by subject and make reference to specific pages and sections of the draft IOP:

85% below EPA Tier 2 Emissions Standard

Page 8 Draft IOP
Bluewater supports the language that starts with "The vessels and propulsion systems . . ." and ends with "and that is the standard we shall mandate."

However, this language appears nowhere else in the draft. In order to be consistent and to show WTA's full commitment to the 85 percent below EPA Tier II - 2007standard, I suggest that similar language be added anywhere the statement about a suggested CARB emissions standard appears, which is in several other places. In fact, we recommend that WTA drop the CARB reference after the first mention and simply call it the WTA emission standard or ~~the Bertken standard or Culnane standard~~. 1

Please change at least the following sections within the chapter on The Boats and in the Executive Summary as follows:

Page 37 Draft IOP

Under heading "Alternative Fuels and Emissions" at the end of the second sentence add "and that is the standard we shall mandate" as follows:

Our Technical Advisory Committee's Clean Marine Ad Hoc Work Group of state and federal regulators, environmental advocates, scientists and ~~world-class~~ naval architects found one propulsion system made of existing off-the-shelf technology that today can affordably achieve emissions reductions up to 85 percent lowers than EPA's 2007 Tier II engines standards, which is the reduction level the California Air Resources Board (CARB) suggested as the proposed standard and *that is the standard ~~we~~ The WTA shall mandate.* 2

Page 38 Draft IOP

Under heading Fuels and Propulsion, in the first sentence, change "up to" to "at least" as follows: OK

Among the five propulsion options that reduce emissions *at least* 85 percent beyond the 2007 standards, one can be used today on passenger ferries: a diesel engine . . . 3

Page 6 Draft Executive Summary IOP

In the first paragraph after the bullets in the first sentence, please add "and that is the standard we shall mandate" as follows: OK

The Authority's study found five propulsion systems using existing technology that meet CARB's suggested standard of 85 percent cleaner than EPA's 2007 Tier II standard, and *that is the standard we shall mandate.* 4

Advanced Technology Demonstration Vessels

Page 41 Draft IOP

This page describes the WTA's commitment to building a fuel cell ferry for the Treasure Island route.

In addition, it mentions a second experimental vessel that will help accelerate the eventual switch from diesel to fuel cell in the ferry fleet. In order to demonstrate the WTA's high level of commitment to the project, we suggest stronger language in the second sentence of the first paragraph after the bullets, as follows: 5

> In association with this development of a small battery electric vessel for Treasure Island, the WTA plans to pursue federal and other funding to design and construct a second experimental vessel testing ~~hybrid electric-battery~~ technology to serve as a bridge between diesel and fuel cell ~~engines~~.

↗ NO, WE HAVE LANGUAGE FOR DIESEL BATTERY ELECTRIC BATTERY ELECTRIC VESSELS.

Fleet Technology – Phase One

Page 41 Draft IOP

On this page, the WTA also summarizes the technological challenges that will occur as it rolls out a new generation of ferries. However, it does not fully explain how the WTA will ensure that new vessels will meet the 85 percent below EPA Tier II 2007 standard or what will happen if it is not achieved.

Concern was expressed in a recent Clean Marine Working Group meeting that it is very possible that when a RFP goes out for the first phase fleet of low-emissions vessels that no boat builder may respond due to the advanced nature of the technology. 6

The draft IOP says that when it comes to procuring new vessels, "new boats will be acquired using the standard procurement procedures outlined by state and federal regulations" and that "issues beyond initial purchase cost are considered such as emissions, wake, operating cost, maintainability, transit-

cycle times and life-cycle cost. It also mentions financial incentives as a way to attract boat builders to compete.

These plans are strong and we certainly support them. However, we would like to see the WTA go further in more specifically addressing the issue of ensuring the marketplace will respond to its requirements.

Bluewater recommends that WTA include a short section in the chapter, perhaps subtitled "Achieving Fleet Emissions Goals" that describes additional ways to make sure that the technology needed is available, such as

- working directly with engine manufacturers,
- building at least one pilot vessel six months or a year in advance of the rest of the fleet,
- calling on CARB to certify engines that meet the standard
- ongoing monitoring of technology developments
- or other avenues to help boatbuilders gain confidence on this new generation of ferries

6

TOO DETAILED FOR IOP

Air Emissions Monitoring

OM

Under the Full Phase Operations organizational chart, the function "Air Emissions monitoring" needs to be added to the box under Marine Engineering.

PROGRAM

7

Air Quality
Page 52 Draft IOP

On this page, the WTA states that the new ferry plan will improve air quality by reducing vehicle miles traveled. However, it is not clear what emissions standard the document is referring to. The next paragraph mentions that additional benefits will be gained by using the WTA standard of 85 percent below EPA Tier 2.

Unless ferries meet the WTA standard, it is extremely unlikely that any air emissions improvements will be gained, based on studies from CARB, CALSTART and the University of Delaware. All agree that air emissions will increase with any other emissions standard, including EPA Tier 2.

8

The WTA either needs to spell out the standard or make a correction. Since no one has seen the WTA Air Quality Technical Study prepared for the EIR, it is impossible to tell where this conclusion came from or to evaluate whether it is correct.

APPENDIX

General Comments

Advisory Committees

The draft IOP did not mention the role of the TAC and CAC in the future. We strongly urge the WTA to continue with these committees and, in particular, to maintain the Clean Marine Working Group of the TAC to follow the expansion of the ferry fleet and to maintain oversight of the technological advances and building of the vessels. This should be spelled out in the IOP.

9

IT THEY'RE MENTIONED ...

Environmental Section
Page 20 Draft IOP

There is a very short section titled The Environment on page 20 that we believe totally shortchanges the WTA's high commitment to environmental responsibility. It is buried in a section called The Routes. If a person read only this section, they may not understand that a full discussion of the environment is contained in a section called The Bay. 10

We suggest that you either delete that small section, combine it with the section called The Bay or refer to the section called The Bay. The section on The Bay is the one that more fully explains the WTA's comprehensive study of environmental impacts and its plans to minimize them. In fact, you may want to rename it: The Bay Environment. 11

Title of Document
Cover Page Draft IOP

If the WTA desires a more "zippy" document, I would suggest changing the name currently appearing on the cover of the Draft IOP to something like: A Strategy for Clean Water Transit on San Francisco Bay.

↑ ONE COULD THINK THIS MEANS CLEAN WATER AS OPPOSED TO CLEAN AIR

My reasons are both aesthetic and factual.

The current title "A Strategy to Reduce Congestion and Improve Air Quality" could be any type of project from water transit to BART to Zero Emission Vehicles. It is too generic. Also, the words "congestion" and "improving air quality" are not particularly exciting.

I also think that transit advocates will question whether the ferry system will indeed reduce congestion and improve air quality. SPELLED OUT IN EIR

12

For instance, the California Air Resources Board stated in its draft ferry emission reports the following:

> "Studies in the Bay Area and elsewhere indicate that congestion relief benefits from transportation projects are generally short-term, since congestion relief triggers new trips from latent demand and congestion returns to prior levels within a few years."

So while ferries may indeed take cars off the road, they will probably be replaced with others. I think you would be safer to say "help ease congestion" if anything. This would also apply to other modes. NO

The ferries will improve air quality only if they t meet the WTA standard and if ridership projections are correct. And even in that case, can we really say that the air quality is improved? Perhaps it is really just not made worse, particularly if more cars replace the ones that are taken off by ferries. This would also be the case with other modes of transit. EIR SAYS SO

Bluewater Network will make additional comments as the final draft IOP and the EIR are released.

With all that said, I would like to add that we are quite impressed with the WTA's work and believe that the ferry plan in general is very worthy of our support. 13

Sincerely yours

Teri Shore
Clean Vessel Campaigner

EIR 6

Tristan Bettencourt

From: kyr@earthlink.net
Sent: Friday, September 13, 2002 3:23 PM
To: email@watertransit.org
Subject: IOP Comments

Below is the result of your feedback form. It was submitted by (kyr@earthlink.net) on Friday, September 13, 2002 at 15:22:50

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email: kyr@earthlink.net

Name: K. Y. Rogers

IOP_Comments: This is the most complete, well thought out, comprehensive and accurate proposal have ever had the opportunity to study. Not one detail is left to chance.
The entire Bay Area community is so fortunate to recieve this quality of public service and dedication. We here in Florida could use even a smattering of this talent!! That's my vote!

1

Congratulations to you all.

SUBMIT: SEND COMMENTS

Steve Castleberry

EIR 7

From: Teri Shore [tshore@bluewaternetwork.org]
Sent: Friday, September 13, 2002 12:59 PM
To: castleberry@watertransit.org
Cc: sanchez@watertransit.org
Subject: EIR question - VMT

Hi Steve,

>From my reading, the EIR states that the expanded system will do little to reduce Vehicle Miles Traveled, yet the IOP and WTA presentations are saying that the plan will reduce VMT by 200,000 miles per year. 1

Please clarify.

Thanks,

Teri
****
Teri Shore
Campaign Director, Clean Vessels
Bluewater Network
311 California St., Suite 510
San Francisco, CA 94104
415-544-0790, ext. 20
fax 415-544-0796
www.bluewaternetwork.org
****

EIR 8

Tristan Bettencourt

From: wheeler@wsdot.wa.gov
Sent: Friday, September 13, 2002 7:09 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(wheeler@wsdot.wa.gov) on Friday, September 13, 2002 at 19:08:45

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email: wheeler@wsdot.wa.gov

Name: Bob Wheeler

WTA_Comments: I just noticed an article in a mariner magazine about your potential growth upwards to 31 vessels in the future. As your fleet grows, you will need an automated dispatch system. We have just built one you may be interested in. It is also an HR system and tracks all records necessary for your employees, qualifications, certifications and job assignments. Any questions please email or call 1

Bob Wheeler
Crew Resource Manager
Washington State Ferries
wheeler@wsdot.wa.gov
206-515-3940 office and voice

SUBMIT: SEND COMMENTS

Tristan Bettencourt

EIR 9

From: Steve Castleberry [castleberry@watertransit.org]
Sent: Monday, September 16, 2002 9:12 AM
To: 'Tristan'
Cc: 'Steve Morrison'
Subject: FW: Clarification on VMT

Tristan - please add this to the comment file.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: Teri Shore [mailto:tshore@bluewaternetwork.org]
Sent: Friday, September 13, 2002 4:19 PM
To: castleberry@watertransit.org
Cc: sanchez@watertransit.org
Subject: Clarification on VMT

Steve,

I see that the figures about VMT in the IOP and EIR are not in conflict, but that the numbers are being cast differently. The 200,000 VMT reduction is touted in the IOP, but does not mention that the EIR describes this decrease as minimal at .001 percent. 1

Here's another question; what are the routes evaluated in the EIR as "reduced Alternative 2". It is not spelled out anywhere (and should be) and I can't quite figure out what these are:
HBFB (Hercules-SF?)
OAKFB (Oakland-SF?)
TIBFB (Tibruron-SF?)
(what's FB? full boat? or an abbreviation for San Francisco?)
SSLTOR
RMDFB (Richmond-SF?)
MZBFB (Mission Bay?) 2

It seems that is reduced Alternative 2 is analyzed only in the Air Emissions section to get the desired results. Shouldn't that alternative be evaluated for all sections, even if the impacts are less than with the others? 3

Also, I don't understand why Alcatraz is included in the baseline "null alternative." It inflates patronage and emissions and is not part of the commuter ferry system. I think the air emissions for the no-project alternative should be recalculated without Alcatraz. 4

Guess I better stop with these emails until I get my comments and questions all together.

Teri

****
Teri Shore
Campaign Director, Clean Vessels



EIR 216

Marin Audubon Society Box 599 Mill Valley, California 94942-0599

January 17, 2003

Water Transit Authority
120 Broadway
San Francisco, CA 94111

RE: Draft Programmatic EIR Comments

Dear Sirs:

Thank you for the opportunity to submit comments on the Draft Programmatic EIR for the Expansion of Ferry Service in the San Francisco Bay Area. We have found the DPEIR to have major deficiencies. Significant additional information and analysis is needed to enable an informed decision to be made on this project.

The DPEIR's major deficiencies that we request be addressed are:

- failure to recognize significant adverse impacts of the project. 1

- failure to clearly recommend that sites at which there are fatal flaws should be removed from consideration. 2

- lack of discussion of cumulative impacts of the project. Although a Programmatic EIR is the most reasonable and logical place to address the cumulative significance of each impacts, the cumulative impacts are discussed at a very minimal level or not addressed at all. A cumulative impact discussion should be included for all impacts. 3

- incomplete biological impact discussions, specifically regarding endangered species. The Implementation and Operations Plan (lOP) contains information that is not included or discussed in the DPEIR but that is relevant to the DPEIR analyses. In many cases the IOP information is different than information that is addressed in the DPEIR. The IOP should be included by reference as part of the DPEIR and that all statements and analyses that are different, unresolved or not included in the EIR should be addressed in the DPEIR. We identify a number of these problem areas in our comments below. 4

- lack of clarity about which sites are still being considered as part of the plan and which, if any, are proposed to be dropped due to the significance of the adverse impacts, infeasibility, or other reasons. The DPEIR should include a comprehensive list and explanation of which sites are intended to be implemented within the project time frame of 10 years, which are not, and state the reasons why. The IOP includes a list of projects under the heading Proposed New System (page 2). Port Sonoma is listed as (further study). IOP Figure 8 lists certain sites that appear to 5

have fatal flaws, such as Moffat Field and Port Sonoma, as being implemented after the 10 year time frame, and simply drops others, such as Gnoss Field, San Leandro and Hunters Point. The table should be revised to clearly present which sites will be dropped, and the discussion should explain why they are dropped, while others, with apparently similar impacts, continue to be listed albeit in the distant future. 5

- A focused discussion of the Port Sonoma site should be presented. Why is this site still included? All of the known adverse environmental impacts of using this site should be presented. There already is a substantial body of data about significant adverse environmental impacts that would result from a ferry terminal at this location. What further studies are being recommended? The question needs to be answered: Is putting additional public dollars into a site such as this really in the public interest, or is it in the interest of just a few local supporters of ferry/rail connections? 6

Another relevant issue to the Port Sonoma site is ridership. The IOP discussion of ridership in the Golden Gate Corridor indicates a potential demand of 1,392 daily passenger trips from Port Sonoma to San Francisco. This figure warrants an explanation particularly since the project site is surrounded by agricultural lands which will generate no riders unless they are developed. How was this figure arrived at? Identify the study that was undertaken? How many riders are projected to come from Novato and how many from Sonoma County? Has timing been factored in? How long would the trip take for Sonoma and for Novato riders to San Rafael and to San Francisco destinations? What other relevant factors were considered? 7

The discussion in the IOP, page 17, states that service will first occur on routes where the environmental impacts are either insignificant or most easily mitigated, and where localities are most committed to supporting ferry service with matching funds. What if, as is the case with Port Sonoma, these two conditions conflict? How will environmental impacts be considered? At Port Sonoma local officials support rail and are ignoring environmental impacts. 8

Our comments on specific sections of the DPEIR are:

Environmental Impacts

The statement is made on page 3-1 "The evaluation does not include a complete inventory of biological resources present in the Bay...." Why isn't this included? 9

Need for Project

The need for the project is not clear. The DPEIR speaks to existing congestion and the IOP discussion goes further and speaks to the need to head off a "major calamity." The certainty of this major calamity is highly questionable. It appears to be based primarily on ABAG projections of significantly increased growth. What is the record of ABAG projections? How many communities fulfill these projections? 10

Assumptions are made that expanded ferry service is the most cost effective and appropriate means of addressing congestion. The DPEIR must include an analysis that supports this conclusion. 11

Concerning information provided on Table 2-1, the primary community support at Gnoss Field or Port Sonoma, is from some local politicians and developers. 12

Identify which routes are "potentially constrained because of ridership, costs, or other feasibility criteria" (page 2-3). The DPEIR discussion lists general criteria used in this evaluation but does not include the results of the analysis. Which sites are high on the list and which would drop out because they fail to meet the feasibility criteria. 13

The DPEIR should include a comprehensive comparison of the adverse impacts (erosion, noise, wildlife impacts, air and water quality, dredging, noise, air pollution, endangered species and migratory species. growth inducing, etc.) and the benefits of the various vessel types (hydrofoil, catamaran, conventional monohull, surface-effect ship and hovercraft). The reader needs to know the pros and cons of each vessel type in order to be able to evaluate. 14

Dredging

The contingency volume noted on page 3.1-8 would not be applicable to the establishment of an expanded ferry service. 15

A project with high dredging needs, such as would occur with Alternatives 1 and 2, appears contradictory to the goals and intent of the LTMS. Evaluate the consistency of each alternative with the LTMS goal of reducing dredging and disposing of dredge material? 16

The statement is made on page 3.1-6, first paragraph, that dredged materials have never been found to be hazardous." Show evidence to support this claim. 17

The increase of dredged material volume by 4.5 mcy is indeed significant. Discuss the analysis that supports the conclusion that this would not be significant. The discussion rationalizes that this "would not occur all at one time." There can be no certainty, however, that they wouldn't need to dredge "all at one time." 18

Furthermore, such a large increase has the very real potential to adversely impact existing dredging projects, even if just a portion of the 4.5 mcy were to be disposed during one year. What would be the potential impact of the proposed increases on existing dredging projects, particularly if upland or ocean disposal were not available. What investigation into the availability of upland (including landfills) and ocean disposal has been completed? It is our understanding that such sites are very limited. 19

Impact 3.1.2.2 There has not been much success identifying upland dredge disposal sites in the Bay Area. What upland sites are considered likely to be used for disposal? CULO-2 states that upland disposal would be at existing landfills. During the LTMS process, there were no landfills that were readily available for disposal. The most likely one was Redwood in Marin County, but that is not feasible because of access and endangered species impacts. What background information has been obtained and contacts made to identify potential landfills disposal sites? Upland sites should not include diked historic baylands. 20

It is not just the disposal of dredged material that adversely impacts Bay resources, it is dredging itself. Dredging increases turbidity, erosion, stirs up pollutants, and destroys benthic organisms. 21

Discuss the cumulative significance of these impacts. 21

Mitigation D-l.l indicates that four of the potential new ferry terminals would account for 12,130 cy of dredged materials as shown on tables 3.16, 3.18 and 9. Describe the area at Port Sonoma from which this quantity would be dredged? The quantity seems low considering the area that appears to need dredging and the amount of sediment that has accumulated. Is the current marina area included or does the quantity only involve dredging near the mouth of the marina area? 22

Impact D-2 discusses various options for dredging equipment. Dredging equipment in the Bay is limited. How available is each of the equipment methods described for use in the Bay? 23

Hovercraft is mentioned as a vessel type that would eliminate the potential impacts of dredging. This benefit must be evaluated against possible adverse impacts of this vessel type. Hovercraft noise is a major concern. What is the noise level of hover crafts and what adverse affects would the noise have? Discuss the economic feasibility of using hovercraft for the various site types? 24

Impact D-4 addresses impacts to threatened, endangered and protected species. Migratory shorebirds are protected by the Migratory Bird Treaty Acts. Discuss the potential impacts of dredging away mudflats to shorebirds refueling during migratory journeys and overwintering in the Bay. Intertidal mudflats are the primary foraging habitat for shorebirds. 25

What are the estimated costs of initial dredging and annual maintenance for the new sites? 26

The IOP states (page 46) "There are several routes that were studied that have very high dredging requirements. However, these routes are not now recommended for implementation." The highest sites were Gnoss Field and Moffatt Field, and Moffatt Field is still mentioned.?? 27

The list of sites and dredging volumes (Table 3.1-5 DPEIR) for Alternative 1 includes two sites, but does not differentiate how much dredging would be needed for each site nor is the dredging frequency addressed. Provide a chart showing how much material would need to be dredged from each site (not the entire route) and how frequently dredging would need to occur for service to continue? 28

Wake Analysis

The discussion of California Clapper Rail at 3.3.1.2 only mentions disturbances such as inundation of nests. While this impact is important, other significant impacts would also result from operation of ferries near Clapper Rail habitat: the potential loss of habitat due to erosion of wetlands would permanently eliminate foraging and nesting habitat for Clapper Rails. Identify erosion as an impact on Clapper Rails and address mitigation measures, the first of which should be avoidance. 29

Changes in sediment movement resulting from ferry operations (3.3 .1.6, page 3.3-8) certainly must be "considered in the context of a dynamic system that has daily seasonal and long-term temporal variations." The cumulative impacts of ferry-induced sediment movement must be 30

considered in addition to the naturally occurring sediment movement, which would increase the cumulative significance of this impact. 30

Impact WW -1 the discussion indicates that wake wash at rocky shorelines is not expected to be significant. This evaluation contradicts the experience of Tiburon shoreline residents whose shorelines have undergone considerable erosion due to wakes of the Larkspur ferry. 31

Port Sonoma and other shorelines, but not Gnoss Field, are identified as being within shoreline areas that could suffer wave impacts. None of the proposed mitigations would seem to be feasible or effective in reducing wave energy along the sensitive Port Sonoma and Gnoss Field shorelines. Even when vessels slow down, there is still a wake. Yet neither Port Sonoma or Gnoss Field are mentioned as having unmitigatable wake wash impacts. The noise impacts of hovercraft, would likely outweigh its wake benefits, and certainly would not mitigate for erosion impacts. What mitigations are expected to be feasible and effective in these locations? 32

How would dredging channels through mudflats impact the remaining adjacent mudflat, the benthic organisms, feeding patterns of fish and birds, and the stability of the mudflat habitat? 33

WW -3 The conclusion that no significant impacts would occur because no nesting sites are within 50 meters of shoreline is inaccurate. Rails move their nests and could very well nest away from the shoreline in one year and not in the next. This must be considered a significant impact. That Clapper Rail nest more than 50 meters from a fringe marsh is not supported by any scientific evidence of which we are aware. Cite the study or studies that support this conclusion.

A study undertaken by Point Reyes Bird Observatory biologists Gary Page and Jules Evans for Marin Audubon Society at the Corte Madera Ecological Reserve that Clapper Rails nest in different locations during different breeding seasonal, and even that the boundaries of territories change. We know of no documentation that Clapper Rails do not nest within 50 meters from a fringe marsh. 34

Mitigation WW-3.3 How could ferry routes at Port Sonoma or Gnoss Field be adjusted to redirect energy away from wetlands? There is not sufficient space in either location to implement this mitigation and, if there were, it would require a structure that would be contrary to BCDC policies and would have further adverse habitat impacts. 35

Mitigation WW-3.4 Identify what "operational adjustments" could reduce vessel wakes at Gnoss Field and Port Sonoma? 36

The discussion in the third paragraph (page 3.3-16) states that harbor seals tend to be on rocky areas. This is not the case with two haul-out areas in southern Marin: at the Corte Madera Ecological Reserve and Strawberry Point. Both are dirt/mud areas. 37

Water Resources

Mitigation W -1.2, for impacts to water quality during construction and operation of the ferry, is inadequate. There are many BMPs. What specific BMP's are recommended for use during and 38

after construction to enaure there is no degradation of water quality? Oil and grease would be deposited from cars on the parking lots and litter would increase. Identify specific measures that would remove these pollutants and clean up the runoff before it flows into the Bay. A mitigation measure should recommend that treatment facilities be installed, used and maintained in each lot. 38

Impact W -2, Construction in floodplains. Avoidance should be considered as a mitigation for impacts of developing in floodplain. The potential impacts of contributing to flooding of adjacent properties by building new terminals should be identified and addressed. 39

What measures should be required of each new facility to protect against spills? 40

Biology

Sturgeon should be identified as a species in decline. 41

The North Bay, at any given time during the winter months, may have the majority of the Pacific Flyway Canvasback and Scaup. This should be considered in evaluating the significance of impacts to open water habitat in the North Bay. 42

Open Bay habitat also provides feeding/foraging habitat, not just loafing and roosting, for diving birds and fish. 43

The list of Significance Criteria should include impacts that would substantially affect migratory species. 44

Define "protected wetlands." Why would the reduction of wetlands be limited only to "protected" wetlands? Are they wetlands that are in the Corps jurisdiction, owned by a protective agency or something else? 45

Impact B-1 The loss of jurisdictional wetland habitat would not just occur as a result of dredging and construction. The erosion from ferry wakes would also cause the permanent loss of wetlands. 46

Mitigation B-l.l Existing mapping should be sufficient to generally identify wetlands in locations identified. There is also sufficient data from agencies and private scientific organizations, such as Point Reyes Bird Observatory, that provide information on the nature of the impacts should these wetlands be lost. Specifically, impacts to the wetlands at Gnoss Field and Port Sonoma would be significant because this area has the largest population of endangered Clapper Rails in the North Bay. 47

This mitigation must consider avoidance first, instead of going immediately to acres available for mitigation. Simple 1:1 replacement would not be adequate because it would take many years for a new marsh to restore itself and success is uncertain. A significantly increased ratio of mitigation wetlands must be required but only after it has been clearly demonstrated that avoidance is not possible. 48

Mitigation B-1 lumps avoidance together with site-specific mitigation. These are not the same. There should be a clear recommendation for avoidance of 49

imapcts and discussion about implementation of this mitigation. 49

Mitigation B 2-1 This discussion should address removal of corgrasss that might invade tidal marsh areas denuted by dredging to construct ferry terminals or channels. Any removal of non-native cordgrass should be coordinated with the Spartina Program. 50

Impact B-3 Loss of eelgrass. Eelgrass is a highly valuable resource in the Bay. Impacts to eelgrass beds should be avoided altogether. Furthermore, the success of replacing eelgrass is uncertain. The discussion should be expanded to address the potential for success in restoring eelgrass beds in the bay. What is the potential impact of turbidity on eelgrass beds? 51 52 53

Maps of the Bay's eelgrass beds do not include the northern part of the Bay. The North Bay map stops at China Camp. Does this mean there are no beds north of that, or was a map left out? The discussion on page 46 of the lOP that "Eelgrass, and wetlands subject to special proteciton are located throughout San Francisco. The Program EIR found that eelgras beds are near the entrance to...Port Sonoma." Eelgrass at or near Port Sonoma should be discussed in the EIR and shown on a map along with that near the other sites. 54

Gnoss Field should be added to the discussion of impacts for Alternatives 1 and 2 at the bottom of page 3.5-31 and bot of 3.5-32. 55

Regarding the discussion in the IOP of air quality benefits, these benefits do not justify or in any way compelsate for impacts to wetlands or endangered or migratory species. 56

Impact B-4 The turbidity discussion minimizes the importance of this impact based on the small scale of the dredging operations. Provide an analysis of how this conclusion was reached. Several of the dredging operations would not be small scale, and it is not clear that these larger projects would be dropped. Furthermore, when considered together, the many individual dredging projects would be cumulatively very significant. Specifically of the dredging for the terminal sites requiring a large amount of dredging, including Gnoss Field and Port Sonoma. These imapcts would be repeated as the dredging reoccurs. 57

The turbidity discussion should also address the cumulative impact of reducing visibility of diving birds that depend on visibility to find prey. A discussion of cumulative impacts should be included and it should consider all of the other dredging projects going on in the Bay. Similarly, the widespread nature of the impact on phytoplankton productivity should be considered which would increase the significance of this impact. 58 59

There is not an adequate analysis presented to support a conclusion that there will be no long term impacts to plankton and productivity as a result of turbidity. 60

Impact B-5 Disturbance to benthic organisms. The frequency of the need for dredging also must be considered in evaluating this impact. If dredging would be destroying benthic organisms and mudflat is being lowered so that organisms barely have time to recolonize, this should be considered a permanent and significant impact. The nature of the habitat being dredged also needs to be considered. If it is an intertidal mudflat, the loss of foraging habitat for shorebirds 61

should be considered significant. 61

Address the cumulative impacts of the loss of benthic organisms. Even if the areas to be dredged are only approximately 1 percent of the shallow benthic habitats in the Bay, this must be considered together with the losses from other dredged projects for a significant cumulative impact. What acreage does the 1 percent represent? 62

Impact B-6 Invasion of non-native species. As above, the cumulative impact, i.e. the project impacts together with other areas where nonnative species have invaded, must also be considered. 63

Impact -B-8 Impacts on spawning herring. Because of the already signficant impacts to herring spawning in the Bay, this impact should be considered significant and avoided. 64

Impact B-9 Impacts of pile driving. This discussion assumes that the piles driven would be small. Support for the accuracy of this assessment should be provided. This impact should be considered significant until proved otherwise. 65 Because of the already significant impacts, i.e. the death of many fish, Caltrans is having to address due to pile driving at the Bay's bridges, this too must be a cumulatively significiant impact unless it is clearly proven otherwise. 66

Impact B-10 Potential effect on shorebirds and wetland species. This discussion refers to mitigation B-1 which is to avoid the impact, but then goes on to describe many acres noted in the Goals report that could be used for mitigation. Similarly, Mitigation B-3 mentions avoidance but goes on to recommend mitigation. Avoidance should be recommendation of choice. The discussion should focus on locating the ferry terminals in locations where wetland impacts would not occur and not on mitigation sites. 67

Impact B-11 This impact addresses disturbance to roosting and foraging waterfowl but specifies that it applies primarily to the South Bay for roosting and foraging waterfowl. The maps themselves demonstrate the importance of the North Bay for overwintering waterfowl, and there is no justification for not including the North Bay. 68 Potential impacts to San Pablo Bay rafting waterfowl are dismissed with the comment that "undisturbed shallow open water roosting and foraging habitat" would remain. The IOP admits that there is not adequate information on the impacts of disturbance on overwintering birds. It cannot be assumed that the birds would just move to another area and return in 10-35 minutes. Even if birds return, there still would be impacts because the birds would have to use extra energy to move to avoid the disturbance and return. 69

Furthermore, the DPEIR analysis conflicts with the IOP discussion (page 42) which states that if there was an impact on rafting birds, it would generally be limited to routes in the extreme North and South Bays." 70

This impact should be considered potentially significant in the North and South Bays. The WTA should commission independent studies to determine the extent and significance of the disturbance of rafting waterfowl on both the North and South Bays. This is a potentially significant cumulative impact that should be addressed now, and cannot be pushed aside to be 71

dealt with by individual terminal projects where the discussion of cumulative significance can be ignored. 71

The IOP discusses consultation with the NMFS (although they only address fish) Audubon Groups (we were not one of the once consulted, although there are significant areas where diving birds raft in the bay off of Marin County), and others to develop studies to evaluate this issue. We stronly agree that repeated disturbance can "cause a decrease in reproductive success and thus possibly threaten one or more species." Existing disturbances, such as hunting on San Pablo Bay further contributes to disturbances and limits areas where birds can safely roost and forage during the winter months. It is during these months they must rest and gain weight if they are to return to their northern breeding ground and reproduce successfully. What studies have identified that rafting diving birds do not use the shipping channels? We request that we be consulted in future discussions. 72

Impact B-13 As noted for the fish, it cannot be assumed that the impacts on marine mammals from pile driving would not be significant without describing the specific nature and location of the piles and pile driving. Identify any terminals that are near haul out areas. 73

Impact B- I 6 Impacts on Clapper Rails. Only avoidance should be considered acceptable as mitigation. The location of habitat for listed species is already well known. Considering that this Clapper Rails are at the brink of extinction, this mitigation should clearly recommend avoidance, instead of mitigating by restoring or creating replacement habitat. The success of wetland restoration is always uncertain, and even when successful, there is a long time period before a restored wetland can provide the functions and values of the habitat lost. 74

The discussion in the IOP (page 42) about Clapper Rail nesting is incorrect (see PRBO letter and discussion above). Clapper Rails do not always nest in the same place. The studies that demonstrate they generally nest away from shorelines so that large waves do not harm the nests should be cited. This is not the same circumstance as repeated waves generated by ferries eroding the shoreline where rails could nest. 75

Significant public and private funding is making possible hundreds of acres of tidal marsh restoration in the North Bay. Restorations include Carl's Marsh, Sonoma Baylands, an approximately 400 acre restoration at Bahia (which Marin Audubon will be implementing along Black John slough leading to Gnoss Field). Discuss the potential impact of the construction and operation of ferry service on these projects. What disturbance and other direct and indirect impacts could occur to these restoration sites and wildlife use of them? 76

The IOP states (page 17) that site-specific environmental study will be required to determine each route's specific impacts." While this may be true, enough is known about the location of endangered species and wetlands to make a reasonable and informed evaluation and decision now, and not waste public money any further on infeasible sites. Gnoss field and Port Sonoma are certainly such sites. 77

Air Quality

Mitigation A-I. Cumulative air quality emissions. List ferry routs that would reduce air quality emissions. The mitigation should specifically recommend eliminating the routes in order to ensure emissions are reduced to less than significant. The routes not listed should be specifically recommended to be dropped. Delete sufficient routes so that the net pollutant load would be the same or less than today. What routes would have to be deleted to create such a scenario? 78

Mitigation A 1.2 Explain why diesel fuel is the only alterative fuel that can be used. Would the project bring the Bay Area any closer to non-attainment for SO2 and CO? 79

Impact A-3.1 This mitigation speaks to parking management strategies that would reduce the impact of cold-start vehicles by limiting the amount of parking at ferry terminals to a level less than full ridership. How would this mitigation affect ridership rates. Discuss the potential for decline in the number of users if the lack of parking extends travel time. 80

Impact A-4 This analynsis should address the cumulative impact of a 5% of No x emissions favor alternatives 1 and 2 and less than 1 % of then total Bay Area emissions. 81

Impact E-4 Emissions of toxic polluntants from diesel fuel. The mitigation for this impact is A-1. A-2 calls for implementing full service on only a limited number of (12) ferry routes, as listed on page 3.6-14 and 15) and A-2 which calls for the use of particulate traps to reduce PM 10 and NOx emissions. Mitigation A-I and A-2 are also mitigations for other air quality impacts: Impact A-I Regional cumulative emissions and A-2 reduction in vehicle miles traveled which would reduce overall emission. However, the list of routes to be implemented (figure 8 in IOP) does not contain some of these routes but does contain others that, presumably, would have higher emission levels. How is this discrepancy accounted for? If this list is only an example, provide a more feasible list and recommend it be implemented. 82

Land Use

The list of existing land uses should be corrected in the following ways:
Fort Baker - currently pelagic wildlife use the cove and these should be noted as a resource to be protected.

- Gnoss Field - The discussion states that "A potential ferry terminal could be located northeast of Novato along then Petaluma River" This is not a description of existing land uses, nor is it even a clear description of where the ferry terminal would be located. In fact, wherever it would be location it would be on a narrow tidal stream that is important habitat for endangered, Clapper Rail, Salt Marsh Harvest Mouse, San Pablo Song Sparrow and Black Rail.
- Port Sonomna - This is an accurate description, except that it fails to note it as important habitat for endangered and other special status species.
- San Rafael - this description is too vague. There are three or more marinas in San Rafael. What is the name of the Marina? 83

Zoning/Future Developments - The discussion on page 3.7-8 states that the existing ferry termial facilities tend to be incompatible with industrial and open space/recreation land uses. Which 84

potential terminal locations that have these adjacent land uses? 84

The Land Use sigificance Criteria are inadequate to address potentially significant land use impacts. They should be revised to include at least the following:
- growth inducement in currently unpopulated areas;

potential loss of agriculture to developed uses;
- failure to conform to existing land use desigation in current General Plan, and
- inducement of the loss of further wetlands/baylands that would remove potential restoration sites. 85

The land use impacts identified only address impacts to established communities and to existing residents. Potential impacts to restoration of the Bay/estuary resulting from development of terminals and operation of a ferry service would result in increased growth pressure to adjacent or nearby agricultural lands and/or diked historic baylands which could be restored to tidal and/or seasonal marsh. Address the potential land use impact in undeveloped areas that would result from the establishment of ferry service in undeveloped areas:
- growth inducement
- loss of agriculture
- loss of opportunity sites for tidal marsh restoration or seasonal wetland enhancement 86

What is the land use designation and zoning of the agricultural lands and baylands in the vicinity of Port Sonoma? 87

Include a list showing terminal locations what would be located in curretly undeveloped areas. Include a recommendation that these sites not be pursued. 88

Impact LU-1 Displacement of existing businesses. This discussion on page 3.7-16 idicates that areas needed for new terminals is not a substantial amount at a regional level 1 %. Quite the contrary, the cumulative impacts of 1 % must be considered together with the already sigificant area around the Bay that has been lost to urban development. How much land, including the projected 1 % for this project and for other anticipated projects, has been or would be lost to development around the Bay? 89

This discussion further states that because the proposed new terminal locations are unknown, the significance of their development cannot be determined. The WTA has an idea of where the termials would be located. The general locations should be evaluated and the potetial impacts for both developed and undeveloped areas discussed. 90

Noise

Identify potential noise impacts to Clapper Rail and possibly other species which, like the Clapper Rail, depend on sound to develop pair bonds and nest successfully. 91

Transportation

Impact T-2 New parking would be needed to accommodate users. The discussion indictes that 92

WTA would "seek to encourage and increase transit access to terminals." How would this be done and what impacts could result? Is it a feasible mitigation? Wouldn't this reduce rider ship? 92

Mitigation T-2.1 is too value. What components would a terminal specific plan need to include to address this impact? 93

What is the projected time for a ferry to travel from Port Sonoma to San Rafael and From Port Sonoma to San Francisco? 94

Ridership

The discussion of ridership in the Golden Gate Corridor indicates a potential demand of 1,392 daily passenger trips from Port Sonoma to San Francisco. This figure warrants a thorough discussion. Explain the calculation and identify the study that explanation of this figure. How many riders corne from Novato and how many from Sonoma? How long would the trip take for Sonoma and for Novato riders? 95

What is the status of routes not on this list - and how will they be dealt with. Page 46 of the IOP states that several routes that have high dredging requirements are not now being considered. Which ones are these? 96

Discuss the potential for riders to be taken from existing modes to ride a ferry system with an end result that there is no or minimal decrease in congestion? 97

Similarly, discuss the impacts of increased ferry service on other modes of transportation ferry. Would bus service lose riders because they are attracted to ferries? 98

Sincerely,

Barbara Salzman, Co-chair
Conservation Committee

Phil Peterson, Co-chair
Conservation Committee

EIR217

Tristan Bettencourt

From: kajukenbo@oddpost.com
Sent: Tuesday, January 21, 2003 3:43 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(kajukenbo@oddpost.com) on Tuesday, January 21, 2003 at 15:43:24

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email: kajukenbo@oddpost.com

Name: Mike Johnson

WTA_Comments: I am very excited about the new proposed ferry routes. However, as a commuter from Napa to Berkeley, I hope that a route can be set up that runs around the perimeter of the Bay. I would gladly take the ferry from Vallejo to Berkeley, but would be too cumbersome to go from Vallejo to San Francisco to Berkeley. For a land-based comparison, look at most major metropolitan areas...you have freeways that go downtown, but also around the perimeter. This would apply to water transportation as well. 1

Please keep this under consideration!
Thanks!

SUBMIT: SEND COMMENTS

EIR 218

To: San Francisco Bay Water Transit Authority
From : L. Jean Palmer-Moloney, Ph.D.
Assistant Professor of Geography, SUNY-Oneonta and
NASA Ames Faculty Fellow, Ecosystem Science & Technology Branch,
Moffett Field, CA
RE: DRAFT Environmental Impact Report for Ferry Transit Expansion
Date: January 25, 2003

After reviewing the DRAFT EIR presented by the Water Transit Authority, I would like to offer the following comments, questions, and concerns. My area of expertise is centered on Moffett Field and the wetlands of the South Bay.

General Comments:

- Section 1.3.1 needs to be adjusted to address the economic downturn following the .com bust and potential population "status quo" or even "out migration" due to job loss in Silicon Valley. 1

- Section 1.3.2: Having conducted a non-scientific survey of friends and acquaintance in the Bay area, it seems that there are many issues related to the current BART system that must be addressed if mass transit ties to the proposed ferry system are to work well. If you propose to tie BART to the Ferry Transit Expansion alternatives, at the ferry terminals there MUST be constantly updated notification of BART schedule changes. Near real-time arrival and departures must be posted in order for the potential riding public to make informed choices about their transportation options and to have confidence in the system. An annoyed clientele will not become the satisfied patrons you want to take mass transit to cut down on pollution, auto traffic, etc. 2
Also, parking garages for BART and for ferries must stay open 24 hours a day to accommodate non-traditional hours worked by many commuters. 3

Comments/Question/Concerns Related to Moffett Field Ferry Terminal: 4
The location of the proposed ferry terminal at Moffett Field is not precisely identified in your report, but the number of possible locations is limited for several reasons NOT mentioned in the EIR.

1. SOUTH BAY ESTUARINE WETLANDS RESTORATION.

At this time, Cargill, Inc. Salt Division is selling hundreds of acres of its extensive solar salt ponds that ring the South Bay to the USFWS, CDFG, and a number of private investors. Under the aegis of the California Coastal Conservancy, a plan for conversion of salt ponds to tidal marsh wetland is being implemented. Environmentalists and ecologists are focused on turning the South Bay into a restored estuarine wetland that will support waterfowl, shore birds, and mammals. "Locals," like the snowy plover, the California clapper rail, and the salt marsh harvest mouse are considered endangered species. Proposing a ferry terminal at Moffett Field would bring development into this protected area. It would seem that any revision you make 5

to the EIR would have to include mention of this restoration project and potential impact to the environmentally sensitive region. 5

2. TIES TO PROPOSED NASA RESEARCH PARK AT MOFFETT FIELD. 6
Though the WTA's Draft EIR mentions the proposed NASA Research Park in passing (pg. 3.7-5), **THERE IS NO MENTION OF A PROPOSED FERRY TERMINAL IN THE NASA AMES RESEARCH PARK EIR.** These two proposals need to be considered simultaneously! Issues such as parking and connection to the Santa Clara Valley Light Rail are addressed for the research park—plans are being made to bring in staff and students from across the country to do research there. There is mention of how the NASA Shuttle would bus research park and Ames Research Center employees and guests from the light rail station to various locations within the park and research center. However, there is no indication as to how the research park or Ames would handle traffic that could result from a bay-transit ferry connection at Moffett Field. It might make a selling point for the proposed Bay View housing addition at Ames, but I doubt that ferry traffic could be or should be limited to research park residents or Ames research center employees. Neither Alternative 1 or Alternative 2 should be allowed to move forward without inclusion of the NASA Research Park expansion plan. 7

3. HOMELAND SECURITY AND PROXIMITY TO AMES RESEARCH CENTER.
Due to increased security measures following 9/11, it seems illogical to expect NASA to allow a ferry terminal so close to its supercomputing center at Ames. (This issues also compounds potential traffic and parking concerns.) 8

4. NASA AMES SITE 25 CLEAN-UP.
In January 2003, the Navy (the responsible party!) determined that Site 25, the EPA superfund site located at Moffett Field, will be cleaned up the highest possible standard. This opens possibilities for future integration of the NASA's Ames Research Center wetlands into the restored Bay wetlands ecosystem. A ferry terminal at Moffett Field would increase the potential for water quality degradation in an area where thousands of dollars are being spent on improving the water quality! 9

5. DEMOGRAPHIC PORTRAYAL OF MOFFETT FIELD INACCURATE.
The Draft EIR uses information from the 2000 US Census to describe areas that could be affected by expansion of ferry transit service. The census information covering Moffett Field overlaps census tracts 5046.01, 5046.02, and 5047. This information does NOT describe conditions at the decommissioned naval air station. Tables 3.7-2 and 3.7-3 paint a fictitious picture of Moffett Field's "Race/Ethnicity Analysis" and "Low Income Analysis," by taking information from surrounding communities of Alviso/San Jose and Mountain View. Consider, for instance, Table 3.7-3, "Low Income Analysis." Moffett Field, Santa Clara County, is shown to have potentially low income residents living in tracts 5046.01 and 5046.02. A look at the US Census Bureau's American FactFinder (http://factfinder.census.gov/servlet/BasicFactsServlet?_lang=en) reveals that the 10

people living in tract 5046.01 are in the city of Mountain View between N. Shoreline and Stevens Creek, well away from Moffett Field, per se. Likewise, those people living in tract 5046.02 are living along the Milpitas-Alviso Highway and in the community of Alviso (now a part of San Jose); they are not living at Moffett Field. The same can be said of Table 3.7-2's "Race/Ethnicity Analysis." Tract 5047 is equally misrepresented. 10

6. SECTION 3.9.1.2—
No locations of Traditional Cultural Properties are noted within the programmatic project area. What about the Crittenden Kitchen Midden site at NASA Ames? (check out the artifacts in Building 245!!) 11

7. pg. 3.9-9—HISTORICAL PERIOD ANALYSIS—
No mention is made of the salt industry that developed in the Bay after the 1859 Comstock Lode strike. No mention is made of impact of salt ponds on character of Bay wetlands. 12

8. MILITARY USE OF LAND—
As shown on Table 3.7-1, "Land Use and Community Matrix," there are no data available for Moffett Field because it is federal military property, there are National Historic Landmarks on the decommissioned base. These could be noted under the category "Pertinent Visual/Aesthetic Policies," could they not? 13

Thank you for the opportunity to provide comment. If you have any questions or would like clarification on any of the comments/concerns stated above, please feel free to contact me by e-mail (palmerj@oneonta.edu) or at my SUNY office (607-436-2192).

EIR 219

CITY OF BERKELEY

Office of Transportation

FAX TRANSMITTAL

DATE: January 27, 2003

TOTAL NUMBER OF PAGES
(INCLUDING COVER SHEET): 10

THIS TRANSMITTAL IS BEING SENT TO:

FAX NO.: (415) 291-3388

COMPANY: Water Transit Authority

REFERENCE: Comments on Draft Program EIR

THIS TRANSMITTAL IS BEING SENT FROM:

NAME: Peter K. Hillier, Assistant City Manager for Transportation

FAX NO.: (510) 981-7099 TELEPHONE: (510) 981-7010

MESSAGE:

2180 Milvia Street, Berkeley, CA 94704 Tel: 510 981-7000 TDD: 510.981-6903 Fax: 510.981-7099

CITY OF BERKELEY

Office of Transportation

January 27, 2003

Water Transit Authority
120 Broadway
San Francisco, California 94111

Reference: Comments on the Draft Program Environmental Impact Report

Ladies and Gentlemen:

Please accept these comments on the Draft Program EIR from the City of Berkeley.

The Draft Program EIR has documented many potential impacts from expanded ferry service in the Bay Area, which provides a level of confidence that both the potential advantages and possible negative impacts will be clearly evaluated for each site where new or expanded ferry service will be considered. 1

As documented in our letter to the Water Transit Authority dated August 13, 2002, the City of Berkeley has formally shown interest in a potential Berkeley/Albany ferry terminal, while at the same time sharing concern about the potential negative impacts which a ferry service may bring to the area. A copy of the August 13, 2002, letter is attached. 2

The City of Berkeley looks forward to working with the Water Transit Authority in the future to evaluate the Berkeley/Albany waterfront area in particular.

Yours truly,

Peter K Hillier

Peter K. Hillier
Assistant City Manager for Transportation

Attachments

2180 Milvia Street, Berkeley, CA 94704 Tel: 510.981-7000 TDD: 510.981-6903 Fax: 510.981-7099

G:/Debra/WTA-EIR



City Clerk Department

August 13, 2002

Thomas Bertken, CEO
Water Transit Authority
120 Broadway
San Francisco, California 94111

RE: BERKELEY CITY COUNCIL MOTIONS ON FERRY SERVICE

Dear Sir,

At their meeting of July 23, 2002, the Berkeley City Council considered the staff report which summarized the discussions and recommendations of numerous commissions within the city dealing with ferry service in the San Francisco Bay Area. Please see the attached report.

The City Council adopted the following motions during the aforementioned meeting:

Item 71. **Appointment to the Water Transit Authority Community Advisory Committee and Affirming Interest in Ferry Service**
From: City Manager
Recommendation: Adopt a resolution supporting the recommendations of the Transportation Commission which a) authorize the appointment of the Assistant City Manager for Transportation to participate in the Water Transit Authority Community Advisory Committee; b) authorize the City Manager to send a letter to the Water Transit Authority affirming Berkeley's interest in an environmentally responsible ferry service from Berkeley-Albany waterfront to San Francisco and other destinations in the Bay Area, such letter to be consistent with Policy T-9 of the Berkeley General Plan; c) take into account the Sierra Club's 14 points of concern; and d) ensure the ferry service be accessible to all levels of income and accessibility. This action accepts and incorporates reports from various other commissions.
Contact: Peter Hillier, Transportation, 981-7000
Actions: Moved to the Consent Calendar by Mayor Dean and Resolution No. 71,626-N.S. authorizing the appointment of the Assistant City Manager for Transportation to participate in the Water Transit Authority Community Advisory Committee.

Moved, seconded, carried (Hawley/Breland: Abstain - Worthington; Absent - Shirek) a main motion to approve recommendation (b, c, and d) and further amended by Councilmember Hawley to state Berkeley's interest in considering an environmentally responsible ferry service and to ask the Authority to consider adding seamless transit connections between feeders and ferries and to also consider AC Transit being designated as the operator.

3
4

Please take the contents of the above motions and the enclosed report and Resolution under advisement in your work to determine the feasibility of additional ferry service.

2180 Milvia Street, Berkeley, CA 94704 • Tel: (510) 981-6900 • TDD: (510) 981-6903 • Fax: (510) 981-6901
E-Mail: clerk@ci.berkeley.ca.us Website: http://www.ci.berkeley.ca.us/clerk

G:\AGENDA\CC\Follow-ups\2002\Ferry Service.doc

If you have any questions, please contact Peter Hillier, Assistant City Manager for Transportation, at (510) 981-7000.

Sincerely,

Sherry Kelly
City Clerk

Enclosures

Office of the City Manager

ACTION CALENDAR
July 23, 2002

To: Honorable Mayor and
Members of the City Council

From: Weldon Rucker, City Manager

Subject: ADOPT FERRY TRANSIT SERVICE RESOLUTION AND AUTHORIZE APPOINTMENT TO THE WATER TRANSIT AUTHORITY COMMUNITY ADVISORY COMMITTEE

RECOMMENDATION:

Adopt a resolution supporting the recommendations of the Transportation Commission which a) authorize the appointment of the Assistant City Manager for Transportation to participate on the Water Transit Authority Community Advisory Committee; b) authorize the City Manager to send a letter to the Water Transit Authority affirming Berkeley's interest in an environmentally responsible ferry service from the Berkeley-Albany waterfront to San Francisco and other destinations in the Bay Area, such letter to be consistent with Policy T-9 of the Berkeley General Plan; c) take into account the Sierra Club's 14 points of concern; and d) ensure the ferry service be accessible to all levels of income and accessibility. This action accepts and incorporates reports from various other commissions.

BACKGROUND:

The San Francisco Bay Water Transit Authority (WTA) was created by the California legislature in 1999 to develop a regional plan for extended for expanded ferry service in the San Francisco Bay Area. The WTA is currently developing two documents for submission to the State Legislature by December 2002: (1) a draft Programmatic Environmental Impact Report (EIR), (2) and a draft Operations Plan. Based on the information contained in these documents, the Legislature will make future decisions regarding funding and organizational options for regional ferry services. The technical information will include:

Ridership:	Accessing viability of proposed routes based on market studies of people's choice of commute mode;
Terminal Access:	Assessing current transit ground connections to potential terminal locations;
System and Cost Effectiveness:	Developing a financing plan and accessing costs of ferry expansion compared to other transit modes;

1900 Addison Street, Berkeley, CA 94704 Tel: 510.644.6580 TDD: 510.644.6915 Fax: 510.644.6012
E-Mail: *manager@ci.berkeley.ca.us*

Air Emissions and
Marine Engineering: Review of air emission studies, assessing feasibility of alternative fuels, and review of hull design to minimize wake for protection of marine wildlife and habitats.

Potential Ferry Terminal in Berkeley

The WTA's current planning efforts include identification of potential ferry terminal locations throughout the Bay Area, and a number of sites currently being considered are on the Berkeley/Albany waterfront. Controversy has developed over selecting Berkeley/Albany sites for potential future ferry services, with the Sierra Club on one side of the debate and the Berkeley Ferry Committee and Friends of the Albany Ferry on the other side. In short, the Sierra Club believes there would be unavoidable negative environmental impacts resulting from ferry service on the Berkeley/Albany waterfront, while the ferry supporters believe the environmental impacts could be mitigated in order to establish a valuable ferry transportation link to the region.

The proponents of the ferry service, the Berkeley Ferry Committee and Friends of the Albany Ferry, have asked numerous commissions in Berkeley to adopt two standard resolutions which support an environmentally responsible ferry service from the Berkeley-Albany waterfront, consistent with Policy T-9 of the Berkeley General Plan; and asking the City Manager to actively participate un the WTA planning process to ensure Berkeley's adopted policies and interests are effectively advocated.

All of the commissions, which have reported on this matter either explicitly or implicitly, support these resolutions.

Furthermore, some of the commissions added more detailed recommendations which reflect their specific areas of interest. Listed below are all of the commissions which have reported, and the specific recommendations they adopted in addition to the two basic recommendations. In the case of the Community Environmental Advisory Commission (CEAC), their one brief recommendation is quoted below:

i) CEAC recommends that City Council examine both the ferry and shoreline park proposals; CEAC prefers to have parks/wetlands development. (Exhibit E)

ii) Commission on Aging: consider that any ferries that serve Berkeley be equipped with grab bars in the public restrooms and escalators or elevator between decks so that all riders can have full access to all passenger areas. (Exhibit F)

iii) Commission on Disability: that the ferry be fully accessible; that "seamless" travel be provided, i.e., one is able to debark an accessible bus or park at nearby accessible parking and board the boat; that no money from other transportation services or paratransit be used in establishing any aspects of the ferry; and that a liaison from the Commission on Disability and the disability community be actively involved in the process. (Exhibit G)

iv) Disaster Council: the two standard recommendations. (Exhibit D)

v) Waterfront and Parks and Recreation Commission: the two standard recommendations. (Exhibit C)

vi) Transportation Commission: ask the City Manager to appoint the Assistant City Manager for Transportation to be Berkeley's representative to the WTA Community Advisory Committee; the city should take into account the Sierra Club's 14 points of concern; the ferry service be accessible top all levels of income and accessibility. (Exhibit H)

In its discussion, the Transportation Commission took guidance from Policy T-9 of the new Berkeley General Plan (Exhibit A). The Commission's recommendations endorsed participating in the WTA's planning process without making a final judgment as to whether any particular plan for ferry service to Berkeley and Albany is beneficial overall to the City of Berkeley. The Commission believed that the new Assistant City Manager for Transportation, Peter Hillier, is the best person to represent Berkeley in this process and to balance all of the concerns that the public has about ferry services. In addition, the Transportation Commission singled out for consideration the 14 concerns raised by the Sierra Club (Exhibit B) in a document titled "Sierra Club Position on Ferry Service." The Commission also recommended that ferry service be accessible to people of all income levels and all levels of availability.

There are a lot of similarities between the recommendations of the commissions. Some of the more detailed recommendations would be addressed during later design stages if the overall project were to progress that far.

The recommendations of the Transportation Commission seem to capture the range of current issues and include the two basic recommendations which are supported by all the commissioners. Therefore, the formal Transportation Commission resolution is the one recommended by staff within this report. This report, with all its attachments, will be forwarded to the WTA, if the resolution is adopted by Berkeley City Council.

FINANCIAL IMPLICATIONS:

None

CONTACT PERSON:
Peter K. Hillier, Assistant City Manager for Transportation, 981-7000

Approved:

Peter K Hillier
Peter K. Hillier, Assistant City Manager for Transportation

RESOLUTION NO. -N.S.

SUPPORTING THE RECOMMENDATIONS OF THE TRANSPORTATION COMMISSION WHICH A) AUTHORIZE THE APPOINTMENT OF THE ASSISTANT CITY MANAGER FOR TRANSPORTATION TO PARTICIPATE ON THE WATER TRANSIT AUTHORITY COMMUNITY ADVISORY COMMITTEE; B) AUTHORIZE THE CITY MANAGER TO SEND A LETTER TO THE WATER TRANSIT AUTHORITY AFFIRMING BERKELEY'S INTEREST IN AN ENVIRONMENTALLY RESPONSIBLE FERRY SERVICE FROM THE BERKELEY-ALBANY WATERFRONT TO SAN FRANCISCO AND OTHER DESTINATIONS IN THE BAY AREA, SUCH LETTER TO BE CONSISTENT WITH POLICY T-9 OF THE BERKELEY GENERAL PLAN; C) TAKE INTO ACCOUNT SIERRA CLUB'S 14 POINTS OF CONCERN; AND D) THE FERRY SERVICE SHOULD BE ACCESSIBLE TO ALL LEVELS OF INCOME AND ACCESSIBILITY.

WHEREAS, the General Plan: Transportation Element – Policy T-9 Ferry Service states the following: "Continue to evaluate the possibility of working with the City of Albany, the racetrack owners, regional transportation agencies, and Alameda Contra Costa Transit to establish a ferry terminal and regular San Francisco ferry service from Berkeley at the foot of Gilman Street or at the foot of University Avenue as an alternative to the Bay Bridge and as an essential recovery element following a significant seismic event;" and

WHEREAS, the California State Legislature established the San Francisco Bay Area Water Transit Authority ("WTA") to investigate and plan for the establishment of an environmentally sound public ferry system providing affordable water transit for the San Francisco Bay Area; and

WHEREAS, by September, 2002, the WTA must issue its draft Programmatic EIR and its Implementation and Operations Plan, including recommendation for new ferry routes; and

WHEREAS, The City of Berkeley, Office of Transportation, will work with WTA in order to ensure that Berkeley's adopted policies and interests as specified in Policy T-9 (attached as Exhibit A) are effectively advocated during the WTA's EIR and planning process.

NOW THEREFORE, BE IT RESOLVED that the Council of the City of Berkeley hereby authorizes the appointment of the Assistant City Manager for Transportation to participate on the Water Transit Authority Community Advisory Committee, and the City of Berkeley acknowledges and will take into account the Sierra Club's 14 points of concern (attached as Exhibit B), and that the ferry service consider all income levels and accessibility for all.

BE IT FURTHER RESOLVED, that a letter consistent with Policy T-9 of the Berkeley General Plan be sent to the Water Transit Authority prior to July 23, 2002, affirming Berkeley's interest in an environmentally responsible ferry service from the Berkeley-Albany waterfront to San Francisco and other destinations in the Bay Area.

Exhibit A

City of Berkeley General Plan

Transportation Element: Policy T-9 Ferry Service

(Adopted December 18, 2001)

Continue to evaluate the possibility of working with the City of Albany, the racetrack owners, regional transportation agencies, and AC Transit to establish a ferry terminal and regular San Francisco ferry service from Berkeley at the foot of Gilman Street or at the foot of University Avenue as an alternative to the Bay Bridge and as an essential recovery effort following a significant seismic event.

Actions:

A. Ensure transit, shuttle and bicycle connections are in place before beginning ferry service to minimize parking demand and traffic caused by people driving to the ferry service.
B. Prioritize transit, pedestrian and bicycle public expenditures over expenditures of public funds for ferry service, and ensure that new ferry service will not result in a reduction in public subsidies for existing transit services.
C. Ensure that ferries are less environmentally detrimental than the automobile. Advocate for low emission, environmentally sensitive ferries.

Exhibit B

Sierra Club Position on Ferry Service

The Sierra Club believes that large-scale expansion of ferry service is likely to result in exacerbation, not amelioration, of the region's problems, unless the following conditions are met:

1. Wildlife shall be protected. Ferry routes shall be planned to avoid harbor seals, rafting ducks and other wildlife.
2. Air and water pollution shall be minimized. Ferry routes shall be established only where they will decrease, not increase, air pollution. The cleanest propulsion system feasible shall be used and leak-proof fueling shall be assured.
3. Well-connected feeder transportation shall be provided, to make ferry travel a true alternative to private automobile use. Feeder transportation shall complement, not compete with, existing ground transportation systems.
4. Growth inducement shall be avoided. A poorly planned ferry system could induce growth in inappropriate areas such as the North Bay and San Mateo coast.
5. Legislation should insure that an environmental impact report and other pertinent studies are done and public hearings are held before the Legislature approves the final plan.
6. The operating subsidy per ferry ride passenger mile shall not exceed operating subsidies of other public transit systems and will not decrease the subsidies available to existing, less costly systems.
7. Ferry services shall be established only when an alternatives analysis shows that other public transit alternatives of similar scope are not clearly more cost-effective.
8. Parking space at ferry terminals shall be minimal and access to ferries shall be primarily by transit, bicycle and walking.
9. Ferry terminals shall be located only in areas that are currently developed. Compact, mixed-use transit-oriented development shall be encouraged in already developed areas around them. Ferry terminals should not be located in – or directly adjacent to – park lands unless their primary purpose is to serve park users; and any negative environmental impacts to parklands are minimal and can be mitigated.
10. Any parking provided at a ferry terminal shall be required to pay for all associated costs, including land acquisition, construction, operation, maintenance, collection and treatment of all potential runoff, and a subsidy for bus transit to the terminal.
11. Ferry terminals shall include secure, free bicycle parking, and passenger ferries shall carry bikes at no cost at all times, in weather- and spray-protected areas.
12. Ferry terminals shall be linked with bike lanes to the Bay Trail and inland areas, provided that all roads and bike lanes shall avoid impacts on wildlife habitat.
13. The priority order for proximity to gangways shall be: transit and handicapped loading zones; bicycle parking; kiss and ride auto pickup; and farthest away, automobile parking.
14. Wildlife habitat shall be protected. The construction of terminals or other facilities that adversely affect endangered species habitat shall be prohibited. All negative impacts on wetlands, mud flats or other aquatic or non-aquatic habitat, including wake erosion, shall be avoided and minimized as much as possible. Full mitigation for any unavoidable impacts shall be required.

2180 Milvia Street, 5th Floor Berkeley, CA 94704 Tel: 510.981.7000 TDD: 510.981.6903 Fax: 510.981.7099

EIR 220

Tristan Bettencourt

From: Paul Kamen [pk@well.com]
Sent: Thursday, January 30, 2003 11:42 AM
To: email@watertransit.org
Subject: Comments on Programmatic EIR



EIR-pk.doc

My comments on the Programmatic EIR follow.

The attached MSword file is identical in content, and might be easier for you to format than the plain text.

Comments on the
Water Transit Authority
Program EIR

by Paul Kamen, N.A.
Chair, Berkeley Waterfront Commission
1224 Campus Drive, Berkeley CA 94708

January 28 2003

I once knew an environmental planning consultant who retired and bought a small farm. He knew that he wanted to be a farmer, but, being a planner, he also wanted to plan his business strategy according to a rigorous methodology.

"The trouble with farming today," he informed me shortly before leaving the city, "is that farmers don't know anything about planning. They make critical business decisions based on hunches and intuition, and it usually leads them seriously astray."

So he set out to plan his farm carefully. He started by selecting three crops that he believed represented a reasonable range of products: asparagus, strawberries, and pineapples. Then, he established three levels of production intensity, plus of course a "no project" option in which he would plant nothing, for a total of four possible scenarios.

For alternative one, he would lease some additional land, plant 100 acres of each crop, build an extensive pumped irrigation network, and contract with a pest control specialist who would continually monitor the crops and apply chemical controls.

For alternative two, he would plant only about 50 acres of each crop and install a passive irrigation system, and use a minimal amount of pesticide as needed.

For alternative three, he would plant only five acres of each crop, and use existing water resources with minimal fertilizer and biological pest controls.

His analysis rejected the "no project" option as not meeting

the initial goal of "farming" (even though this was the only option found to be "revenue-neutral").

Alternative three, he determined, would not provide sufficient pest control for the strawberries or water for the pineapples, and the low production volume would not make efficient use of the necessary investment in farm machinery.

Option two made better use of capital outlay, but costs would still exceed revenue and the irrigation was marginal.

Option one provided enough water for high production, but the size of the projected annual loss was well beyond the retired planner's ability to sustain the operation.

So he decided, based on a rigorous and objective cost-benefit evaluation process, to go with alternative two.

I didn't hear from my friend for several years, and then one day on a road trip I happened to be driving near his farm. So I stopped by to see how he was doing.

"Well, the asparagus is doing fine," he told me with a newly acquired country drawl, "and sometimes I get some real tasty strawberries, even though I never seem to make any money off them in this market. But tarnation, I lose my shirt on the pineapples. Another couple years and I'll be flat broke."

What the farmer had completely missed in his rigorous analysis of system alternatives is that some crops are more viable than others, regardless of the scale on which they are grown.

WTA has made exactly the same mistake. The three alternatives presented in the programmatic EIR only distinguish between a minimal program, a medium program, and an intense program. The EIR makes no attempt to sort out which routes will be viable and which routes will be difficult. All three options include both long routes and short routes, high speed and low speed, routes crossing a body of water and routes paralleling a long shoreline. 1

The data is there, and it is possible, with some effort, to back out the information that the report should have been organized around. But in its present form, the most important conclusions are deeply buried.

To be more specific: Short low-speed routes that cross heavily trafficked bodies of water make sense. These routes have the highest demand and the lowest operating costs. For example, Berkeley to San Francisco could be a successful route at any one of a wide range of possible schedule densities, from very sparse to very frequent. Similarly, Treasure Island to San Francisco is extremely viable, and an SFO-OAK airport shuttle might also be attractive because of the very high-value transportation nodes at each end of the route. But long high-speed routes paralleling shorelines are unlikely to ever approach break-even, regardless of which scenario they are thrown into. Even assuming high subsidy levels, it is clear that some kinds of routes meet the WTA's goals much more effectively than others. These distinctions have not been made. 2

It is recognized that this EIR is at the programmatic level and does not attempt to evaluate individual sites or routes. But that should not have prevented the report from identifying and evaluating the various parameters that contribute to the success or failure of San Francisco Bay ferry routes in 3

general.

Furthermore, just as the planner-turned-farmer made some incorrect assumptions about irrigation and climate, WTA has missed some important details that affect the outcome of their study.

Required water depth, for example, is dependent on the speed, size and design details of the ferries. Yet in the study, required channel depth is assumed to deep enough for the deepest draft ferries now operating on the Bay, and only very expensive surface effect designs are mentioned as a mitigating design strategy. This deep draft assumption appears to have been made up front, without allowance for significantly reducing displacement vessel draft in response to problems associated with dredging. These problems could not have been fully quantified before the study began, and channel depth should have been one of the variables. 4

Shorter routes using slower and smaller vessels need less depth and less dredging. This is not reflected in the EIR's evaluation, and this error has somewhat concealed the advantages of some of the most viable routes.

Terminal site selection is also non-optimal in at least one case: The assumed Gilman Street location for the Berkeley-SF route adds unnecessary distance and dredging requirements compared to the closer and deeper locations near the Berkeley Pier. Again, site-specific planning may correct this problem, but the EIR should have contained the necessary general findings to provide future site planners with better guidelines for comparing and evaluating nearby candidate site alternatives. 5

Environmental effects are also tied closely to speed, and therefore also tied to the length of the route. Keep in mind that installed horsepower varies by approximately the cube of speed, so an 18 knot ferry requires only one eighth the installed horsepower of a 36 knot ferry of similar size. With comparable emission controls, engine emissions will vary in proportion to power. Therefore it is questionable to pursue new technologies for fuel conservation and emission controls when simply slowing down will accomplish the same result and then some. Conventional power plants with mature emissions control technology (as used on land-based applications) will easily allow ferries to meet very strict criteria. 6

The same is true for wake profile. The use of long slender displacement hulls to save fuel and minimize wake is a mature and low-risk technology. There is no need to study new wake-eating hull forms or expensive air-supported technologies - as long as speeds are low. 7

Allowing the EIR to discriminate between more viable and less viable route types is the key. If the EIR had recognized that some kinds of routes will work better than others, especially in the context of a region that already contains a network of freeways, bridges and tunnels, then the analysis would have been free to show the most effective and reliable mitigation strategies to satisfy the key environmental constraints. 8

The four options should have been organized around different route and service characteristics, not around different intensities of what is essentially the same mix of ferry services. 9

I happened to run in to my planner-turned-farmer friend just

the other day.
"My farm finally went bust," he admitted, "so I'm back at my old job, consulting for environmental planning firms and writing environmental impact reports."

He seemed happy to be working productively again. But then he started babbling incoherently about getting into the boat building business...

Paul Kamen, N.A.

Chair, Berkeley Waterfront Commission
1224 Campus Drive, Berkeley CA 94708
510-540-7968 pk@well.com www.BerkeleyWaterfront.org

EIR 220
Some comment
by post

Comments on the
Water Transit Authority
Program EIR

by Paul Kamen, N.A.
Chair, Berkeley Waterfront Commission
1224 Campus Drive, Berkeley CA 94708

January 28 2003

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Paul Kamen, N.A.
Chair, Berkeley Waterfront Commission
1224 Campus Drive, Berkeley CA 94708
510-540-7968 pk@well.com www.BerkeleyWaterfront.org

6 Nov, 2002

EIR 200

Dear Mr. Bentler.

Thank you for working on helping ferries, that are environmentally sound, get more people out of their cars. I Ride the Oakland ferry, with my bicycle, quite frequently. It is delightful.

But ferries are not a panacea, Nor are their terminals appropriate in many locations. Ferry routes and terminals that have direct or indirect impact on wetlands are INappropriate! Please assure that expansion of ferry service benefits areas, such as Richmond, where there is existing industrial shoreline development.

Port Sonoma is a poster child of what a bad ferry location would be. It is not

in the middle of a dense population area, it is subject to extremely high rate of siltation, and the wake turbulence could adversely impact surrounding wetlands. 6

Sincerely,

David Nesmith
319 Lenox Ave
Oakland, Ca 94610

6867 Wilton Dr
Oakland CA 94611
7 November 2002

EIR 201

Tom Bertken, CEO
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken,

I am writing to express my concerns about siting of ferry terminals in the proposed expanded ferry system. It is very important that environmental values be preserved in a larger ferry system. In particular, wetlands are at risk from poorly located ferry terminals. Wetlands are among the most fragile Bay ecosystems and have been lost to a great degree as the Bay Area developed. The remaining wetlands must be protected. 1

Part of the argument made to expand the ferry system is its environmental benefit. This benefit will only be realized if the most sensitive Bay lands and estuaries are protected.

I urge you, please, to give wetlands protection the highest priority in determing possible sites for new ferry terminals.

Sincerely,

Richard Schneider

2139 Grant St. #1
Berkeley CA 94703
Nov. 7, 2002

EIR 202

Tom Berthon CEO
WTA
120 Broadway
San Francisco CA 94111

Dear Tom Berthon:

I urge the WTA to exclude wetland sites such as Port Sonoma and especially sites within the Eastshore State Park. 1

Do not implement ferry service unless it is clearly demonstrated that this use of funds is cost-effective compared to other possible transit expenditures for reducing vehicle-miles traveled and pollution. 2

Sincerely,
Donald Forman

EIR 203

Tom Berkes
Water transit Auth
120 Broadway
San Francisco CA 94111

The Ferry System should be environmentally proper. The sites must not be in wetlands, such as East Bay Shoreline Park and Point Sonoma. No dredging should be allowed. We can have ferries and protect wetlands. Connections with transit must be emphasized. The Ferry system also must be cost effective compared to other transit. 1 2 3 4

Alan Carlton
2208 Pacific Ave
Oakland CA 94501

EIR 204

Nov. 7, 2002

Tom Petken, CEO
WTA
120 Broadway
San Francisco, CA 94111

Dear Mr Petken,

I urge the Water Transit Authority to be extremely careful to host responsible ~~Ferry~~ Ferry policies with respect to environmental concerns:

- Clean ferries 1
- No wetland sites — particularly in the Carquinez State Park 2
- Poor transit connections 3
- Free ride for bicyclists 4

Sincerely,
Deborah Landshoff

Debbi Landshoff
6016 Orchard Ave.
Richmond, CA 94804-5022

David I Tam
PO Box 601
Berkeley CA 94701-0601
(510) 517-0270 • pragmatist94701b@yahoo.com

EIR 205

7 November 2002

Tom Bentken, CEO
Water Transit Authority
120 Broadway
San Francisco CA 94111

Dredging Wetlands, Cost-Effectiveness

Dear Mr. Bentken,

I'm skeptical that the expansion of Bay Area ferry service will be cost-effective as a significant increase in Bay Area transit utilization. As Authority members must realize, environmentalists have prevailed in federal court in holding the Metropolitan Transportation Commission's feet to the fire for the unmet commitment to increase Bay Area transit ridership by 15%. The Draft Environmental Impact Report will be manifestly inadequate if it fails to address this concern. 1 2

I'm skeptical that location of ferry terminals can be such that they can supplement AC's transbay bus service, rather than merely take patronage away, thus harming the financial viability of the service. 3

Finally, dredging wetlands in wildlife protection areas is clearly unacceptable. 4

-David I Tam

EIR 206
206

CITY OF SUNNYVALE

The Heart of Silicon Valley

456 WEST OLIVE AVENUE SUNNYVALE, CALIFORNIA 94086 (408) 730-7470

Frederik M. Fowler
Mayor

Julia E. Miller
Vice Mayor

John Howe
Councilmember

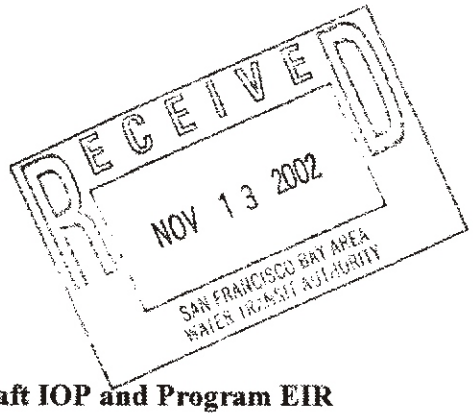
Tim Risch
Councilmember

Manuel Valerio
Councilmember

Patricia Vorreiter
Councilmember

Jack Walker
Councilmember

October 30, 2002



San Francisco Bay Area Water Transit Authority
Thomas Bertken, Chief Executive Officer
120 Broadway
San Francisco, CA 94111

RE: **Sunnyvale Comments Regarding the Draft IOP and Program EIR**

Dear Mr. Bertkin,

The City of Sunnyvale has reviewed the Draft Implementation and Operations Plan and the Program Environmental Impact Report that the San Francisco Bay Water Transit Authority (WTA) has prepared for the expansion of ferry transit service in the San Francisco Bay Area. Once again, we would like to thank you for the opportunity to participate in this process.

Sunnyvale is supportive of the Implementation and Operations Plan, and the extent to which the Moffett Field Terminal has been incorporated into the plan. Although the new route has not been selected for implementation in the 10 year plan, it has been included for further study, planning and design. Sunnyvale would like to request that the Moffett Field Ferry Terminal as the South Bay Terminus be included on all ferry route maps. In addition, we believe that it will be important to continue to monitor the ridership potential of the Moffett Field Terminal as the land use plans for the Moffett Industrial Park, and the NASA/Ames Research Park become finalized and implemented. Sunnyvale believes that if the projections from the development plans in North Sunnyvale were considered, the ridership model would have shown Moffett Field as a more viable terminal location. Enclosed for your information is the Draft Moffett Park Specific Plan and its accompanying EIR. This document was released for public comment and review on October 15, 2002. Public comments will be received until November 29, 2002. 1 2

Sunnyvale would also like to request that the WTA actively pursue a working relationship with the NASA/Ames Research Center leadership in order to further the goal of a Moffett Field Ferry Terminal on the NASA/Ames site. The Center Director position has just changed hands from Henry McDonald to Scott Hubbard. 3

Generally, Sunnyvale is also supportive of the Program EIR. We understand that the WTA has done extensive research on innovative ferry technology including clean air

vehicles, alternative fuels and alternative propulsion systems. It is also understood that the Bay Area Air Quality Management District will be monitoring new transportation funding to promote clean air and reduce particulate matter (pm) emissions. In light of this, the City of Sunnyvale would like to request that this innovative ferry technology be employed as primary mitigation for impacts identified in the EIR before the elimination of any routes identified in the IOP. 4

Thank you for your consideration of these comments. Please contact Jack Witthaus, Transportation and Traffic Manager at 408-730-7330 with any questions you may have.

Sincerely,

Frederik M. Fowler
Mayor

CC: Vice Mayor, Julia Miller
Scott Hubbard, NASA/Ames Research Center

EIR 207

Madrone Audubon Society

INCORPORATED

Water Transit Authority
Watertransit.org
EIR Comments
120 Broadway
San Francisco, CA 94111

October 28, 2002

Dear Authority members:

We thank you for the opportunity to comment on your Draft Program Environmental Impact Report: Expansion of Ferry Transit Service in the San Francisco Bay Area. We realize that extensive work has gone into the EIR; we expect significantly more information to be gathered and presented before decisions are made to expand ferry service.

As an organization of 2000 members in Sonoma County, the Madrone Audubon Society is particularly disturbed by Port Sonoma to San Francisco remaining as a route to be studied. Tremendous amounts of time and monies have been invested in preserving and restoring lands in the area of Port Sonoma and the Baylands of our south county. Years of efforts have also gone into keeping the south Sonoma County area intact as an agricultural area under the official county General Plan. At present there is a major effort by a broad coalition of local, state and federal agencies, noted scientists and members of the public, and a large coalition of Non-governmental agencies, including the Madrone Audubon Society, the Bay Area Audubon Council and the National Audubon Society and the Point Reyes Bird Observatory to implement the San Francisco Bay Area Wetlands Ecosystem Goals Project through the 1999 Baylands Ecosystem Habitat Goals report that specifically recommends that the entire baylands area surrounding Port Sonoma be restored to tidal and seasonal marsh while allowing for farmers that wish to continue be accorded the flexibility to carry on agricultural operations that enhance habitat values. Over $100 million has already been allocated by local, state and federal authorities to restore baylands in this area since the 1990s; this figure will likely double in the next 10 years as other restoration projects in the adjacent areas come online. 1

Any ferry activity in the area of Port Sonoma would have significant, unmitigatable impacts on wildlife, including some endangered species, and the continuous habitat. You state "implementation of recommended new water-transit service will first occur on routes where (1) the environmental impacts are either insignificant or most easily mitigated ...." If you proceed any further at all with study of a Port Sonoma to San Francisco route, as you state, "extensive site-specific environmental studies must be done to evaluate the potential impacts". Since the Petaluma River supports the largest remaining intact tidal marsh in the state of California, and it is located immediately adjacent to the proposed Port Sonoma ferry terminal, any changes and expansion would have significant impacts. Impacts would include but not be limited to affects on sediment deposition patterns, restoration processes, breeding populations of species of special 2

P. O. Box 1911 • Santa Rosa California 95402 • Ph. 707.546.7492

concern (including California clapper rail with Federal and State of California endangered status, California black rail with State of California threatened status, and both San Pablo song sparrow and Salt marsh yellowthroat birds with State of California Species of Special Concern status), and to existing high quality tidal marsh habitat directly adjacent to Port Sonoma Marina to north, southeast and west. 2

Expansion of ferry transit service should not come at the cost of undermining or degrading these large-scale, collaborative conservation activities. Even with low-profile development of ferry service related infrastructure along Highway 37 would be required for fresh water, for wastewater handling, for recurrent winter flooding management. Any ferry project development in the Port Sonoma area is inconsistent with the recommend-dations of the Baylands Ecosystem Habitat Goals report. 3 4

Thank you for accepting public comments. We look forward to receiving any further documents as your transit plans and any future studies proceed.

Sincerely,

Diane Hichwa, Conservation Chair, Madrone Audubon Sociey

EIR 208

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

ALAMEDA COUNTY
Roberta Cooper
Scott Haggerty
(Vice-Chairperson)
Nate Miley
Shelia Young

CONTRA COSTA COUNTY
Mark DeSaulnier
Mark Ross
Gayle Uilkema

MARIN COUNTY
Harold C. Brown, Jr.

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
Chris Daly
Leland Yee
(Vacant)

SAN MATEO COUNTY
Jerry Hill
Marland Townsend
(Secretary)

SANTA CLARA COUNTY
Randy Attaway
(Chairperson)
Liz Kniss
Julia Miller
Dena Mossar

SOLANO COUNTY
John F. Silva

SONOMA COUNTY
Tim Smith
Pamela Torliatt

William C. Norton
EXECUTIVE OFFICER/APCO

November 25, 2002

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: Water Transit Authority Draft Program Environmental Impact Report

Dear Ms. Haught Johnson:

Bay Area Air Quality Management District (District) staff have reviewed the Water Transit Authority's (WTA) Draft Program Environmental Impact Report (DEIR) for the expansion of ferry transit service in the San Francisco Bay Area. The DEIR and the Draft Implementation & Operations Plan (IOP) describe expanded water transit systems for the region.

The District commends the WTA for its commitment in the IOP to implement the cleanest practicable ferry technology available. We are especially heartened by your agency's pledge in the IOP to build a new ferry fleet that will achieve an 85% reduction in the 2007 EPA Tier 2 emissions standard for marine engines. The District would like to see the same kind of commitment to emissions reductions reflected in the DEIR, where it is currently just one of the air quality impact mitigation measures. We also compliment the WTA for including financial and planning resources for landside transit services with the proposed ferry system expansion. Such foresight will certainly help achieve a fully integrated regional transit system. 1

The District is generally in favor of transit and transportation alternatives to the single-occupancy vehicle. However, we can only be supportive of such projects that are clearly beneficial to air quality. As required under state law, the District is undertaking an independent review of the Draft IOP approved by the WTA's Board of Directors on November 12, 2002. We expect our review to be completed by January, 2003. 2

One of our concerns about the WTA's environmental analysis is the inconsistency between the ferry system proposed in the IOP and the four alternatives analyzed in the DEIR. It is our understanding that the WTA has recently completed an additional transportation analysis of the Draft IOP routes, including less frequent headways than those assessed in the DEIR. It is also our understanding that the WTA's consultants have conducted an air quality assessment of the additional IOP-specific transportation analysis. We recommend that this assessment be included as part of the WTA's environmental documentation. 3

The following comments pertain to the *Air Quality* Section of the DEIR:

The DEIR discusses the air quality benefits of both reducing routes and using emission controls on ferry boat engines under all the alternatives, but only provides quantification of the mitigated emissions for a Reduced Alternative 2. In order to better understand the effects of the mitigation measures, the WTA's environmental document should provide net emissions for all alternatives after the mitigations are applied. 4

Under *Impact A-1* on *page 3.6-14*, an unlabelled table presents percent increases in criteria pollutant emissions for Alternatives 1 and 2. Alternative 1 has a much smaller percent increase than Alternative 2 for CO and ROG. We assume that this is a typographical error in which the decimal place has been shifted by mistake. If this is not the case, provide an explanation for the dramatic differences for those two pollutants. 5

The District has concerns about contradictory statements made regarding proposed mitigation measures for cold-start emissions from motor vehicles. *Mitigation A-3.1* states "cold-start emissions would be reduced by restricting the number of cars parking at the ferry terminals…limiting the amount of parking at the ferry terminals to a level less than full ridership." From the DEIR and technical appendices, it appears that the WTA is proposing to provide ample parking at the majority of the terminals. Therefore, the WTA's environmental document should analyze the effect upon projected ferry ridership if parking were limited according to this mitigation measure. 6

Another inconsistency can be found under *Impact A-6,* which refers to the emissions increase from buses traveling to and from ferry terminals. *Mitigation A-6.1* claims that "emissions would be reduced by decreasing or not providing bus service to new terminals." This mitigation measure conflicts with the earlier mitigation measure to limit parking at ferry terminals. It is also inconsistent with the terminal access mode split noted in the *Transportation* section. The WTA's environmental document should analyze the impact of implementing this mitigation measure on the terminal access mode split. 7

Additionally, concerning *Impact A-6*, the statement is made that for Alternatives 1, 2 and 3 (even after mitigation) emissions from buses connecting to ferry terminals will be equal to or less than the No Project Alternative. This statement needs clarification. Because all of the three proposed alternatives call for some increased bus service over the No Project Alternative, there must be some increased emissions from connecting bus services. 8

The discussion under *Impact A-5* includes the statement "… ferries would emit toxic pollutants in the exhaust in the form of particulate matter from the combustion of diesel fuel and those emissions from all alternatives would be greater than those from the No Project Alternative." While the District concurs with the above statement about overall emissions across the region, it is equally important to understand the impacts of localized particulate matter (PM) exposure at new and expanded ferry terminal sites. The District recommends that the WTA's environmental document include a screening analysis that identifies the terminal sites where future passengers 9

and nearby sensitive receptors (e.g. housing, schools) would have the greatest likelihood for exposure to increased PM emissions. 9

In *Table 3.6-6*, the emissions figures for ferries are unclear. We do not understand how NOx and PM_{10} emissions for the Reduced Alternative 2 can be lower than for the No Project Alternative unless the WTA assumes that existing ferries will not be retrofitted with the same controls of selective catalytic reduction (SCR) and particulate traps (PT) as the new fleet. Such assumptions need to be made obvious and accounted for in both the WTA's environmental document and IOP. 10

Tables 3.6-5 and *3.6-6* are either mislabeled or are incorrect. Firstly, the bus emissions are identical in both tables, which does not make sense considering that Alternative 2 calls for a significant decrease in the number of ferry routes and therefore the amount of bus service to ferry terminals. Secondly, both tables have been mistakenly sub-labeled under "Buses" as Alternative 3 with the identical number of bus vehicle miles traveled. Thirdly, we recommend that the WTA assume that connecting bus services will use an all diesel-fueled fleet, rather than the combination of medium duty gasoline and diesel vehicles used in the environmental analysis. An all diesel fleet is more consistent with our experiences working with shuttle bus service providers, as well as the future purchasing plans by local transit agencies. 11

The District finds the lack of discussion about the air quality impacts from dredging problematic. According to the *Dredging* section, Alternative 2 would call for at least 4.7 million cubic yards of dredged material. The kinds of dredging tools listed in *Table 3.1-10* are primarily diesel powered, and with continuous use, can lead to significant particulate matter emissions. In *Impact A-8*, the DEIR is correct in stating that the District does not require quantification of construction emissions, but we do urge your agency to require the implementation of all feasible control measures. Some of our suggested mitigations include: use of diesel oxidation catalyst or particulate filters on dredging equipment; use of alternatively fueled equipment (CNG, biodiesel, water emulsion fuel, electric); minimize idling time of equipment; maintain properly tuned equipment; and limit hours of operation of heavy duty equipment. 12

Finally, air quality problems arise when sources of air pollutants and sensitive receptors are located near one another. The District is concerned about potential land use conflicts that might arise from constructing terminals and developing residential units in areas with existing sources of pollutants or toxics. If there are nearby industrial or commercial uses, ferry riders and new residents may be affected by odors, dust, and diesel exhaust impacts from activities associated with those existing uses. Citizen complaints can lead to nuisance cases or toxicity claims that are difficult and expensive to resolve. The District suggests that the WTA's environmental document contain a screening level analysis of potential land use conflicts between existing sources of pollutants/odors and proposed terminals. A screening level analysis will indicate if more detailed review will be needed in subsequent site-specific environmental impact reviews. 13

<u>The following comments pertain to the *Transportation* Section of the DEIR:</u>

One of the most important factors in reviewing the benefits of the IOP is the change in vehicle miles traveled (VMT) between the No Project Alternative and the proposed water transit system. 14

The VMT data provided in the DEIR and the Ridership Model Forecast in Part 2 of the IOP's Technical Appendix are significantly different. The WTA's environmental document should provide an explanation as to why there is a difference of approximately 7 million miles traveled per day between the two documents, or correct the discrepancy. 14

The discrepancy in VMT data continues with the assumptions made concerning the DEIR's No Project Alternative. The District assumes that an appropriate No Project Alternative would use VMT projections from the Metropolitan Transportation Commission's most recent Regional Transportation Plan (RTP) as the most likely scenario for future transportation projects and activity in the region. However, in reviewing the DEIR of MTC's 2001 RTP, we note that their VMT figures for 2025 are significantly higher than those listed in either the DEIR or the Technical Appendix. We recommend that the WTA's environmental document and the IOP use MTC's estimates for the No Project Alternative or provide an explanation for using different estimates. 15

Figures on Daily Person Trips across Bay Area Screen lines are also inconsistent between the DEIR's No Project Alternative (*Table 3.12-5*) and the Draft RTP (p. 17). This leads us to believe that the WTA has a different set of assumptions about the No Project Alternative than what has been forecasted in the most recent Regional Transportation Plan. The District recommends that the WTA's environmental document reconcile the VMT and trip data, or explain the reasons for the deviations. 16

The tables at the end of the *Transportation* section are difficult to understand and appear incomplete. The District recommends that all the transportation tables include data on all of the proposed alternatives, not just Alternatives 1 or 4. For example, *Table 3.12-16* shows the mode split for accessing terminals by ferry corridor for Alternative 1 only. The WTA's environmental document should include equivalent data on mode splits for all the alternatives or, at the least, text which clearly explains how mode splits can be derived for the other alternatives. Also, in order to better understand the ridership calculations in the DEIR, we suggest that the WTA provide a table that lists the peak and non-peak ridership figures for all proposed alternatives by individual route. Such information would be easier for readers to understand than the current tables, and would be simpler to use compared to trying to derive ridership numbers from the current tables. 17

The WTA's environmental document should provide more information about the assumptions that were made concerning the transportation modal split under each of the proposed alternatives. For example, the IOP states that the WTA has conducted ridership surveys which conclude that the new ferry system will "draw most of its riders from vehicles and that these are people who have proved unwilling to regularly use other forms of transit." However, *Table 3.12-13* shows ridership changes by alternative between different transit modes, and seems to indicate that ridership from existing transit modes will decrease with the implementation of a more robust ferry service. So there would be a significant number of riders switching to ferries from other transit modes. The District suggests that the WTA better explain the transit ridership changes between the proposed alternatives and how the WTA came to the conclusion that the majority of the new ferry riders would come from single-occupancy vehicles. 18

The DEIR analysis holds the mode split for accessing the ferry terminals relatively the same across all of the proposed alternatives: 66% drive, 16% bus/rail and 18% walk/bike. The WTA's environmental document should clearly show how these figures were determined and how they fit into the concept of creating more transit-oriented development near existing and new ferry terminals. 19

If you have any questions regarding these comments, please contact Michael Murphy, Principal Planner, at (415) 749-4644 or Suzanne Bourguignon, Environmental Planner, at (415) 749-5093.

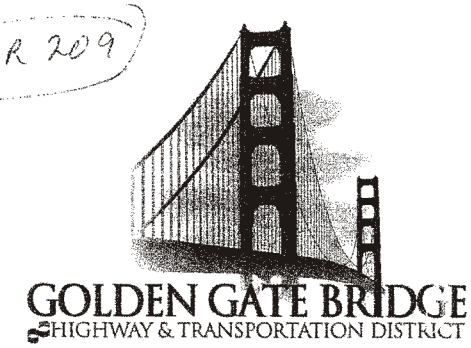
Sincerely,

William C. Norton
Executive Officer/ APCO

WN:SB

cc: BAAQMD Board of Directors
WTA Board of Directors
Chris Brittle, MTC
Paul Milkey, CARB

EIR 209



December 12, 2002

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

Re: **Draft Program Environmental Impact Report (DEIR), Expansion of Ferry Transit Service in the San Francisco Bay Area**

Golden Gate Bridge, Highway and Transportation District (District) has reviewed the above referenced document and offers the following comments as they pertain to existing and future ferry trips along the Golden Gate Corridor. This letter is a follow-up to District letters to you dated August 16, 2002 (signed by Alan Zahradnik, Planning Director) and October 15, 2002 (signed by David Clark, Deputy General Manager/Ferry Division). A copy of Mr. Clark's letter is enclosed.

District understands this document to be a programmatic Environmental Impact Report and, as such, localized effects of expanded ferry transit service will be developed and evaluated as new ferry routes are implemented at a future time.

General Comments

- Water Transit Authority's (WTA) Draft Implementation and Operations Plan (IOP) has technical information that is pertinent to the effects of the expanded ferry transit plan discussed in the DEIR. District suggests DEIR make reference or include projected capital and operating costs. 1

EIR Comments

Program Description

- DEIR should address the relationship between Larkspur Ferry Terminal (LFT) and San Quentin. For example, would the new San Quentin ferry terminal replace or complement LFT? Would the forecasted patronage estimate for a San Quentin ferry terminal be the same as for LFT? 2

- Similarly, Table 2-1 and Figure 2-1 refer to a potential ferry terminal in San Rafael. Would a future San Rafael ferry terminal replace or complement a Larkspur and/or San Quentin terminal? How would ferry patronage forecasts at San Rafael vary with ferry terminals at Larkspur and/or San Quentin? 3

- Similarly, Table 2-1 and Figure 2-1 refer to a potential ferry terminal at the Sausalito Bay 4

Model. Would a future Bay Model ferry terminal replace or complement a Sausalito terminal? How would ferry patronage forecasts at the Bay Model vary with a co-existing ferry terminal in Sausalito? What are the benefits of a facility at the Bay Model given the close proximity to the existing Sausalito Ferry Terminal (e.g., increased capacity, additional parking supply, less vehicular congestion in downtown Sausalito)? 4

- Similarly, Table 2-1 and Figure 2-1 refer to a potential ferry terminal at Gnoss Field and Port Sonoma. DEIR should explain whether these two terminals would co-exist or are mutually exclusive. 5

- Finally, the DEIR refers to potential ferry terminals at Hamilton and Port Sonoma. DEIR should explain whether these two terminals would co-exist or are mutually exclusive. 6

- DEIR Page 2-2 and Figure 2-3 should clarify that Alternative 3 ferry routes shown are primarily commuter services, and other recreational/weekend services exist in San Francisco Bay. 7

Dredging

- Page 3.1-12 states that dredging in Larkspur Ferry Channel is a "nonfederal project" when in fact the Army Corps of Engineers has funded the most recent dredging project in their Fiscal Year Capital Budget program. In addition, this page states dredging in this channel last occurred in June 2001; actually, dredging was just completed for the 2002 cycle. Dredging will also occur in 2003. 8

- Tables 3.1-5 and 3.1-6 do not show dredging requirements for San Quentin. San Quentin may potentially share the LFT channel. It would require some dredging alternative to the existing channel. 9

- Tables 3.1-5 and 3.1-6, and Figure 3.1-3 indicate potential dredging requirements for proposed ferry terminal locations. District appreciates that a San Quentin ferry terminal does not represent a new requirement for dredging. Nevertheless the dredging requirements shared with LFT should be included. 10

- What are dredging requirements for Gnoss Field? Are they in addition to those required for Port Sonoma? 11

Navigation

- Table 3.2-5 presents a summary of vessel incidents obtained from the U.S. Coast Guard's Vessel Traffic Service. It includes data from 1996 to 2001. While some data appear to have reporting errors (e.g., 01/18/00 incident on Golden Gate Ferry's M.V. San Francisco could not have occurred in Vallejo), the DEIR should note that this table may not be an accurate representation of vessel incidents in San Francisco Bay; rather, it is a sampling of incidents that typically occur for a six-year period. 12

- Figure 3.2-3 does not accurately indicate the correct location of the Larkspur wind surfing area (which is immediately east of LFT) and the "Rod and Gun" (which is immediately north and west of the touchdown point of the Richmond-San Rafael Bridge). In addition, District recommends this figure identify ferry terminals as existing or proposed. 13

- EIR does not mention the location of other nearby recreational facilities such as the Marin Rowing Association located east of LFT. Activities at this rowing club are currently scheduled by the Association to minimize conflicts with ferry schedules at LFT. 14

Wake Analysis and Biology

- District prepared the Corte Madera Ecological Reserve Harbor Seal Habitat Protection Study in August 1998. It provided an assessment of seal haul-out protection alternatives. 15

- Table 3.3-3 incorrectly indicates some information pertaining to the San Francisco – Tiburon ferry route. Golden Gate Ferry is not the operator of the San Francisco – Tiburon ferry route. It is presently operated by Blue & Gold Fleet. This table also incorrectly lists the M.V. Golden Gate as the vessel that operates on this route. 16

- Table 3.3-3 incorrectly indicates the average number of daily one-way trips as 34 on the San Francisco – Larkspur ferry route. The correct number of trips is 42. This would make the daily mileage 462 rather than the 370 shown on this table. 17

- Table 3.3-3 incorrectly indicates the average number of daily one-way trips as 22.7 on Golden Gate Ferry's San Francisco – Sausalito ferry route. The correct number of trips is 18, not including the two summer seasonal trips. 18

- Table 3.3-4 is inconsistent with Table 3.3-3 in regards to routes operated by Golden Gate Ferry and vessels assigned to these routes. 19

- Table 3.3-4 suggests varying wake wash values for Golden Gate Spaulding Class vessels. Although the DEIR does not explain how varying wake wash levels for vessels within the same vessel class were obtained, District suggests this table present a single value for each vessel class. 20

- DEIR should explain why the San Francisco – Port Sonoma route (shown on Table 3.3-7) requires a 350 passenger vessel. 21

Air Quality

- DEIR makes reference to Appendix AIR-A. This appendix purportedly has ferry route information for each alternative. Since this appendix is not included in the DEIR, District recommends that a summary of this Appendix be inserted. 22

- This section of the DEIR does not present the underlying assumptions in terms of mode share 23

for the four alternatives. Does access to the ferry terminals vary compared to existing conditions? Is rail service on the former Northwestern Pacific Railroad (NWP) used as access to Port Sonoma? 23

- DEIR identifies air quality impact (A-3) associated with motor vehicles leaving ferry terminals during the evening commute period. DEIR suggests mitigating measures such as parking fees and preferential parking for carpools. What information does WTA have that quantifies what the reduction of single-occupant vehicles could be as a result of these parking strategies? 24

- District recommends DEIR correlate air quality impacts with projected auto and transit trips to ferry terminals shown in Table 3.12-16. 25

Land Use

- Page 3.7-6 of the DEIR should refer to the railroad right-of-way adjoining Port Sonoma as the former Northwestern Pacific Railroad. 26

- Page 3.7-18 (Land Use Impact-2) does not make reference to the possible impacts to established communities (i.e., San Quentin Village) that may potentially result from a new ferry terminal at San Quentin. 27

- Although the DEIR correctly states that new ferry terminals potentially may have a positive impact on a local community by creating a new form of accessible regional transportation, the DEIR should also acknowledge that a new ferry terminal (e.g., San Quentin or San Rafael) may require new landside support facilities, such as arterial roadways, parking garages, and freeway ramp connections, that may impact a local community. 28

Geology

- Table 3.10-2 summarizes the geohazard exposure for potential terminal sites. Although information is presented for Larkspur, San Rafael, and Port Sonoma/Gnoss Field/North Bay, it is not clear what the geohazard exposure would be for a possible ferry terminal at San Quentin. 29

Noise

- Page 3.11-4 states some proposed ferry terminals may include rail links (and the noise generated by this mode of transportation), such as Amtrak or BART.

  DEIR should reference proposed or existing ferry terminals near an Amtrak station (i.e., a conventional inter-city railroad with diesel hauled locomotives), such as Jack London Square in Oakland or Martinez. Similarly, the DEIR should cite those potential ferry terminals near a BART station (i.e., an electric mass transit rail system). Ferry terminals at Larkspur, San Quentin, and/or Port Sonoma potentially may have a diesel commuter rail system linkage in the future. 30

Finally, the DEIR should acknowledge that the noise generated by the above rail technologies can vary. 31

Transportation

- Table 3.12-1 provides a comprehensive summary of public transit services in the Bay Area, although not all these services connect with existing (or proposed) ferry services. Some small scale transit services not included in this table include Sally Sausalito Shuttle, West Marin Stagecoach, Novato's EZ Rider, Novato's Hamilton shuttle, PresidiGo in San Francisco, UCSF shuttle, and San Francisco State shuttle. 32

- Table 3.12-2 should identify the number of District ferry vessels from San Francisco to Larkspur as four (not the five indicated). 33

- Page 3.12-2 of the DEIR states the "2025 forecast . . . take into account planned expansions in bus, BART, light rail and train service." Does the DEIR assume the proposed Marin-Sonoma commuter rail project to be operational in 2025? District recommends a table be developed which summarize these transit expansions. 34

- Table 3.12-5 illustrates an approximate 51 and 75 percent increase in daily person trips across the Golden Gate corridor by bus and ferry transit in the year 2025, respectively. Although District understands these numbers to be projections, this information indicates that demand for future Golden Gate Transit transbay bus and ferry service will continue to grow. District understands most of this growth to be between Sonoma and Marin counties. Transbay travel projections should be called out separately. 35

- Pages 3.12-5/-6 of the DEIR state that a charge for parking "reduces overall ridership . . . compared to the 2025 No Project alternative, which does not include a parking charge at ferry terminals." This suggests that parking charges may not be an advisable strategy to control parking demand at ferry terminals, as was suggested above (under Air Quality impact A-3). DEIR also suggests that the effects of charged parking would generate fewer ferry passengers than the 2025 No Project alternative. DEIR does not clearly explain whether the effects of paid parking on ferry patronage is beneficial. 36

- Pages 3.12-5/-6 of the DEIR suggests that vehicle miles traveled may decrease at LFT as "the result of a potential introduction of parking fees and additional transit service that would encourage some commuters onto transit." Is this the result of a shift to access via shuttles?

  What levels of transit service would be required (or have been assumed) to achieve the modal share derived in the DEIR? What transit levels of service are required (or assumed) for a potential ferry terminal at San Quentin? Have studies been prepared that indicate how many parking spaces would be needed at a San Quentin ferry terminal? 37

Growth Inducement

- Chapter 4 of the DEIR does not discuss growth inducing impacts which may result from new ferry terminals at San Quentin, San Rafael, or the Bay Model at Sausalito. Are growth inducing impacts expected as a result of these new ferry facilities? 38

IOP Comments

Non-Traditional Ferry Service Markets

- How would the Golden Gate National Recreation Area Loop cited in the DEIR operate? What are the ports of call? Is there enough weekend parking at these ports? DEIR should stress that weekend service would make better use of existing fleet that would otherwise be underutilized. 39

- Has the IOP or DEIR considered the need for ferry service for various special event services (e.g., Pacific Bell Park, Oakland Coliseum/airport, Sears Point Race Track, Candlestick Park) from San Francisco to North Bay? 40

- Has the IOP or DEIR considered the value of car ferries in San Francisco Bay? 41

Governance

- IOP and DEIR should explain more clearly the relationship between WTA and existing ferry operators. IOP and DEIR should also explain who would operate existing and future services. 42

Vessel Design

- IOP calls for standardized vessel designs for the Bay's ferry services. District appreciates the desire to strive for uniformity in vessel design since this would potentially simplify the design of "side-loading" vessels. However, the IOP should recognize that Golden Gate Ferry currently deploys hydraulic gangways at the Larkspur and San Francisco ferry terminals. Any future ferry terminals in the Bay that Golden Gate Ferry desires to serve should be able to accommodate all ferry vessels. 43

Operational Impacts, Maintenance and Layover of Vessels

- Section 3.6 of the DEIR makes reference to operational impacts. As requested in District's August 16th letter to WTA, this document (and the IOP) should clarify the relationship between the existing LFT and a possible new ferry terminal at San Quentin. The EIR and IOP should cite whether the San Quentin terminal would replace LFT or co-exist with LFT. Should the terminals co-exist, will there be operational issues associated with two ferry terminals that are closely spaced. This comment is also valid for other ferry terminals that are closely spaced, such as the existing Sausalito ferry terminal and a possible ferry terminal at the Bay Model, LFT and San Rafael, or Pacific Bell Park and Mission Bay in San Francisco. 44

- In this same section, neither the IOP nor DEIR suggests where the maintenance of new ferry vessels (and its potential impacts) may occur. Would maintenance of these vessels occur at their "home" ports, at San Francisco Ferry Terminal, or at a remote location? 45

- Neither the IOP nor the DEIR suggests where the layover of new vessels would occur. Would layover of these vessels occur at their home ports, at San Francisco Ferry Terminal, or at a remote location? 46

District staff appreciates the opportunity to comment on the DEIR for this project. Please call Principal Planner Maurice Palumbo at (415) 925-0160 if you have questions.

Very truly yours,

Alan R. Zahradnik
Planning Director

ARZ:gj
Enclosure
c: Celia G. Kupersmith
David B. Clark
Teri W. Mantony
Maurice P. Palumbo
Rebecca Wessling
a:f:\AA\ferry\WTA DEIR.112.doc

EIR 210

Tristan Bettencourt

From: Jim Cassell [jscassell@yahoo.com]
Sent: Monday, December 16, 2002 7:55 PM
To: email@watertransit.org
Subject: Berkeley/Albany Ferry Service

To Whom It May Concern:

As a citizen of Berkeley, Ca. I strong urge you to endorse a ferry line from Berkeley to San Francisco. 1

Also, I would like to ferries to be as ecological as possible to protect the Bay. 2

Another item is the the ferry does not need to be hi speed and could be low tech. 3

It is also very important to have the ferries running at 6:00a.m. until at least 12:00midnite and on Fri-Sat until 1:00a.m. 4

I believe the best location for a farry terminal would be at the Golden Gate Fields parking lot. 5

The sooner the better is would be great to have a ferry system to improve Bay Area life and traffic conjestion. 6

Thank you,

Jim Cassell
1311 Spruce St.
Berkeley, Ca. 94709

Do you Yahoo!?
Yahoo! Mail Plus - Powerful. Affordable. Sign up now.
http://mailplus.yahoo.com

EIR 211

Tristan Bettencourt

From: cbarry@hotmail.com
Sent: Thursday, January 02, 2003 5:15 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(cbarry@hotmail.com) on Thursday, January 2, 2003 at 17:15:28

---

email: cbarry@hotmail.com

Name: Chris Barry

WTA Comments: Use of sonar as discussed in the IOP may be difficult. In general, sonar does not work well at shallow immersion and high speeds due to masking effects from cavitation and aeration. The sonars available for foward looking are generally operated at very low speeds in fishing service, often at deep immersion. Naval ASW practice is also to slow down to low speeds during active search. 1

In addition a Wesmar 500 meter unit, one of the smallest available, will produce more than 500 pounds of drag at 25 knots, resulting in an additional expenditure of about 90 BHP or as much as five gallons of additional fuel per hour. 2

If sonar is needful, then I suggest a system of moored stationary buoys powered by solar panels that would relay data to the ferry via a radio link. 3

SUBMIT: SEND COMMENTS

EIR 212

Tristan Bettencourt

From: Bud@strategic-environmental.com
Sent: Thursday, December 19, 2002 3:50 PM
To: email@watertransit.org
Subject: EIR Comments

Below is the result of your feedback form. It was submitted by
(Bud@strategic-environmental.com) on Thursday, December 19, 2002 at 15:50:01

---

email: Bud@strategic-environmental.com

Name: Robert Abbott

EIR_Comments: Anthropogenic hydroacoustic energy is known to injure fish and may lead to near-term or delayed mortality. Injuries to the inner ear may not lead to immediate mortality but affect feeding, predator avoidance and navigation. Harm to any organ is not permitted under the ESA. Propeller noise and vibration generated by vessels with powerful engines are known to generate peak sound pressure levels in excess of 180 dB re 1 µ Pa. It is likely that virtually all fish within about 1 meter radius of the propeller or a large tug or freighter are seriously harmed. Large fish will generally exhibit avoidance behavior but eggs and larvae can not. Fish eggs are particularly vulnerable to vibration soon after fertilization. Larval fish are vulnerable to sound pressure as soon as they form a swim bladder. The proponents have not provided documentation on the sound pressure or vibrations generated by the propellers of high speed ferries and therefore it is not possible t!
o assess the long term impact of the ferry system on fisheries resources. 1

SUBMIT: SEND COMMENTS

EIR 213

LEAGUE OF WOMEN VOTERS OF THE BAY AREA
An Inter-League Organization of the San Francisco Bay Area

January 6, 2003

Water Transit Authority
120 Broadway
San Francisco, CA 94111
Fax: (415) 291-3388; email@watertransit.org

Re: Draft Program EIR on the Water Transit Authority Implementation and Operations Plan

The League of Women Voters of the Bay Area appreciates this opportunity to comment on the DRAFT Program EIR (DPEIR) for the Water Transit Authority Implementation and Operations Plan (IOP). We appreciate that the Water Transit Authority has been under very tight time constraints for preparing the IOP and DPEIR for such a wide-ranging project. We are cognizant of the many unknowns about future transit links that affect the evaluation of possible terminals and look forward to joint study of those sites by WTA and landside transit agencies. For now, WTA's final documents could better inform decisions by including more of the following information:

Cumulative impact analysis is one of the values of a programmatic EIR. The wide-range of potential combinations of terminals and routes complicates this requirement but does not eliminate it. Examples of areas where cumulative analysis seems essential are:

- On the waterside, cumulative impacts on threatened and endangered bird and fish species and their habitats are critical. The Clapper Rail is one of the few species discussed in the Appendix. Yet the total extent of Clapper Rail habitat that may be impacted by the various alternatives and the recommended ferry program due to wake, erosion, filling, excavation and indirect impacts is not clear. Cumulative impacts to steelhead and salmon are similarly critical. 1

- On the land side, the cumulative adverse impacts of large parking lots and air and water quality problems related to many cars driving to ferries is not clear. The estimated acres of new parking by the Bay to support the ridership postulated for each terminal and the relation to runoff, traffic generation and any induced low density development need to be developed. 2

Consistency between the Implementation and Operations Plan and the DPEIR needs to be improved. Most noticeably:

- Potential impacts on rafting migratory waterfowl that depend on the Bay waters during winter months acknowledged in the IOP should be assessed in the DPEIR and recommended impact mitigations or avoidance included in the DPEIR. 3
- Mitigations for negative land use impacts of car linkage to ferries are included in the IOP but not in the DPEIR. 4
- Pedestrian, bike and transit access preference in terminal design and transit oriented land use at the terminal are included as an aesthetics mitigation. Such terminal standards are more importantly a land use mitigation to support transit and pedestrian oriented ridership. 5
- The DPEIR includes only land use impacts and mitigations for developed areas. Impacts on sensitive habitat and agriculture must be included. 6

As there are many facets of ferry service for decision makers to weigh, we urge more information in summary tables including:

- A chart comparing the vessels analyzed with regard to the potential impacts of noise, degradation of air and water quality, erosion, and loss of endangered species, as well as cost effectiveness. The chart should identify which vessel type is being suggested for each route to aid evaluation of the cumulative significance of the impacts. 7
- A complete chart of existing land use and planned land use at proposed terminals (the Land Use Matrix following Appendix page 3.7-25 omits Gnoss Field, Hamilton, and Port Sonoma). It should be clear in the chart which locations require a general plan amendment. 8
- A transit chart including the number of existing transit routes serving the proposed terminal vicinities and their frequency; the consistency of ferry terminal location with local jurisdiction transportation and transit agency plans; and new transit service anticipated in the ridership and cost estimates. 9
- A chart listing ferry terminal sites being dropped from consideration for this ten year plan and those retained with the relevant findings (eg. amount of dredging, estimated ridership, cost per passenger and/or environmental damage). This would provide a very valuable reference as the ferry program unfolds and the plans and considerations of localities and agencies shift. 10

The latter chart is of particular interest to our 21 local Leagues as we endeavor to promote a cost-effective, balanced regional transportation system. Thank you for your consideration.

Sincerely,

Eva Bansner

Eva Alexis Bansner,
President

Sandra Threlfall

Sandra Threlfall
Administrative Vice President
510-339-9233 <threlfall@pacbell.net>

1611 Telegraph Avenue, Suite 300, Oakland, CA 94612
www.lwvba-ca.org

Jan. 15, 2003

EIR 214

Tom Bertken CEO
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken,

I urge the Water Transit Authority to build a clean & green ferry system. Please mandate that all new ferries are at least 85% cleaner than federal law requires. [1] Exclude wetland sites. [2] Avoid dredging. [3] Minimize parking lots [4] & increase public transit. [5] Offer free rides to bicyclists who ride to the terminal (not drivers). [6] And make sure routes are cost-effective. [7]

Thank you.

Margaret Pratley

Margaret Pratley
2322 Shattuck #204
Berkeley, CA 94704

EIR 215

THE LEAGUE OF WOMEN VOTERS®
OF SONOMA COUNTY
100 E. STREET, SUITE 209
SANTA ROSA, CA 95404-4606
(707) 546-5943
http://sonco.ca.lwvnet.org

January 15, 2003

San Francisco Bay Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear President Johnson and Members of the Board:

The League of Women Voters of Sonoma County is interested in and has concerns regarding the possibility of development of Port Sonoma as a ferry terminal. The area for a ferry terminal is surrounded by wetlands and land zoned for agriculture. At present it is only accessible by automobile. The closest population centers are Novato, about 3 miles west, and Petaluma, about 10 miles north. 1

The League at the State level has strong positions supporting the maintenance of agricultural land and the preservation of open space. Our League in Sonoma County supports strict adherence to the Sonoma County General Plan where the lands surrounding Port Sonoma are zoned agricultural and wetlands. In light of these positions, the League of Women Voters of Sonoma County believes that the land use designations for properties within the valley where Port Sonoma is located should not be changed. 2

Our State League positions support a variety of transportation modes, with emphasis on increased public transit services to reduce the use of the single occupant vehicle (SOV). In addition, we realize that the congestion on Highway 101 in Sonoma and Marin Counties is ever worsening and any reduction in the use of the SOV could help alleviate the situation.

There is the possibility of passenger rail to serve a ferry terminal at Port Sonoma. The existing railroad tracks abut the south end of the port. An EIR to begin in 2003 will look at railroad operation, including a study of Port Sonoma. This EIR will evaluate the merits of a link between passenger rail and ferry service at Port Sonoma. If this link is established, the uses and extent of development of this port should not be larger than its present area and should be consistent with the zoning of surrounding lands. 3

However, the LWVSC does not want to see the wetlands near Port Sonoma paved over for roads and parking spaces nor do we want to see agricultural land rezoned for development. Beginning ferry service to Port Sonoma before there is a rail link would subject this area to unacceptable development pressures. It is the position of the LWVSC that the use of Port Sonoma as a ferry terminal should not be approved before passenger rail service is available at Port Sonoma. 4

Sincerely,

Nancy Richards

Nancy Richards, President
League of Women Voters of Sonoma County

1600 Broadway, Suite 300
Oakland, CA 94612-2100

t. 510.452.9261
f. 510.452.9266

www.savesfbay.org

EIR 190

October 29, 2002

Thomas G. Bertken, Chief Executive Officer
San Francisco Bay Area Water Transit Authority
IOP and DEIR Comments
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

These comments on the Water Transit Authority's Draft Environmental Impact Statement (DEIR) for Expansion of Ferry Transit Service in the San Francisco Bay Area and Draft Implementation and Operations Plan (IOP) are submitted on behalf of Save The Bay (Save San Francisco Bay Association). Save The Bay has been working for more than 41 years to protect and restore San Francisco Bay, supported by thousands of active members throughout the Bay Area and beyond.

Save The Bay participated in the formulation of a water transit blueprint prepared by the Blue Ribbon Task Force for Bay Area Water Transit convened under the auspices of the Bay Area Council in 1999, and offered extensive comments on the environmental impacts of that Commission's final conceptual plan. We provided input on legislation sponsored by Senator Don Perata to establish the Water Transit Authority. We have offered comments and ideas to the Water Transit Authority on the scope of its conceptual studies, operating plan and EIR. And we are pleased to provide reactions and suggestions on the draft just released.

The DEIR represents a good faith effort to describe the major elements of an ambitious ferry expansion system, and several alternatives to scale that expansion. The report does indicate that new technologies may present opportunities to expand passenger ferry service economically and efficiently in parts of the Bay Area, especially those where significant infrastructure to support ferry service is already in existence. Where service can be expanded cost-effectively, and without significant adverse environmental impact, additional ferries may represent an attractive supplement to the Bay Area's transit options.

The EIR requires significant additional work to refine some of the findings in the current draft, especially in the following areas:

1. Water Quality and Dredging

a) The San Francisco Bay Regional Water Quality Control Board has characterized hot spots of toxic sediment in accordance with the state-mandated Bay Protection and Toxic Cleanup Program. The EIR should identify those hot spots and underscore that no dredging should be performed near them, to reduce the likelihood of resuspending contaminated sediments. 1

b) The EIR should evaluate the alternatives for the potential that required dredging would release contaminants into the water column, and would produce contaminated material requiring non-aquatic disposal. For that analysis, potential dredge locations should be tested for contamination with actual sampling. 2

c) The EIR should specify that no maintenance dredging or dredging of new access channels will be allowed that will impact jurisdictional wetlands, to reduce the likelihood of significant impacts to water quality and to endangered, threatened, or other special status species that use the wetlands. The DEIR's suggested mitigation measures (sections 3.1 and 3.5) do not ensure adequate protection of wildlife or water quality, and they do not ensure less than significant adverse impacts. 3

d) The EIR and IOP should address how dredging for expanded ferry service could be accommodated into the Long Term Management Strategy for dredged materials, and explain what type of consultation with LTMS agencies has occurred. There is no indication in either document how the predicted volume of dredge material can be accommodated in the LTMS, or where dredge material will be disposed. 4

e) The EIR and IOP should address water quality impacts from solid waste and human waste that would be generated by each of the system alternatives, and should analyze the water quality impacts of mixing exhaust with turbulent water in the tunnel between the hulls of the newer, high-speed catamarans. 5 6

2. Aquatic Impacts of Ferry Operations on Wildlife

The DEIR contemplates system expansion that could increase ferry trips on San Francisco Bay by several times, or by an order of magnitude. This level of expansion is likely to result in more significant impacts on wildlife than the current draft acknowledges. These impacts should be assessed in greater detail in the EIR at the programmatic level. While particular infrastructure will require detailed, site-specific impacts analysis, the EIR must characterize the likely combined impacts of a system that includes multiple route expansions and terminal construction on regional resources in the Bay. Because they are in such short supply and have been significantly degraded by 150 years of development and alteration, each remaining area of sensitive shoreline wildlife habitat, including tidal marsh, and sensitive underwater wildlife habitat, including 7

eelgrass beds, is a regional resource. Combined impacts to these resources from a proposed ferry system expansion could be significant, even if a particular site-specific impact is not significant, and the cumulative impact might be impossible to mitigate. 7

Operation of ferries may have detrimental impact on sensitive habitat and wildlife, both from their transit through waters frequented by wildlife, and from wakes that accelerate erosion of shorelines and damage marshes, which could significantly impact water quality, fish and wildlife. Less than five percent of the Bay's original tidal marsh habitats remain, and these remnants are vital for several endangered species of birds, fish, and a mammal--the salt marsh harvest mouse. The Petaluma River supports the largest remnant of tidal marsh in California.

Wakes may also contribute to erosion of levees that are essential to current and future wetland restoration projects around San Francisco Bay, and that provide important habitat values themselves, especially as high water refuges for wetland-dependent birds and mammals. One of the largest wetland restoration projects in the Bay is underway at Bair Island within the Don Edwards San Francisco Bay National Wildlife Refuge, in close proximity to proposed ferry service at the Port of Redwood City. Levees at Sonoma Baylands near the mouth of the Petaluma River are close to a proposed ferry terminal at Port Sonoma, and salt pond levees are predominant throughout the South Bay.

a) The EIR and IOP should assess the system's likely impacts on eelgrass beds, tidal marsh and other fragile regional resources. The WTA should not defer this investigation to individual site-specific EIRs. 8

b) The EIR should analyze wake impacts for each proposed route and terminal where new service or altered service may occur. Wake impact analysis should include impacts on existing tidal marsh, areas where restoration is underway, areas where restoration is planned, and levees that may provide habitat values. It is not appropriate to defer such analysis to a future site-specific EIR for a particular ferry terminal or route. Instead, that wake impact analysis should be conducted in this programmatic EIR to assist in the determination of alternatives for system expansion, and to provide public disclosure on significant system impacts. 9

c) The EIR should analyze in greater detail the impacts of increased ferry activity on waterfowl, including diving and rafting ducks, that rest and forage on the Bay's waters. Several of the proposed ferry routes pass through the largest concentrations of waterfowl in the North and South Bays, as well as the Contra Costa shoreline. A comprehensive, not site-specific, examination of the cumulative impacts on the San Francisco Bay's waterfowl population should be made now to provide public disclosure on significant system impacts and to assist in the determination of alternatives for system expansion. 10

3. Air Quality Impacts

Emission of contaminants and particulates from operation of ferries may have a detrimental impact on the Bay Area's air quality. It is important for the EIR to underscore that many of the emissions of concern also have an impact on San Francisco Bay, either from direct precipitation into the Bay and its tributaries, or from stormwater runoff into the Bay that collects settled particulates throughout the watershed and deposits them into the Bay.

a) The EIR should mandate the same emissions standard outlined in the IOP (85 percent below EPA Tier 2 – 2007). SB 428 requires that mandated standard as mitigation to reduce air emissions as much as feasible, and also requires an air quality analysis by the Bay Area Air Quality Management District that is not present in the DEIR. 11

b) The IOP should indicate, as does the DEIR, that even with the low-emissions mandate an expanded ferry system is still likely to have a significant adverse impact, and will provide only a minimal reduction of traffic congestion (total daily Vehicle Miles Traveled). Both the IOP and EIR should present the public health implications of the air quality impacts, including the potential for disproportionate impacts from air emissions on low-income and minority communities. 12

c) The EIR should include analysis on dioxin that may be introduced to the air and waters of the Bay through operation of diesel ferries, and proposals to prevent or reduce those emissions. The EIR should also include analysis of greenhouse gas emissions for each alternative, and proposals to reduce or mitigate those emissions. No such analyses are evident. 13 14

d) The EIR alternatives should calculate air emissions based on the proposed ferry routes in the IOP, should incorporate emissions impacts from dredging associated with particular alternatives, and should clarify whether hovercraft information presented in this draft is based on any analysis by the WTA Clean Marine Committee. 15 16

4. Integration with Regional Transportation

To ensure that water transit can provide the maximum additional transportation benefits to the Bay Area region as a whole, and to reduce the risk of unintended consequences that adversely affect the Bay directly and indirectly, ferry service must be integrated with other transportation modes, both in planning and execution. The DEIR does not provide adequate information about the nature and extent of this integration. The WTA should conduct additional studies to determine: 17

a) Alternative surface transportation feeder systems that can actually reduce the number of automobiles and automobile trips generated by additional ferry service. The extent that, if individual automobiles remain the primary method for passengers to get to and from ferries, the water transit system could cause more gridlock, fuel consumption and air pollution than it alleviates.

b) The extent to which the DEIR's ridership projections are dependent on providing automobile access, subsidized parking and improved or expanded approach roads, which themselves could have adverse environmental impacts at specific ferry terminals and throughout the system. The relative cost effectiveness of applying proposed subsidies for these automobile access components as compared with other feeder transit options.

c) The extent to which cost effectiveness of subsidized additional ferry service postulated in the DEIR is increased or reduced if local match funding assumed for infrastructure is not forthcoming.

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Thank you for your careful consideration of these comments.

Sincerely,

David Lewis
Executive Director

EIR 191

RECEIVED
OCT 28 2002

October 22, 2002

Ms. Charlene Haught Johnson, President
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: WTA IOP and Program EIR

Dear Ms. Johnson:

The Presidio Trust commends WTA's efforts to make water transit an important component of Bay Area transportation. As the Agency entrusted with the mission of making the Presidio a sustainable national park, we are very supportive of transportation alternatives to the automobile.

The Trust is pleased that a ferry terminal at the Presidio has been included in the WTA network. We believe it would be an ideal way to get visitors and employees to Crissy Field and other prime destinations in the Presidio. The Trust has always viewed this terminal as accessed primarily by pedestrians, bicyclists and transit riders, as well as our free PresidiGo shuttle service. 1

We also want to ensure that the WTA considers potential parking impacts in more detailed planning for this terminal. To achieve our goal of financial self-sufficiency, the Trust needs to lease the buildings on the west portion of Crissy Field near the potential ferry terminal sites. To this end, we need to ensure that water transportation not displace the very limited parking in the area that would adversely impact our ability to lease these buildings. We would also like the WTA to clarify measures that will ensure that ferry riders access the terminal using transit or other non-auto modes. 2 3

Please feel free to contact me or Joanne Marchetta, our project manager for West Crissy, if you need further information. We look forward to your continued progress in providing water transportation access to the Presidio.

Sincerely,

Richard Tilles
Transportation Project Manager

cc: Hillary E. Gitelman, Director of Planning
Michael Savidge, NPS

34 Graham Street, Post Office Box 29052, San Francisco, California 94129-0052
415/561-5300 Fax 561-5315 presidio@presidiotrust.gov

CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061

EIR 192

E. Clark Thompson
Mayor

Janice Cader-Thompson
Michael Healy
Matt Maguire
Bryant Moynihan
Mike O'Brien
Pamela Torliatt
Councilmembers

October 30, 2002

Water Transit Authority
Attn: WTA IOP Comments
120 Broadway
San Francisco, CA 94111
By Facsimile: 415-291-3388

Dear Charlene Haught Johnson and the Water Transit Authority Board of Directors:

The City of Petaluma is pleased to learn that Port Sonoma in Sonoma County has been maintained as a potential high-speed ferry service and dock location for the North Bay in the recent Water Transit Authority's Implementation and Operations Plan.

The City appreciates the public awareness and interest that your comprehensive study has afforded residents and businesses and encourages the WTA to maintain Port Sonoma in the Implementation and Operations Plan as the best possible location for high-speed ferry service in the North Bay. The possibility of affordable public transportation and excursion trips to the North Bay by ferry would serve many people in an environmentally sound way. 1

Sincerely,

Clark Thompson

E. Clark Thompson
Mayor of Petaluma

cc: Petaluma City Council
Supervisor Mike Kerns
Jessica Vann Gardner, Petaluma Visitors Program

City Manager's Office
11 English Street
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Phone (707) 778-4345
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EIR 193

SIERRA CLUB
SAN FRANCISCO GROUP
85 Second Street, Box SFG, San Francisco, CA 94105

November 7, 2002

Attention: WTA EIR Comments
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111, Fax: 291-3388

Re: Detailed Sierra Club Comments

The Sierra Club appreciates the extension of comment time and offers the following expanded comments to Mr Flashman's 10/31 letter:

Energy Impacts: Section 3.13.2.3 should be corrected to clearly show the additional energy which be consumed for each ferry alternative studied, in comparison with other transportation modes. The DEIR attempts to show that the increase in total transportation energy consumed due to increased ferry use is negligible by aggregating all transportation energy and comparing the impacts of alternative levels of ferry service. This tends to conceal the actual energy consumed. Fortunately Table ENRG-A-1, in the appendix, partially clarifies this issue. This table shows the energy consumed per passenger mile, (Btu/PMT) for all transportation modes except ferries. This is a useful number for those entrusted to make transportation decisions. However, there is sufficient information to calculate Btu/PMT for ferries, by combining data from the appendix with data from section 3.13.2.3. The results of this calculation are shown below:

Alt No.	Energy Mbtu/day w/ferries	Energy Mbtu/day wo/ferries	Energy Mbtu/day ferries	PMT/Day ferries	Btu/pmt ferries
	A	B	C	D	E
1	1,215,814	1,202,079	13,736	659,178	20,838
2	1,212,888	1,202,357	10,531	630,431	16,705
3	1,207,165	1,203,393	3,772	307,296	12,274
4	1,204,174	1,203,428	746	249,150	2,993

A is from the EIR page 3.13-4
B is from the EIR appendix, Table **ENRG-A-1**
C = A - B
D is from the EIR appendix, Table ENRG-A-3
E = C / D

1

Environmental Equity: Page 3.7-11 should be corrected to show the income of riders. The DEIR shows the distribution of income for census tracts near proposed ferry terminal sites. The discussion in 3.12 Transportation indicates that many ferry riders will drive from areas which may have higher incomes than the area surrounding some ferry terminals. Ferry fares are generally much higher than other alternative transit fares and the income of riders will also be higher. The IOP includes income information as part of ridership prediction and this

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information should be shown in DEIR. This section should include information showing how low income is defined ie percentage of median income. The EIR should show the percentage of riders: below 80% of median; between 120% of median and above 120% of median income. Environmental equity was a major consideration of the agreement for San Francisco Muni transit improvements agreed to by the SF MTA and recent litigants. 2

Alternative Analysis:

Table 3.12-3 should be corrected to show how BART can handle all of the projected ferry ridership with only minor changes. The DEIR shows that BART's peak hour capacity is limited by the safety limitation of the TransBay tube to 30 trains per hour. This is true based on current technology and vehicles; however BART is beginning to plan for an automatic train control system which will safely allow closer spacing of trains. In addition as BART expands additional vehicles will be required. Efficient use of the BART investment will demand the use of three and four door cars to reduce station services times consistent with the capacity of automatic train control. When BART runs just a few trains, with three or more doors per car, per hour the capacity of the tube will increase. Increasing service by only one train per hour increases BART's peak hour capacity by more than the increase in daily ferry ridership projected in 2025 for Alternative 2. Since this DEIR is dependent on some technology improvements for the achievement of air quality improvements in it appropriate to discuss higher BART capacity with some minor changes. 3

Because annualized capital costs are such a major part of transit cost comparisons this information should be included with all necessary details. IOP figure 7 indicates note (1) relative to Annualized Capital Cost but (1) is not included. The DEIR and the IOP should be corrected to show the comparison required for ferries versus other transit modes. In recent years MTC has published tables showing: operating costs; user fares; daily ridership and total annual subsidy from all sources. This is also important information to select alternatives considering cost and it also has impacts on environmental equity and should be included in the DEIR 4

The DEIR should be corrected to discuss congestion reduction produced by congestion management techniques. In 1993 congestion pricing was studied, for the Bay Bridge, by a Task Force including members of the: MTC; BAAQMD; FHA; Caltrans; BAC; Bay Area Economic Forum; Santa Clara Valley Manufacturing Group; EDF; Sierra Club and Union of Concerned Scientists. The Task Force found that a $2 increase in tolls during peak hours, at that time, would decrease delays from 40 to 47% while decreasing traffic during the three hour peak commute time by 6 to 7%. This is a solution to the perceived congestion problem, similar in capacity to increased ferry service, that can be accomplished with no capital cost which will provide increased toll revenue which can be used to provide even more transit. The IOP mentions Golden Gate Bridge District's use of higher tolls for this purpose but does not mention that congestion pricing is utilized in many other crossings throughout the nation, including tunnels in New York and highways in Southern California. 5

Very truly yours,

Howard Strassner

Howard Strassner, Chair Transportation Committee
419 Vicente, San Francisco CA 94116, 661-8786, (h,w,fx) email: ruthow@juno.com

EIR 194

Date: October 30, 2002
W.I.: 1111
Referred by: POC

ABSTRACT

Resolution No. 3514

This resolution transmits MTC's comments on the San Francisco Bay Area Water Transit Authority's Draft Implementation and Operations Plan to the Water Transit Authority, as required by State Legislation (AB 428, Perata).

The comments are contained in the MTC Executive Director's report to the Planning and Operations Committee dated November 8, 2002.

Date: October 30, 2002
W.I.: 1111
Referred by: POC

RE: Comments on San Francisco Bay Area Water Transit Authority's Draft Implementation and Operations Plan

METROPOLITAN TRANSPORTATION COMMISSION
RESOLUTION NO. 3514

WHEREAS, the Metropolitan Transportation Commission (MTC) is the regional transportation agency for the nine-county San Francisco Bay Area pursuant to Government Code Section 66500, et seq; and

WHEREAS, the State Legislature created the San Francisco Bay Area Water Transit Authority (SB 428, Perata) in 1999; and

WHEREAS, the Water Transit Authority shall prepare and adopt an Implementation and Operations Plan that includes all appropriate landside, vessel and support elements for expanded water transit service on the San Francisco Bay; and

WHEREAS, the bill requires MTC cooperate with the Water Transit Authority by providing certain data, developing travel forecasting models, collaborating on the development of feeder system proposals, and identifying steps for coordination with other aspects of the Bay Area's transportation system; and

WHEREAS, the Commission shall submit the Implementation and Operations Plan to MTC for review not later than 90 days prior to the date the plan is submitted to the Legislature; and

WHEREAS, MTC shall prepare and transmit comments on the Plan to the Water Transit Authority not later than 90 days after the date the Plan was submitted to MTC; and

WHEREA, the Water Transit Authority submitted their Plan to MTC on September 13, 2002: and

WHEREAS, MTC has reviewed the Plan and has prepared written comments shown in Attachment A; now therefore, be it

RESOLVED that the Commission approves the comments in Attachment A; and be it further

RESOLVED that the Commission directs its Executive Director to transmit the comments to the Water Transit Authority.

METROPOLITAN TRANSPORTATION COMMISSION

_____

Sharon J. Brown, Chair

The above resolution was adopted by the
Metropolitan Transportation Commission
at a regular meeting of the Commission held
in Oakland, California, on November 20, 2002.

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
Tel: 510.464.7700
TDD/TTY: 510.464.7769
Fax: 510.464.7848

Memorandum

TO: Planning and Operations Committee DATE: November 8, 2002

FR: Executive Director W.I.:

RE: Review of Water Transit Authority's Implementation and Operations Plan

The Water Transit Authority (WTA) was created by legislation SB 428 (Perata) in 1999 with the following key provisions:

> *"The Authority shall operate a comprehensive San Francisco Bay regional public water-transit system, that includes water-transit terminals, feeder buses and any other transport and facilities supportive of the system."*
>
> *The Authority shall prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan. The plan shall include all appropriate landside, vessel, and support elements, operational and performance standards, and policies.*
>
> *"The Authority may not operate water transit services that are scheduled at the same time, from the same origin, and to the same destination as publicly sponsored services, if those public services were in operation as of June 30, 1999."*

The Draft Implementation and Operating Plan (Plan) was developed over a 2 year period with extensive input from around the region. The WTA has been holding public hearings around the region both on the Plan and the program Environmental Impact Report. MTC has participated on the WTA's Technical Advisory Committee and has had a number of consultation meetings with the staff of the WTA as the Plan was being prepared.

Under SB 428, MTC must review the Plan and submit comments to the Authority within 90 days of receiving the Plan. The WTA presented the Plan at the September 13 Planning and Operations Committee.

Concurrent with our evaluation, the WTA has proposed specific routes for consideration under Senator Perata's proposed bridge toll increase. MTC is assisting with this evaluation which will determine projects eligible to receive funds from a possible increase in bridge tolls to $3, assuming approval by the Legislature. Generally, this report defers to that parallel evaluation process for determining the initial set of candidate terminals and routes which will be implemented if the increase is approved.

The Plan includes the following major elements:

- The rationale for expanded ferries
- Ridership projections and most promising routes
- Possible locations for new terminals
- Capital costs (vessels and terminals) and operating and maintenance costs
- Specifications for new boats in terms of size, performance, and emissions
- Potential funding sources
- Emergency response capabilities
- Other-Safety Plan and discussion of Water Transit Oriented Development

Generally the Authority envisions an incremental growth in service depending on funding opportunities, speed with which new terminals can be analyzed, designed, and approved, and market factors.

Our evaluation focuses on the following topics:

- Reasonableness of ridership forecasts
- Reasonableness of cost estimates
- Impact on other transit operators
- Role of the WTA in disaster response
- Financial issues
- Institutional considerations
- Water Transit Oriented Development

1

Plan Overview

The WTA Ferry Plan cites the need to relieve congestion in the bridge corridors and improve air quality as the two main driving factors for expanding water transit service. The Plan suggests that ferries, along with other transbay improvements, will be needed to serve the 40% increase in travel projected in MTC's recent Bay Crossings Study. Ridership on existing and new ferry routes could increase from about 4,000,000 annual users today to some 12 million riders in 2025 (excluding recreational routes). The number of ferry vessels would increase from 13 today to as many as 44 in 2025. Advances in marine engine emission controls will allow new diesel powered vessels to be significantly less polluting than today's ferries with far less emissions of Nitrogen Oxides (NOx) and particulates. Other environmental issues, such as dredging impacts and wake impacts, have been evaluated in considerable detail in the companion Environmental Impact Report. The EIR evaluates three major alternatives: expansion of existing service, moderate expansion of new service, and a comprehensive system. Like MTC's EIR for the Regional Transportation Plan, it is a program level evaluation, with specific terminal sites to be analyzed further in subsequent site-specific environmental documents.

Ridership Forecasts

We believe the WTA has used reasonable assumptions and methodologies to produce their 25 year forecast of ferry ridership by route. The travel forecast models are the most comprehensive tools yet developed to estimate ferry ridership. Implicit in the forecasts is the recognition that riders of ferries often choose to use these services for reasons other than simply time and cost. Specifically, a unique travel forecast model was employed, building off of MTC's travel model, that equates the propensity to use ferries with a number of individual factors including the importance to the ferry rider of reliability of service, the overall "travel experience", adversity to

2

stress, desire for personal space, concern for the environment, etc. These passenger market characteristics were developed from a survey of existing ferry users and non users.

In addition, the Plan has significantly improved on previous analyses by using realistic headways and fares. The forecasting work included a sensitivity analysis addressing the impact of ferry headways, parking charges and bridge toll levels on ridership. 3

Proposed Routes

Recommended routes are the result of a critical screening process that has pared down the size of the system from some of the initial proposals. By and large this process has been open and well articulated to the public and policy makers.

> "*Potential routes were studied with the understanding that water transit which only benefits a small segment of Bay Area residents would be a poor use of scarce transportation dollars. Additionally routes with small ridership would not only fall short of the mandate to improve Bay Area mobility, but would not remove enough vehicles from the road to improve air quality*" (Implementation and Operations Plan, pg. 11)

Service frequencies would vary depending on the route, but generally assume either 30 to 60 minutes in the peak period and generally half as frequent in the off peak. Given these frequencies and other assumptions, the WTA predicts the following ridership in 2025 by type of route (see Table 1):

New routes: 14, 822 riders a day

Expanded service on existing routes: 26,318 riders a day--of which around 4,340 riders a day would be due to augmented service that could be provided by the WTA

Routes for future study: 5,070 riders a day--not including airport or GGNRA service

Table 1
WTA Routes and Riders
(Daily riders)

	2025 Ridership	
New Service	**Forecast**	**Due to WTA**
San Francisco – Treasure Island	3,587	All
Albany/Berkeley to SF	2,776	
So. SF – San Francisco	2,187	
Richmond – San Francisco	1,854	
Redwood City – San Francisco	1,477	
Antioch/Pittsburg/Martinez – SF	2,038	
Hercules/Rodeo – San Francisco	903	
Sub Total	14,822	
Existing – Augment Service	**Forecast**	**Due to WTA**
Larkspur – San Francisco	7,820	
Sausalito – San Francisco	5,329	
Vallejo – San Francisco	4,220	
Tiburon – San Francisco	2,823	
Oakland – San Francisco	2,540	
Alameda – San Francisco	2,135	
Harbor Bay – San Francisco	1,451	
Sub Total	26,318	4,340*
Routes for Further Study	**Forecast**	**Due to WTA**
Oakland – Treasure Island	539	All
Berkeley – Treasure Island	477	
Benicia-San Francisco	223	
Port Sonoma – San Francisco	1,392	
San Leandro – San Francisco	1,378	
Moffett Field – San Francisco	529	
Harbor Bay – So. San Francisco	465	
Harbor Bay–Redwood City	98	
Harbor Bay-Moffett Field	54	
SubTotal	5,070	
Grand Total	46,295	

* Number is approximate, since WTA projections for new and expanded routes includes a $2 parking charge which is not assumed in the projections for existing ferry routes.

Under the basecase analysis, existing ferries are projected by WTA to carry about 22,000 daily riders in 2025, or about double today's levels. Under WTA's most comprehensive set of routes,

ridership would double again to 46,295 daily users in 2025. Thus the Plan, in its most expansive form, would produce around 24,000 additional riders in 2025. For comparison purposes, Caltrain currently carries about 28,000 riders a day, and some of Muni's most heavily used bus routes carry between 25,000 and 50,000 riders a day. The Plan does not include forecasts for 2010, but the WTA estimates the ridership would be about 80% of the 2025 ridership forecasts.

Table 2 compares single occupant auto, HOV, and transit times for various routes proposed in the WTA Plan. Generally the ferries offer a significant improvement over drive alone times to San Francisco. Transit travel times show more variation, depending on the specific route. On the Peninsula travel times for Caltrain appear to be somewhat faster from South San Francisco and Redwood City to downtown San Francisco.

Table 2
Transit and highway travel times to Downtown San Francisco
(Minutes)

Ferry Route to SF:	Ferry Run Time	Drive Alone Time	BART/Caltrain Run Time
Benicia/Martinez	53	119	45 (North Concord)
Antioch/Pittsburg	85	132	52 (Bay Point)
Hercules/Rodeo	42	92	32 (El Cerrito del Norte)
Richmond	29	71	35
Berkeley	22	61	22
South San Francisco	31	25	15
Redwood City	47	56	40-52
Harbor Bay	23	68	19 (Coliseum)

Note: Transit travel times exclude waiting time, walking time, driving time to transit, and travel time on other transit modes (e.g., Muni Metro). These times are probably on the order of an added 15-20 minutes on top of the transit travel times above for BART and Caltrain. Access times may be somewhat less for ferries, due to the closer proximity of potential ferry riders to the terminals. Drive alone times exclude only walking time (time from parking lot to office in downtown San Francisco). [Ferry run times are from BAWTA Working Paper "Ridership Model Forecasts," Table 2. Drive alone times are from MTC year 2025 RTP forecasts. BART/Caltrain run times are from schedules.]

Regional transportation effects. Like many other transportation investments that are incremental in nature, the proposed ferry system would have a relatively small impact on daily regional travel (VMT), about a .001% reduction in 2025. The largest impact on traffic would be expected in the bridge corridors. Table 3 shows that ferry riders would come from both former auto users and former transit users--about 53% of the ferry riders would come from autos and 47 % from non-ferry transit services. The most significant diversions would be from BART in the Bay Bridge corridor and from the Vallejo ferry in the Carquinez/Benicia Bridge corridor if the Benicia route, which is not in the proposed near term Plan, were to be implemented after a future study.

Recommendations:

- The WTA should develop10 year route forecasts to better guide near planning and route selection 4
- The manner in which the travel forecasts were prepared makes it difficult to determine the impact of the Benicia to San Francisco route (proposed for future study) on the existing Vallejo service. Any subsequent analysis should clarify the impact. 5

Table 3
Source of New Ferry Riders by Bridge Corridor
(Daily Person Trips)

Bridge Screenline		2025 No Project	2025 WTA	Difference from No Project	Percentage Change
Bay Bridge	BART	262,671	256,073	-6,598	-0.9%
	AC Transit	3,812	3,682	-130	0.0%
	Ferry Transit	3,058	15,053	11,995	1.7%
	Highway	451,521	446,168	-5,353	-0.7%
	Subtotal	**721,062**	**720,976**	**-86**	**0/0%**
Golden Gate	Golden Gate Transit	14,055	13,471	-584	-0.3%
	Ferry Transit	14,247	17,364	3,117	1.6%
	Highway	168,637	166,307	-2,331	-1.2%
	Subtotal	**196,939**	**197,142**	**202**	**0.1%**
SF/San Mateo County Line	Caltrain, BART and Samtrans	99,129	98,099	-1,030	-0.2%
	Ferry Transit	0	2,006	2006	0.4%
	Highway	380,252	377,223	-3,029	-0.6%
	Subtotal	**479,381**	**477,328**	**-2,053**	**-0.4%**
San Mateo Bridge	Ferry Transit	0	617	617	0.0%
	Highway	161,611	161,271	-340	-0.2%
	Subtotal	**161,611**	**161,888**	**277**	**0.2%**
Dumbarton Bridge	Highway	161,796	161,765	-30	0.0%
Richmond-San Rafael Bridge	Highway	90,986	91,103	117	0.1%
Carquinez/Benicia Bridges	Ferry Transit	5,933	4,319	-1,614	-0.9%
	Highway	176,634	176,471	-163	-0.1%
	Subtotal	**182,567**	**180,790**	**-1,777**	**-1.0%**
TOTAL		**1,994,342**	**1,990,375**	**-3,967**	**-0.2%**

Source: WTA

Cost Estimates

WTA projects a total system cost of $642 million over 10 years, including $396 million in capital and $246 million in operating subsidies. For the capital expenditures, new vessels and feeder buses would cost $230 million (58%) and new terminals would require $166 million (42%) in year 2002 dollars. Operating costs would be divided approximately 75% for ferries and terminal operations and 25% for transit feeder service.

The cost estimates appear reasonable given the conceptual nature of the Plan. The estimates were compared to other sources developed in the past, including MTC's *Transportation Blueprint for the 21st Century* evaluation (2000) that included a number of ferry proposals. While the cost of new vessels is more certain, the final costs of new terminals will be influenced by a large array of local factors. Land acquisition costs have not been factored in at this time. Seismic design requirements and environmental mitigation will need to be considered on a site-specific basis. For this study the conceptual cost of $10 million for new terminal facilities, including contingency and project development costs, seems appropriate. Since the costs are in today's dollars, actual costs will be influenced by inflation and other factors between today and the year of construction. 6

By 2015 total operating costs will equal $74 million per year and include administrative costs. Fare revenues will cover about 60% of the costs (current ferry routes cover 35% to 72% from fares). Fare revenues assume that some additional ridership growth will occur beyond the baseline due to higher bridge tolls in the future and parking charges on some of BART's spaces.

Table 4 shows the estimated 10 year costs for new routes and expansion of service on existing routes. The WTA has provided the costs of expanding existing services as an indication and reminder that these services will also need to be enhanced and improved in the future to attract new riders. Expanded service on existing routes could only be implemented with the concurrence of the existing service providers.

Table 4
WTA Plan Cost Summary
(Millions of 2002 dollars)

Cost Item	New Ferry Service	Expanded Existing Ferry Service
Ferries		
Capital-Terminals	112	54
Capital-Vessels	154	66
O&M	116	44
Subtotal	382	164
Feeder System		
Capital-buses	3	7
O&M buses	37	49
Subtotal	40	56
Grand Total	422	220

A general comparison between the costs of new and expanded service suggests that the limited investment in new routes proposed in the WTA plan would be a cost effective approach, at least for the initial 10 year period.

Service	% Riders in 2025	% Capital Costs	% Annual Operating Cost
• New	77%	68%	62%
• Expand Existing	23%	32%	38%

Cost effectiveness. The WTA's enabling legislation requires that the cost effectiveness of ferries be compared to that of other modes. The WTA compared the cost effectiveness of ten (10) of their proposed services with other transit options, such as express buses, BART, or Caltrain. In five (5) of these cases the cost effectiveness of the alternative transit mode was equal to or better, and in five (5) cases it was worse than the ferry. While the WTA uses a different methodology than MTC used in the past to calculate cost effectiveness (MTC estimates were based on cost per new transit rider which accounts for shifts between transit modes, whereas WTA uses cost per new ferry or alternative transit boarding), the comparative results are still reasonable. Overall, the WTA study concludes that in most markets the combination of ferries and another transit mode reduce traffic to a greater degree than either investment would on its own. The WTA also suggests that the cost effectiveness can be improved for some of the proposed routes by more fine tuning of the ferry service frequency and schedules.

Recommendations:

- Capital cost estimates should be revised to include terminal land acquisition and environmental mitigation costs once specific terminal locations are identified. 7
- Ferry system operating costs should include an allowance for dredging where new terminals will require periodic maintenance of channels. 8

Impact on Other Operators

As a new transit operator in the Bay Area, WTA could affect the operations of other transit systems and services in several ways as discussed below.

Transit coordination agreements. Under MTC's Transit Coordination Plan (SB 1474) WTA will need to execute coordination agreements with other operators for connections and transfer agreements. 9

Use of TransLink® The WTA has already recommended that new ferry services would incorporate TransLink® into their fare collection system.

Impact on ridership base for other operators. Where the WTA is proposing new service in close proximity to an existing service, there should be a focused analysis to determine whether the market is most cost effectively served by adding new service or increasing the frequency of the existing service. This would be the situation with the existing Vallejo service and the Benicia to San Francisco route, a possible future study route. 10

Feeder and shuttle bus access. Feeder service should, to the extent possible, provide for timed transfers between ferries and buses. The WTA Plan also recognizes that shuttles to major employment sites near ferry terminals would be an effective way for serving the connecting ferry rider, and efforts to work with employers to initiate such shuttles would be strongly encouraged. The WTA Plan also notes that in some instances, the WTA may operate its own feeder services. 11

San Francisco Ferry Terminal. The San Francisco Ferry Terminal will serve as the hub of the WTA's proposed system. Due to the large number of vessels that could conceivably be serving the San Francisco Ferry Terminal in the future, the staging of new ferry service to match berthing capacity would be critical. According to the WTA Plan, the San Francisco Terminal could see five times greater operations than are occurring today. Even with additional berths, there could be congestion in and around the Ferry Building as vessels maneuver to enter and leave the docks. One option would be to consider additional berthing locations along the San Francisco waterfront to better disperse vessel traffic. 12

Interoperability among ferries. The WTA is considering using bow loading for new vessels, whereas existing ferries on the Bay use side loading. Additionally some existing ferry vessels with low freeboard (e.g., Red and While ferries) cannot use some of the existing berths at the San Francisco Ferry Terminal. The WTA has agreed to incorporate the loading/unloading requirements for all existing vessels into any new floating docks they develop.

Maintenance. The Plan identifies the need for new maintenance facilities to work on ferries and berth spare vessels, but defers any further details on possible locations for a facility and arrangements with other operators to a subsequent study.

Recommendations

- WTA should work with MTC on incorporating TransLink® as part of their fare system 13
- WTA should work with other ferry operators in the location and design of a future maintenance facility to determine if there are efficiencies and economies of scale that can be achieved for all operators. 14
- WTA should continue to collaborate with MTC on the future refinement of feeder system proposals. 15

Role of Ferries in a Disaster or Transit Strike by Another Operator

As the WTA Plan points out, earthquakes and transit emergencies have in the past required that ferries step into the breach to provide traveler options in these situations. While all the bridges are being seismically strengthened to withstand another major earthquake, road closures on the approaches and nearby facilities could potentially create bottlenecks getting to and from the bridges. Intermittent labor strikes by transbay bus and rail operators have created hardships in the past as well. The advantage of having an additional contingent of WTA ferries available in the Bay Area, as opposed to having to find boats in other locations (as was done in the 1989 Loma Prieta earthquake when boats were brought down from the State of Washington) is that the response can be prompt instead of postponed. Additionally, the WTA proposes to acquire spare vessels which could be of great value in boosting the regional emergency response capability.

The WTA Plan would also improve the regional emergency response capability through new docks that can handle all types of ferries operating on the Bay (see Interoperability discussion above).

Recommendations:

- The WTA should continue to participate in the Trans Response Plan Committee whose membership includes participation from Caltrans, State Office of Emergency Services (OES), airports, and major transit operators to prepare for a future emergency. 16
- In planning new terminals, the design will likely take into account features to reduce seismic risk. The planning and design phase should also look off site and assess whether the landside links (roads, bridges, paths) can also withstand an earthquake to enable the terminal to continue to function. 17

Institutional

There are currently five different ferry operators on the Bay: Golden Gate, Vallejo, Oakland/Alameda, Harbor Bay Isle, and Tiburon (private). As with the larger mix of Bay Area transit operators, the question arises as to whether there could be benefits in the consolidation of some operators/services. In the East Bay there is a question about whether the WTA could be the long term provider of services such as the Oakland and Alameda routes in addition to the various proposed new routes emanating from Richmond and Berkeley/Albany to San Francisco.

For other ferry operators, long term consolidation does not offer the same benefits, primarily because these operators have already established a close nexus between their other transit operations and their ferry operations. While the WTA suggests it could augment service on existing routes to support additional ridership growth, these agreements would simply remain an option for existing ferry operators if they determine at some point there would be advantages to such an arrangement.

On the other hand, the WTA organization and capabilities may eventually evolve to a point where they could take on an expanded function and lead role in a number of water transit-related areas. These functions might be perceived by existing ferry operators as having some benefit. In particular, the WTA could provide a broader regional coordination function for a variety of water-related programs, such as:

- Consolidation of purchases and maintenance functions
- Planning, design, and permitting for new terminals or expansion of existing terminals
- Acquisition of new vessels
- Disaster planning
- Applications of new environmental technologies through retrofits
- Environmental monitoring
- Research and development
- Marketing

If expanded service is desirable on existing routes, operating agreements would be developed with the current service providers.

Recommendations:

- The WTA should continue to consult with local ferry operators and MTC about areas in which the WTA could perform functions that would lead to cost savings for existing operators. 18
- The status of the Oakland/Alameda ferries (where the current contractor has filed with the state PUC to discontinue service) should be monitored vis a vis a future WTA role. 19

Financial

The WTA legislation states that the WTA will need to develop new funding sources other than those in existence as of June 30, 1999. This basically means new bridge tolls, local sales taxes and other local funds, and new federal discretionary funds. The current funding strategy is to obtain funds from the proposed increase in bridge tolls to $3. The proposed Solano County transportation sales tax measure in November 2002 provides additional funding for the existing Vallejo ferry service. The WTA also seeks to create a permanent Bay Area earmark in the federal ferry boat discretionary program in TEA 21 reauthorization next year. Other local sales tax measures that may provide funding opportunities include: Marin/Sonoma, San Francisco, San Mateo, and Contra Costa counties. New terminals are expected to be largely locally funded.

With respect to operating funds, bridge toll revenues are relatively flat and do not increase annually with inflation. Instead, these funds are constrained by the capacity of the bridge and the number of toll paying vehicles using the bridges or the decision by the legislature or voters to increase the toll. Given that operating costs will increase based on labor contracts and cost escalation, the WTA needs to address how it will sustain a given service level over time if it is dependent primarily on bridge tolls for operating subsidy. Like other transit operators in the Bay Area, the WTA also will need to build in periodic fare adjustments into its financial planning. 20

An underlying funding concern is whether the WTA will, over time, redirect new funds its way that may otherwise have gone to some of the existing ferry operators. As the WTA seeks to

expand further, competition for transit funding in the Bay Area could increase. The WTA might compete with other ferry and transit operators for future federal (STP/CMAQ) and state (STIP) funds that would be programmed by MTC. The WTA would be eligible for replacement and rehabilitation capital needs under FTA Section 5307 and, after 7 years of operation, for FTA Section 5309 fixed guide way funds. However, it is unlikely any significant facility or vessel replacement needs would arise before 25 years, since the terminals and vessels would be new.

Over time it will be necessary to ensure some funding parity for all operators. Clearly the negotiations on the current proposed bridge toll increase is one situation where the WTA is seeking substantial amounts of capital and operating funds; however, it is expected that the existing ferries will also benefit if the legislation is successful.

Recommendations:

- The current WTA proposal for possible new bridge toll funds does not include any funding for feeder systems. Because of the importance of intermodal connections, the WTA's future financial plans should seek to identify local funding opportunities for these services. 21
- The long term financial planning conducted by the WTA should take facility and vessel replacement needs into consideration. 22
- The WTA financial planning should recognize the potential for cost escalation in scaling the initial services to ensure they can be maintained over time. 23

Water Transit Oriented Development

The Plan also notes the significant opportunities along the waterfront of a number of communities to integrate new ferry service with mixed-use development near the terminals. This approach would be consistent with MTC's interests in the Bay Area's Smart Growth initiative and in enhancing the performance of new transit investments in the Bay Area. New development near ferry terminals will also improve access to the ferries, as more people will be able to walk and use bikes to and from the ferry service.

Other-Comments on Report

In reviewing the WTA's Draft Implementation and Operations Plan, MTC has transmitted separate comments on several figures, which require clarification in the way they present information developed recently in MTC's Bay Crossings Study.

Staff requests that the Committee forward these findings and recommendations on the WTA plan to the full Commission for approval. As noted at the onset of this memo, we will provide the Commission a separate report at a later date on the evaluation of individual ferry routes proposed by the WTA for funding in the $3 bridge toll legislation.

Steve Heminger

Steve Castleberry

EIR 195

From: Erik Schmidt [erik.schmidt@noaa.gov]
Sent: Tuesday, August 13, 2002 12:13 PM
To: castleberry@watertransit.org
Subject: DEIR tech. studies comments

Steve,

Thanks for the opportunity to comment on the WTA Draft EIR technical studies. Following are comments from NOAA Fisheries:

1. Section 2: Listed species in SF Bay do not include Sacramento River fall/late fall run chinook salmon, which are a candidate species only (and do not receive listed species protection). Listed species include:

Sacramento River winter-run chinook salmon (Oncorhynchus tshawytscha), Endangered (January 4, 1994, 59 FR 440).

Central Valley spring-run chinook salmon (Oncorhynchus tshawytscha), Threatened (September 16, 1999, 64 FR 50394)

Central California Coast coho salmon (Oncorhynchus kisutch), Threatened (October 31, 1996, 64 FR 56138).

Central California Coast steelhead (Oncorhynchus mykiss), Threatened (August 18, 1997, 62 FR 43937).

Central Valley steelhead (Oncorhynchus mykiss), Threatened (March 19, 1998, 63 FR 13347). 1

2. Section 3, Impact B-9. Effects of underwater sound pressure levels (SPLs) have not been adequately stated and analyzed. Research does not support avoidance behavior from high SPLs by salmonids and other fish, and an analysis of potential SPL impacts to listed salmonids, similar to the analysis under Impact B-13 for marine mammals, should be included in this section. 2

3. Table 2-4 should be changed to reflect the accurate listed salmonid species noted above (add Central Valley steelhead). 3

Please feel free to call me if you have any questions about these comments.

Erik Schmidt

Silicon Valley Bicycle Coalition

Promoting the bicycle for everyday use

EIR 196

P.O. Box 831, Cupertino, CA 95015-0831
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SVBC is a 501(c)(3) non profit organization

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Jim Stallman
Saratoga

November 9, 2002
Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

To whom it may concern:

The Silicon Valley Bicycle Coalition represents the commuter and recreational cyclists of Santa Clara County. We are excited that a Draft Operations Plan is being reviewed to improve ferry service in the San Francisco Bay as we recognize the importance of multi-modal services to bicycle riders. In Section 3.12 (Transportation) of the Environmental Impact Report Impact T-1 is cited as follows:

"New and existing ferry terminals would require access by car or transit."

Other language within this section seems to indicate that bicycle access and accommodations would not be included in new ferry terminals and terminal upgrades. Bicycles provide an excellent way to get to and from transit hubs and should be accommodated at any new or renovated terminals within the Draft Operations Plan as well as on the ferries themselves. There should also be secure bicycle parking facilities at the terminals. 1

I would direct you to study the Bikes on Caltrain program that has been extremely successful on the Peninsula and carries hundreds of bicycles per day. VTA in the South Bay has equipped every bus and Lightrail trolley in their fleet with bicycle racks. We are certain you would find similar examples throughout the Bay Area. 2

Thank you,

Greg McPheeters
Executive Director



Red and White Fleet

SINCE 1892 – THE SAN FRANCISCO SIGHTSEEING TRADITION

EIR 197

November 15, 2002

Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Comments on WTA's Implementation and Operation Plan

The Red and White Fleet would like to commend the Water Transit Authority on its extensive efforts in producing a very thorough IOP for expanded ferry service on San Francisco Bay. We recognize and applaud the inclusiveness of your development process and the document clearly represents the best input of numerous interests.

Before the IOP is actualized, we would like the opportunity to express our concerns regarding a number of issues that we believe may impact the passenger fleet on the bay as a whole.

1. Operation: Under "Operating Phase" on page 58, the plan states that the WTA will negotiate with existing public operators for increases in frequency of existing routes. No mention is made of private ferry operators and how they might be incorporated into the larger WTA plan. It also mentions that the Vessel Operations division of WTA will have the responsibility of compliance with regulatory requirements and safe vessel operations; are we to assume this refers only to the operation of the WTA's own fleet of vessels or that WTA will have the authority to enforce regulations and implementation its own safety standards on other operators? 1 2

2. Emissions: Under "Marine Engineering and Maintenance" on page 58, the plan indicates that the WTA will monitor emissions on the new fleet. What considerations will be made for emissions of the existing fleet? 3

   As the WTA seeks to meet its own stringent emissions parameters, we believe it should constantly evaluate the cost/benefit ratio as certain emissions savings margins can be met very economically with conventional solutions (e.g. electronically controlled fuel injection) and that savings beyond those margins tend to become exponentially more expensive. It may be more cost effective and practical, given the limitations of naval architecture, to address vessel emissions by offsetting them with shoreside engine conversions. 4

Red and White Fleet
Fisherman's Wharf Pier 43 1/2
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www.redandwhite.com

Red and White Fleet

SINCE 1892 – THE SAN FRANCISCO SIGHTSEEING TRADITION

3. Vessel Safety: While we appreciate the WTA's efforts to construct the safest vessels practical, we believe its intended compliance with the IMO High Speed Craft Code would not necessarily accomplish this goal. The High Speed Craft Code applies to vessels operating in open water conditions and so mandates certain design and equipment requirements that would likely be superfluous on San Francisco Bay. We strongly encourage the WTA to work with the passenger fleet (possibly the Passenger Vessel Association) and boat building industries in its design specifications to develop the most relevant measures to incorporate especially if it chooses to exceed the building regulations as defined in Title 46 of the Code of Federal Regulations. 5 6

4. Operations: We would like to convey our concern over the prospect of "positive control" of vessel traffic as mentioned in the Safety Plan. We believe that a cooperative effort to address vessel traffic communications and collision hazards among Vessel Traffic Service, Vessel Operators and appropriate regulators would produce a safer solution. 7

5. WTA Integration into Current Transit Organizations: We don't believe that the IOP, as it stands, fully clarifies how the WTA will integrate with existing operators, particularly vessel operators. As Captain David Clark of the Golden Gate Bride and Highway Transportation District expressed in his letter to the WTA, existing operators have a number of concerns regarding the impact the WTA's safety, operating, and environmental policies will have on them. As the WTA moves forward, we hope it will make an effort to further consider and clarify how it will accomplish its mission while allowing new and existing private and public vessels operators to continue to be a part of the water transportation system. 8

Joe Burgard
Director of Operations
Red and White Fleet

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Peter Zadis
1580 Geary Road
Walnut Creek, CA
94596

11/10/02

EIR 198

Tom Berthen, CEO
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Berthen

More gray whales than ever are entering San Francisco Bay. The collision of a gray whale with one of your new Fast Ferries would be a tragedy.

I urge you to help protect California gray whales from collisions with fast ferries by requiring whale observers on new vessels in your San Francisco Bay ferry expansion plan. Trained paid whale observers would be posted on the fast ferries when whales are present in the Bay. In addition to watching for whales and preventing collisions, the whale observer could educate crew and passengers about gray whales and marine life in the Bay.

We humans can co-exist with wildlife and wild nature, we must respect all God's creatures and learn to live in harmony with nature.

1

Sincerely, P Zadis

Nov 18 02 12:01a Jim Harberson 707-769-0842 p.2

EIR 199

Comments on IOP and EIR

Port Sonoma is the only site in the North Bay that is adjacent to a railroad line. The existing NWPRR mainline track runs directly through the site and offers the opportunity of a seamless mass transit system for the North Bay. Since there has never been and will not ever be a direct rail connection from Sonoma County to the population and employment centers of San Francisco and the East Bay this rail/ferry connection at Port Sonoma is our only possibility for this seamless mass transit connection. Availability of this system will provide a dramatic reduction in automobile use and air pollution. 1

Since Port Sonoma is located at the mouth of the Petaluma River, dredging will be less of a effort and cause less environmental impact. The channel across the San Pablo flats is routinely dredged by the US Corps of Engineers and the environmental effects are already documented and mitigated. 2

Any charges of growth inducement on nearby property are without foundation. 3
Approximately 1000 acres of adjacent land bordering Port Sonoma are either owned by governmental agencies or are encumbered by easements which prohibit growth. No other site has this protection. Indeed Port Sonoma alone offers the possibility to not only enhance existing wetlands but actually increase the amount of wetlands. Several hundred acres adjacent to Port Sonoma can be converted to wetlands which will increase the inventory of this vital wildlife habitat and provide a positive effect on the environment. Properly designed ferry terminals are compatible with wetlands. Muzzi Marsh in Larkspur has coexisted with the Golden Gate Larkspur Ferry terminal for many years. Indeed it has been improved and expanded by GGT as a condition of operation. 4

New high speed ferry designs have much smaller wakes which, when combined with the Port Sonoma location at the mouth of the Petaluma River, will have a much reduced impact on the shore. 5

I'm not sure that the IOP has examined the possibility of tourist service of a train/ferry connection at Port Sonoma. The nearby Napa Wine Train has been a financial success and it has no connection to the large tourist center of San Francisco. A similar tourist train in Sonoma County which begins at Port Sonoma could be even more of a success. Replacing automobile tourist traffic with a ferry/rail operation reduce congestion and air pollution. 6

The projections of ridership to Port Sonoma are encouraging but probably low because the North Bay has no history of ferry service and therefore no basis for . As is well known, the ridership of the Vallejo ferry service increased dramatically over projections as the service was appreciated by commuters. I believe that an even larger increase in the North Bay is likely because of the availability of a rail connection at Port Sonoma. 7

Dorothy W. Dugger
Deputy General Manager
Bay Area Rapid Transit District
800 Madison Street/P.O. Box 12688
Oakland, CA 94604-2688
510-464-6090
FAX: 510-464-6009

facsimile transmittal

EIR 176

To: Tom Bertken Fax: 415-291-3388

From: Tom Margro Date: 10-31-02

Re: Pages: 3

CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Notes:

BART
30 YEARS OF SERVICE YEARS OF PRIDE

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
800 Madison Street - Lake Merritt Station
P.O. Box 12688
Oakland, CA 94604-2688
Telephone (510) 464-6000

October 31, 2002

Thomas G. Bertken
Chief Executive Officer
Water Transit Authority (WTA)
IOP Comments
120 Broadway
San Francisco, CA 94111

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TOM RADULOVICH
9TH DISTRICT

Dear Mr. Bertken:

Thank you for the opportunity to comment on the Water Transit Authority's Draft Program Environmental Impact Report (DEIR) for the *Expansion of Ferry Transit Service in the San Francisco Bay Area*.

As the operator of a rail network that extends into four counties, BART supports improved regional transit mobility. Last year, BART spearheaded a regional planning effort involving the Metropolitan Transportation Commission (MTC) and transit operators from throughout the region. BART has also investigated opportunities to expand service with transit modes other than traditional BART technology. BART believes that the WTA's proposed ferry system could be a key component of a regional transit network that could significantly enhance transbay transit options. 1

Since the WTA's proposed ferry system primarily links bayside communities with San Francisco, there is clearly a mutual and potentially complementary relationship between ferries and BART. For example, some portions of the BART system may have limited capacity in the future to accommodate new riders during certain time periods, which could be addressed by ferry service enhancement. However, the DEIR does not adequately address the project's impacts on existing transit service. For each of the 2025 ferry alternatives, the DEIR shows substantial ridership diversion from BART to ferry services. We are concerned about this ridership diversion and associated revenue impacts and want to work with the WTA to make sure future ferry service complements rather than competes with BART service. 2

We hope the final EIR will provide for ongoing coordinated planning efforts between our two agencies. As we develop a better understanding of future needs, we are especially interested in identifying underserved regional markets where ferries could provide additional capacity that complements BART. In evaluating proposed ferry routes, BART would like to work with the WTA to coordinate capacity analysis, ridership forecasting and service planning efforts. 3

The proximity of San Francisco's Ferry Building, the proposed hub of the ferry network, to the Embarcadero BART station also provides exciting opportunities for the WTA and BART to facilitate regional travel. BART can help boost ferry ridership by distributing San Francisco-bound ferry riders to destinations along Market St. and in the Mission, as well as by enabling North Bay ferry patrons reach East Bay destinations. As Embarcadero is one of BART's busiest stations, with over 60,000 weekday entries and exits, we are currently undertaking a comprehensive study to identify improvements to accommodate the current and future demand. With the potential to add even more riders to the Embarcadero Station, we invite the WTA to help support the study and the implementation of identified improvements. We would also be interested in developing fare integration policies to encourage ridership on both systems. 4

Thank you again for the opportunity to comment on the DEIR for the *Expansion of Ferry Transit Service in the San Francisco Bay Area*. We look forward to working in partnership with the Water Transit Authority to improve transit across the bay.

Sincerely,

Dorothy W. Dugger

Thomas E. Margro
General Manager

Tristan Bettencourt

From: greg@bellmarine.com
Sent: Thursday, October 31, 2002 4:03 PM
To: email@watertransit.org
Subject: IOP Comments

EIR 177

Below is the result of your feedback form. It was submitted by (greg@bellmarine.com) on Thursday, October 31, 2002 at 16:02:42

---

email: greg@bellmarine.com

Name: Greg Greenway

IOP_Comments: Dear WTA planners:

Regarding the proposed ferry route from Richmond to San Francisco, I would encourage the WTA to consider an alternative terminal location in Richmond as feasibility studies proceed. As you know, there is strong support in Richmond for renewed water transit service, and the city and surrounding communities deserve another opportunity to make ferry service successful. While the presence of existing terminal infrastructure is an advantage of the previous service site, a central explanation for the drop in ridership with previous service is that ferries took a long time to get to open water from the current location.

I am commenting on behalf of Castro Point LLC, which owns and leases property which we believe, if developed into a ferry terminal, would avoid some of the drawbacks associated with the existing terminal while preserving the same advantages. The alternative site that we are proposing is the former Red Rock Marina immediately north of the eastern span of the Richmond-San Rafael bridge. Castro Point LLC has all of the necessary permits to restore Castro Point pier and the marina, but it also represents a potentially ideal ferry terminal site for Richmond. In fact, this property is the original location of Richmond's ferry terminal half a century ago. 1

The site has ample area for parking and is located along the path of the Bay Trail, making it accessible to pedestrians and bicycles and offering view sites and public amenities. The site can also be accessed without driving through the Richmond harbor. From the point of view of water access, the site does not present wake problems, and it offers possible opportunities to add a link to the Vallejo ferry route without adding significant trip time.

We are not suggesting that the existing Richmond ferry terminal is an inadequate site. Indeed, Castro Point LLC is strongly in favor of bringing ferry service to Richmond regardless of the terminal location. Moreover, it is sensible to base your feasibility studies and recommendations on the existing terminal. At the same time, we would encourage WTA to consider the advantages of alternative sites in addition to the existing terminal, including the former Red Rock Marina, as you continue with more site-specific studies and planning. 2

Castro Point LLC intends to work with the City of Richmond and local ferry advocates to determine the degree of interest and community support for developing the Red Rock Marina property into a ferry terminal, and we would only move forward with that local support.

Sincerely,
Greg Greenway
for Castro Point LLC/Red Rock Marina

SUBMIT: SEND COMMENTS

EIR 178

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October 24, 2002

Mr. Steve Castleberry
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

RE: Draft Program EIR, Expansion of Ferry Service in the San Francisco Bay Area

Dear Mr. Castleberry:

Thank you for providing the East Bay Regional Park District with a copy of the subject Draft EIR. The Park District is a Special District created by state legislation (California Public Resources Code, Article 3, 4400 series) for the purpose of acquiring, planning and managin g public parks, open space and regional shorelines and ecological preserves for public recreation and natural resource protetion. Currently, the District manages 16 regional shorelines and shoreline preserves in Alameda and Contra Costa Counties. Of these, two parks, the **Martinez Regional Shoreline** and **Oyster Bay Regional Shoreline** (San Leandro) are located adjacent to proposed new service sites, and may be impacted. In addition, the District is in the process of planning three new regional shorelines which would be directly impacted by new routes and docking facilities listed in Alternatives 1 (Comprehensive) and 2 (Expanded Service). They are:

- **The Eastshore State Park (Berkeley Albany)**
- **East Bay Gateway Park (Oakland Army Base); and**
- **Point Molate.**

The Land Use matrix (Table 3.7-1) should be updated to reflect that both the Oakland Army Base and Pt. Molate have approved reuse plans. The Eastshore State Park General Plan will be finalized in the near future. 1

The document brings together a great deal of useful data related to potential demand and impacts of implementing ferry service at 48 candidate sites. However, it would seem that the usefulness of a program-level document would be to provide the basis for decisions on preferred route alternatives and those routes and sites to be eliminated from further consideration. There is no indication of such decisions either with respect to individual sites, nor of the selection of an environmentally superior or preferred alternative among the three general alternatives studied. 2

While the analysis of impacts and proposed mitigation measures in the document appears to be generally adequate at a programmatic level, it will obviously need to be augmented by focused, project-level EIRs containing site-specific studies, evaluations and monitoring programs when individual projects are initiated. When future projects are selected for further planning, project-level EIRs should consider the following, in relation to the Park District properties named above: 3

2950 Peralta Oaks Court P O Box 5381 Oakland, CA 94605-0381
TEL 510 635-0135 FAX 510 569-4319 TDD 510 633-0460 www ebparks org

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1. The District will have either fee title or other posessory interest in all of these properties, including, in some instances, under-water lots.

2. The District should therefore be considered a Responsible Agency under CEQA for any project at these locations.

3. The District will have the authority to concur with a federally required 4f evaluation relating to the taking or constructive use of park lands.

4. In considering compatibility with existing local plans, land use plans for nearby parks should be considered, as well as BCDC priority use designations and shoreline public access requirements.

3

Thank you again for the opportunity to review this document. Please feel free to contact me at (510) 544-2623 or Larry Tong, Interagency Planning Manager (544-2621) with any questions.

Sincerely,

Brian Wiese
Interagency Planning

EIR 179

City of East Palo Alto

Water Transit Authority
IOP/EIR Comments
120 Broadway
San Francisco, California 94111

October 31, 2002

Dear Director:

The City of East Palo Alto (EPA) appreciates this opportunity to comment on the Water Transit Authority's (WTA) Draft Implementation and Operations Plan and Draft Program Environmental Impact Report. As you may know, Highway 101 runs through our city and University Avenue which is one of the main roads in East Palo Alto also serves as the main approach to the Dumbarton Bridge. Therefore, many commuters drive through East Palo Alto on a daily basis and our city has excessive traffic problems for a city of our size. Because of this traffic, East Palo Alto strongly supports finding regional approaches to alleviate traffic congestion and would be in favor of projects, including ferry routes, which lessen the number of cars driving over the Dumbarton Bridge. 1 2

After reviewing the Implementation and Operations plan, we suggest that you include in your marketing plan a component targeting minority communities and people who speak English as a secondary language. We also suggest that you update your maps of the Comprehensive Alternative in the Draft Environmental Impact Report. In your plan and draft Environmental Impact Report, the proposed hub labeled East Palo Alto is shown as being north of the Dumbarton bridge in the San Francisco Bay National Wildlife Refuge in Menlo Park not in East Palo Alto which is south of the bridge. 3 4

We would like to receive copies of all the future draft environmental documents for individual ferry projects in San Francisco Bay. So please keep us on your mailing list. We look forward to further developing our working relationship in the future. We would appreciate a briefing of the proposed plan and environmental impact report. Please contact Debra O'Leary at 650-853-3166 to arrange it.

Sincerely,

Sandy Salerno,
Acting City Manager

2415 University Ave East Palo Alto California 94303 Tel 650/ 853-3100 Fax· 650/853-3115

EIR 180

Bi-County Office
2171 Junipero Serra Blvd
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Daly City, CA 94014
PHONE (650) 994-5864
FAX: (650) 994-4601
e-mail lindaw@alasfsm.org
www.californialung.org

AMERICAN LUNG ASSOCIATION®
of San Francisco & San Mateo Counties

To: Water Transit Authority
Fax Number: 415. 291-3388
From: Linda Weiner, Communications/Air Quality Director
Date: October 30, 2002
Subject: WTA EIR Comments
DIRECT TELEPHONE: 650. 994-1903, EXT. 304 or 650. 994-5864
If you do not receive 3 pages, including cover sheet, please call.

Message:
Attached find comments from the American Lung Association of San Francisco & San Mateo Counties on the Environmental Impact report of the WTA. Also sent by e-mail earlier today.

When You Can't Breathe, Nothing Else Matters®

Bi-County Office
2171 Junipero Serra Blvd.
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Daly City, CA 94014-1999
Phone: (650) 994-5864
Fax: (650) 994-4601
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AMERICAN LUNG ASSOCIATION®
of San Francisco & San Mateo Counties

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To: San Francisco Bay Area Water Transit Authority

From: Linda Weiner, Director of Communications/Air Quality Advocacy
American Lung Association of San Francisco & San Mateo Counties
Bonnie Holmes-Gen, V.P., Government Relations
American Lung Association of California

Re: Comments on EIR for Ferry Expansion

Date: October 30, 2002

The American Lung Association believes that an updated and expanded ferry system could relieve congestion within the San Francisco Bay Area transportation system by providing alternative transportation choices. However, it is of the utmost importance to ensure that the proposed ferry system does not worsen air quality. We believe that it would be a useless endeavor if more transportation choices were offered at the expense of public health. According to the report, it appears that air pollution would increase by 1.3% with a smaller percentage for congestion relief. This is not acceptable. 1

Therefore, our goal is to ensure that the system achieve the lowest emissions feasible by emphasizing use of the most advanced emission control technologies and alternative fuels, thus becoming a model ferry fleet. Toward that end, we believe that the air quality impacts of the proposed ferry expansion must be more fully evaluated with additional investigation and analysis to get a complete picture of air quality and health impacts. Additional mitigation measures must also be included to ensure that there is no worsening of air quality. 2

Important additional analysis and mitigation measures that should be undertaken:

*An analysis by the Bay Area Air Quality Management District must be conducted as required in the WTA's authorizing legislation, SB428, before the public comment period concludes. 3

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*The ferry emissions from the no-build alternative should be added to the other alternatives, since the existing fleet is likely to remain on the Bay even as the new system expands. Please note that in the IOP the full system of 44 boats (14 existing plus 30 new) is touted in the plan, indicating that the existing fleet is essential considered part of the entire WTA ferry system. 4

*An analysis of air quality impacts on public health needs to be completed for the program DPEIR, as increases in emissions, particularly diesel emissions, will have a regional public health impact. This was not addressed anywhere in the DPEIR or the IOP. 5

*The air quality section does not address the potential for air emissions to disproportionately affect low-income shoreline communities or people of color. This is a regional issue since ferries will be traveling between and past several communities, already negatively impacted by other environmental issues. The subject of environmental justice is discussed only in the Land Use section concerning terminal construction in shoreline communities. 6

*The proposed mitigation for reducing bus emissions by using natural gas or alternative fuels needs to be incorporated in the IOP. The American Lung Association does not believe that biodiesel is a clean fuels alternative, particularly because of the high level of NOX. 7 8

*The emissions standard mandated in the IOP at 85 percent below EPA Tier 2 - 2007 is not mandated as a mitigation in the DPEIR but discussed only as an option. The program DPEIR should be revised to reflect the mandate as a required mitigation to reduce air emissions as much as feasibly possible, as required by the SB428. 9

*As no alternative fuel high speed ferry currently exists, The American Lung Association recommends a pilot program to test at least two technologies that could conceivably meet the CARB standards. The goal of the program would be establish that such an alternative fuel high speed ferry could indeed be manufactured and utilized efficiently. 10

Thank you for your attention to our public health air quality concerns.

EIR 184

MOFFETT PARK

BUSINESS & TRANSPORTATION ASSOCIATION

October 31, 2002

Water Transit Authority
120 Broadway
San Francisco, CA 94111

VIA FACSIMILE, 415-291-3388

RE: Draft Implementation and Operations Plan, Support

To Whom It May Concern:

The Moffett Park Business and Transportation Association (MPBTA) is a business organization comprised of corporate employers in the Moffett Park area of Sunnyvale, dedicated to the advocacy and solution of mutual business interests with emphasis on transportation issues. Our members, which include Lockheed Martin, Juniper Networks, Menlo Equities, Yahoo!, Network Appliance, PalmSource, the City of Sunnyvale, Ariba and Interwoven, represent approximately 15,000 employees in Moffett Park.

We would like to take this opportunity to voice our support for the Water Transit Authority's Draft Implementation and Operations Plan (IOP). We feel that water transit, as presented in the Draft IOP, is an efficient, cost-effective and environmentally friendly method of transporting both people and freight, and eagerly anticipate seeing this project move forward.

We also strongly encourage the Water Transit Authority to continue to study the possibility of a future ferry terminal at and routes to Moffett Field in the South Bay. We understand that the projected ridership figures do not currently justify the expense of building a terminal at Moffett Field at this time, but we feel that the projected increased development and employment growth at NASA/Ames and within Moffett Park will dramatically increase future ridership projections at Moffett Field. 1

Please feel free to contact me with questions or concerns, or if we can do anything to assist the Water Transit Authority's efforts to bring water transit to the South Bay.

Sincerely,

Jennifer Gunderson

Jennifer Gunderson
Executive Director

cc: MPBTA Board of Directors

1184 Mathilda Avenue, Sunnyvale, CA 94089
Phone: 408.936.2433 / Fax: 408.747.4297

WWW.MPBTA.ORG

MOFFETT PARK
BUSINESS AND TRANSPORTATION ASSOCIATION
1184 MATHILDA AVENUE
SUNNYVALE, CALIFORNIA 94089

FACSIMILE TRANSMITTAL SHEET

TO:	FROM:
WTA IOP Comments	Jennifer Gunderson
COMPANY:	DATE:
Water Transit Authority	10/31/02
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER:
415-291-3388	2
PHONE NUMBER:	RE:
	IOP Comments

☐ URGENT ☑ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

PHONE: 408.936.2433
FAX: 408.747.4297

EIR 182

EAST BAY BICYCLE COALITION

POST OFFICE BOX 1736 OAKLAND, CALIFORNIA 94604

www.ebbc.org

October 31, 2002

Thomas Bertken
Water Transit Authority
IOP and EIR Comments
120 Broadway
San Francisco, CA 94111

RE: IOP and EIR Comments

Dear Mr. Bertken·

The East Bay Bicycle Coalition (EBBC) has represented the interests of bicyclists throughout the counties of Alameda and Contra Costa since 1972. This April our members were treated to a presentation from Steve Castleberry of the Water Transit Authority We subsequently voted to support expanded ferry service with the conditions that the service is friendly to the environment, to bicyclists, and to the Bay Trail.

We are disappointed that the EIR does not mention on-board bicycle storage, bicycle parking at terminals, bicycle access and Bay Trail routes to the ferry terminals nor does it address the freeway and rail barriers that will hinder bicyclists and pedestrians from reaching new ferry terminals. 1

Our Safe Routes to Transit proposal to the Toll Bridge Committee recognizes the importance of walking and bicycling as feeder modes to transit that are cost effective, sustainable and reduce pollution. This proposal focuses on providing secure bicycle parking at stations and terminals, safe access for bicyclists and pedestrians to transit, and the removals of barriers nonmotorized access to transit. We conservatively estimate that implementation of Safe Routes to Transit can shift 10% of automobile trips to walking and bicycling. According to Census 2000, 4.5% of commuters in Alameda County choose walking or bicycling as their primary mode. We can add an additional 2% to this figure for bicyclists who ride to transit and indicate "transit" as their primary mode. Provision of structures like the new Berkeley Bike/Ped Bridge are crucial for bicyclists and pedestrians to reach the new terminals. The complete Safe Routes to Transit proposal is available at www.ebbc.org/SR2T.pdf. 2

We also wish to note the importance of to proposed Alameda-Oakland Water Taxi service that the Air District has funded. This new service will soon provide a much-needed connection across the estuary. It deserves mention in the EIR as a complimentary service and we wish to see it become 24-hour by 365 days per year 3

Sincerely,

Robert Raburn

Robert Raburn, Executive Director
tel: (510) 530-3444

National Park Service
U.S. Department of the Interior

Golden Gate National
Recreation Area

Fort Mason
Building 201
San Francisco, CA 94123

415-561-4720 phone
415-561-4710 fax

Golden Gate National Recreation Area Fax

To: Charlene Johnson Chair, WTA — w/ copies to: Tom Bertken, Steve Morrison

Fax number: 297-3388

From: Mike Savidge

Date: 10/31/02

Pages to follow: 3

EIR 183

Subject: Comments on EIR + IOP

Comments: Thanks for your enthusiasm in working with us! We look forward to continuing our partnership in bringing these plans to fruition —

If there is a problem, please call: Above

Telephone: (415) 561-4725

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United States Department of the Interior

NATIONAL PARK SERVICE
Golden Gate National Recreation Area
Fort Mason, San Francisco, California 94123

IN REPLY REFER TO:
D-18 (GOGA-SPT)
OCT 31 2002

Charlene Haught Johnson
Chairperson
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: Water Transit Authority's (WTA) Implementation and Operations Plan(IOP) And Environmental Impact Report (EIR)

Dear Ms. Johnson,

The Golden Gate National Recreation Area (GGNRA) commends, and supports, you and your staff on your effort's to improve water transit access throughout the Bay Area through the obvious professional and hard work reflected in these two documents. With the exception of some minor edits, and a concern about the need to more effectively integrate recreational ferry access into the IOP, the documents seem well-balanced in presenting information for their different intended purposes. 1

We are especially pleased to have Ft.Baker, Ft.Mason & Presidio (Crissy field) included in your EIR analyses. Each of these sites, you may know, had also been previously-identified as important ferry destinations in a 1977 Metropolitan Transportation Commission study, titled, the "Golden Gate Travel Study " So, it is with much anticipation that we look forward to working with you on finally making this a reality! One of the non-park sites we believe is critical to a Bay Area ferry system is the Albany/Berkeley area, also identified in the earlier study as a key East Bay linkage point! We have commented to that effect in the Eastshore State Park plan, and hope to work with the State, and you, to insure that this area continues to be a priority for water access. 2

With the above as mutual objectives, we would like to work with you on improving the visibility and importance of recreational ferry access to this Bay Area system, and more specifically highlighting it effectively in the IOP. Attached are some specific comments on how and where this inclusion might take place, such as in the "Executive Summary." Integration of recreational ferry services effectively into these plans is essential to gain more popular support for such a plan and its funding, as recreational ferries both stir images of each of our first ferry ride, and provide greater fare box returns during the non-commute periods of the day, and on weekends

Thank you for your continued energy, efforts and enthusiasm in planning to insure water transit access, especially recreational ferry access, is an integral part of Bay Area transportation options from the moment someone decides to travel on the Bay! Without it, the existing service levels of automobile traffic on both weekdays and weekends will only increase, and further denigrate the quality of life and experience for both residents and visitors to this beautiful area!

Sincerely,

Brian O'Neill
General Superintendent

Cc: Tom Bertken, CEO (WTA)
Steve Morrison, Project Manager (WTA)

Subject: GGNRA Comments on IOP

First , while two existing sections provide recreational ferry access references, it is important that the IOP reflects it as being more effectively integrated into the overall document in terms of its visibility and importance. For example, identification of it in the "Executive Summary" would improve its profile. If it cannot be under the section titled, "What is the proposed new system," at least a bullet in section titled, "Connections" would help. This could state, for instance, that links to sites such as Ft.Baker, Ft.Mason and Crissy Field would serve to further decongest the road corridors on weekends with landside shuttles providing alternative access to congested sites like Vista Point and the Presidio. Forts Mason and Baker could also serve as critical Bay links in emergency disaster response scenarios. 3

Second, it should be noted that on page 21, in figure 12, including GGNRA sites of Ft.Mason, Ft.Baker and Crissy Field on the map would underscore that they demonstrate (as they indeed do in the estimates forwarded to your office) a competitive ridership demand. Leaving them out suggests that they do not! 4

Third, on page 22, in figure 14, Ft.Baker is cited above Tiburon when it is actually below Sausalito 5

And on page 23, under the section titled, "Other Possible Expansion," in the second line, it reads, "...GGNRA sites such as Fort Mason, Fort Baker and Fort Point..." Please substitute Crissy Field (Torpedoe Wharf) for Fort Point since the terminal is actually a part of the Crissy field (Presidio) area, not part of the Fort Point National Historic Site. In fact, all references in either report to Ft. Point should be changed in its nomenclature to Crissy Field similarly. 6

Fourth, please correct my job title as part of the Ad Hoc Working Group on page 39 to Director, Strategic Planning with affiliation as GGNRA. 7

Fifth, the reference on page 38 under section titled, "Alternative Fuels and Emissions," in last sentence to "This propulsion system is ten times cleaner than existing ferries and can be operational within 3 years" seems overstated. 8

Sixth, we applauded your integration of pedestrian, bike and transit access into the full Connections section, and would suggest also including a brief section about Parklands access. 9

Seventh, strengthening intermodal connections, particularly transit, would improve the document if only by referring to another more detailed, follow-up intermodal plan & effort. 10

Eight, on page 61, we enjoyed the "Making a Difference" section, and welcome partnering with you on such a venture!

SAN FRANCISCO BICYCLE COALITION

1095 Market Street #215
San Francisco CA 94103
415.431 BIKE
415 431 2453 fax
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PROMOTING THE BICYCLE FOR EVERYDAY TRANSPORTATION

EIR 184

October 31, 2002

via fax 415/291-3388

Thomas Bertken
Water Transit Authority
IOP and EIR Comments
120 Broadway
San Francisco, CA 94111

RE: IOP and EIR Comments

Dear Mr. Bertken:

The San Francisco County Bicycle Coalition (SFBC) has reviewed the Implementation and Operations Plan (IOP) and the Environmental Impact Report (EIR) for the Water Transit Authority's planned expansion of Ferry Transit Service in the Bay Area.

We have also reviewed the comments by the Marin County Bicycle Coalition and the Regional Bicycle Advocacy Coalition, and urge you to implement their recommendations. 1

No single transit option alone is sufficient to provide the transportation choices that people deserve. Any mode should always be planned in conjunction with other modes. Bicycling, especially, should be encouraged as part of a ferry trip as it provides door-to-door, on demand service, at very little public cost, as well as the benefit of environmental and personal health. 2

We appreciate your efforts to bring ferry service back to the Bay Area.

Sincerely,

Leah Shahum
Executive Director

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Regional Bicycle Advocacy Coalition (REBAC)
of the San Francisco Bay Area
PO Box 10205 • Oakland, CA 94610
510-452-1221
REBACazu@earthlink.net
www.BayAreaBikes.org

EIR 185

October 31, 2002 via fax 415/291-3388

Thomas Bertken
Water Transit Authority
IOP and EIR Comments
120 Broadway
San Francisco, CA 94111

RE: IOP and EIR Comments

Dear Mr. Bertken:

The Regional Bicycle Advocacy Coalition (REBAC) has reviewed the Implementation and Operations Plan (IOP) and the Environmental Impact Report (EIR) for the Water Transit Authority's planned expansion of Ferry Transit Service in the Bay Area.

Thank you for your attention to bicycle access and carriage on the ferries. Bicycling provides door-to-door on-demand service, and it promotes personal and environmental health. However, the plan should be much more specific and much more aggressive in its proposals to link ferry trips with bicycle trips. 1

REBAC strongly supports the detailed comments of Deb Hubsmith in her letter from the Marin County Bicycle Coalition, and urges you to implement those recommendation. We would like to emphasize one element: bicycle access to the terminals. 2

The section on bicycle access to the terminals is inadequate. Those who implement this plan, as currently written, do not have sufficient guidance to plan access routes that are truly safe for bicycling; therefore we see nothing in this plan that effectively encourages bicycling to the terminals.

For example, the plan refers to connections to the "bay area bicycle network" without acknowledging that the network is spotty at best and without specifying the type of connection. Instead, the plan should state the following: 3

> Safe bicycle access to the ferries should be facilitated and encouraged through the provision of class one (bike or multi-use paths) or class two (bike lanes) facilities from the bicycle parking area or pedestrian boarding area of the ferry to the nearest class one or class two facility in the bay area bicycle network. The Water Transit Authority should 4

work with the Metropolitan Transportation Commission and local governments to provide class one and class two facilities on the roads outside of the WTA's jurisdiction. 4

Only language which is this specific is effective in ensuring safe bicycle access to the terminals. We hope you understand that REBAC cannot support expansion of the ferry terminals unless safe bicycle access is ensured.

Sincerely,

Dave Snyder
President of the Board of Directors

EIR 186-189

Water Transit Authority

IOP Public Hearing

Napa County

Napa

Thursday, October 24, 2002

EIR 186

Public Comment Session:

Alice Pitt: First of all, congratulations on getting this far. Those of you who are on this board are committed for an 8-year term to see this project through. It was an ambitious time line to get all the contracts out and scoping and work back. It looks like you are going to make the deadline. And that is a huge accomplishment there.

I did a quick review of the operating plan I received in the mail. And thank you for the outreach. I think you have done a good job in trying to reach people that showed an interest in this process. I did not see any surprises. I was looking at the routes and they appear logical. They seem a lot more realistic than the grand vision, which we all had back in 1999. Which was indeed a grand vision. But I think we all realize it was a bit too ambitious with the funding constraints in the state and the competition for transit funds. So the routes look logical. The boats seem logical. I wasn't quite sure what choice the clean fuel sub committee actually came up with. It looks like a methodical way to review the choices, with the diesel SCR combination coming to the top. For practical reasons, for visionary reasons and to reduce our reliance on oil I think to use a public program to really foster alternative fuels, you ought to stick to a focus on other fuels that will work beyond diesel. And it will take substantial amounts of money and R&D and work with the US Coast Guard but it is possible. And, I think as a leader in technologies for clean ferries you probably should make that part of your priorities. 1

The financial plan seems logical. It is ambitious but it is cost-effective as shown by studies. I was surprised that the shoreside land facility acquisition costs were not 2

included. Those will obviously be substantial. And, you can find some development mitigation that will maybe grant you some land in a transit oriented development plan and that's wonderful. But, I think at some point you will have to face the reality that WTA will have some cost on your own budget line for those land costs. 2

I think where I found the report lacking the most was in the WTA structure and the institutional arrangements. Clearly the plan was very vague and ambiguous about WTA and their collaboration and partnership with existing providers. And I can understand that because it is a very sensitive issue. But I think it is an opportune issue. I think the plan needs to acknowledge the success of the services existing today. Some more than others, and your cost analysis will clearly show you which ones probably are not effective models and not the best investment of public transit subsidies. There is one service in particular which has always amazed me, that it continues to receive funding to the amount they do with the limited ridership that they have. So I would urge the plan to be amended slightly. To recognize that there is an immediate need to enhance the existing services and develop through those existing providers what those priorities are. As an ex-captain and ex-administrator and contract manager for several services, I can tell you from my professional opinion what would be the most helpful. A focused marketing plan and also a back up vessel that develops and funds. And, somehow gives a collaborative opportunity for all the services to utilize that vessel. There was an event in the last couple of months and there was a very busy weekend and there was a breakdown and there was no back up boat available. Besides stranding the people on the day of, it is really bad PR for additional riders. At 10 million dollars or so per boat in today's dollars, the services just can't afford to have their own back up. And if there is some way to jointly share that in the near-term. Obviously that is worked into the long-term plan, but I think that is a priority goal early on to retain and grow in riders. 3 4 5

You have already mentioned the water transit oriented development and obviously that is a key to success. It will reduce your connection cost and it is ultimately the best way to go. Representing farm land and grape growers here we all know that infill and city centered growth is preferable to sprawl. We have down a great job here in Napa County

in preserving Ag land or Agri service for almost 35 years old now. And we are very supportive of ABAG's smart growth planning efforts to really concentrate the Bay Area's new development in existing urbanized areas. San Francisco and Oakland have in the planning process said that they believe in redevelopment of their areas as prime new development sites rather than sprawling out into the North Bay counties. Other than that, for Napa specific comments, having lived here for almost a year and half. I can tell you that there is a small but significant core of commuters that utilize Baylink. They carpool or drive. There are no transit connections from Napa to Baylink. I am surprised that nobody is here from Napa Transit Authority. But they would tell you that that is a missed transit link and opportunity.

But beyond that small and significant commute ridership, there is a huge amount of Napa residents throughout the county that recreationally ride Baylink and love it. And they are wonderful supporters. Not only is it the transit ethics but they create revenue during non-peak periods. Which is so important to your fare box returns. And one of the reasons why Baylink has such a good fare box return and other services such as Harbor Bay has nothing. So while Napa may not be on the bay and a typical market for ridership growth know that it is there. And there should be some planning recreationally. I know it is kind of hard to focus on recreational market. And early on with Alameda/Oakland there was one summer where we actually dropped weekend ridership. Early on weekend ridership was so poor, why were we even doing it. We went back to it, and after five years it and proved to be a very significant revenue enhancement to the service.

6

Good luck. You are doing a great job and I am really pleased with the results and eventually you find more Napa residents involved in the process but for now I think you are on the right track

EIR 187

Ms Johnson: thank you very much. Cecil Drew Shaybard

Cecil: Hello. My name is Cecil Shaybard. I live in American Canyon. I work in San Francisco. I moonlight as an American Canyon City Council member. I have ridden the

Vallejo ferry-boat for about the last five years. In the past I rode the Larkspur ferry-boat for about 13 years. And this sounds like an ambitious plan. My major concern is the coordination of transit services. The transit services in the bay area are provided by more than a half dozen different entities. And they are like little kingdoms. They don't really want to work together. There is little coordination. They fight for transit monies. And they consider BART and SamTrans to be enemies. And I think all the transit systems should work together and they should even work with Caltrans and the highway system.

About a month and a half ago I went to a meeting on the rail transit for North Bay. And they did consider tying in the Vallejo ferry-boat but they didn't want to have anything to do with BART. Which is really another rail system. So I would like to see plans that sort of integrate all transit systems, ferries, trains, BART, buses and highways. Something that show how many people are going from point A to point B, either commuting to work or traveling or pleasure. And plan on how they are going to move all those people. Thank you. 1

EIR 188

Ms. Johnson: Thank you Mr. Shaybard. Erica Latto.

Erica: Good evening. I am here with a couple of hats on. I do the marketing business development for the Napa Valley Wine Train. I serve on the Napa county Transportation Planning Agency, rail feasibility committee. I also serve on the marketing committee of the Convention of Visitors Bureau. And a regional organization Redwood Empire Association, which deals a lot with moving people around. And I was very intrigued with the information I received from Ms. Sanchez. And looked at what you folks are proposing and looking to doing. And went to one of these meetings earlier. And what other folks are proposing to doing and everybody has the same human cry, that is, where is the money coming from?

They are also working on the similar models provided by the Metropolitan Transportation Commission, which, and I will mail comments, when you look at connecting up to this area. We have been trying to get, for example the City of Vallejo, there is a rail line that

is ideally situated to meet ferries without requiring more parking to be built or more land acquisition. And I see at Jack London Square where that works beautifully. And we have a huge amount of bodies that are moving in the North Bay that have nothing to do with commuting. But again, have a lot to do with high return on fair box because they are the leisure travelers. And I don't know how between all these different government agencies, all these different funds, all these different feasibilities, and all these different consultants to get everybody in the same room and provide the connectivity. It took me three weeks to help a journalist from oversees to find out how to get around the Bay Area without renting a car from Sacramento. It does not just begin and end in these nine counties or whatever you are charged with. I was with some MTC people today and they know about you but they don't really know about you. I don't know if you aware of the rail feasibility studies going on they are trying to connect. 1

I guess my question with all my hats on is how do I, as a business person who is trying to keep 140 people employed and get some cars off the road being in railroad business, find a way to communicate with you as a government entity on the alternative ways, I do like what you are proposing, to look at where rail into this area connecting to ferries has been part of the studies? I don't know if it is a day late and a dollar short. I hope you will address that.

I was also curious to find out if any of the information that your agency has spent a lot of time and energy compiling is available for some of these other work groups that are trying to look into solving some of their problems of congestion management. I am hoping through all these surveys, to see somewhere in the environmental impact a lot less loss of life and car accidents and things like that. 2

I think what you have done is really, really, really impressive. Wish you a lot of luck. But maybe if everybody pulls all their little money that they didn't think they have enough for and also invite some of the tourism professionals in the region to the table. 3

A lot of money, San Francisco, even though its down, is still the number one tourist destination and we can all build off that and get our money from there. So thank you for doing this.

Ms. Johnson: Thank you very much.

Steve: There are a couple of things I may be able to shed a little light on. First off, as far as the recreational user goes. We are very much aware of and want to capitalize on the recreational market, whether it is in Napa, Sonoma or anywhere else in the Bay Area.

Public: It is harder to track, right? EIR 189]1

Steve: Well, it requires different modeling.

One of the things that we are committed to doing is, and if you read the plan you will see, we are going to be doing ongoing studies and more refined studies in a variety of areas depending upon what the changes of increment are that gives us reason to want to study. For example, if there is an area where the land use is changing, compared to what the ABAG data is that we used in our initial model, then we want to able to restudy and come up with more accurate numbers. Our goal is to provide as much water transit service throughout the bay as we can. In that light, then as far as tourism and recreation, say up to here, that is ongoing thing that we are interested in trying to work with. As you know we have been in discussions regarding tourism to Napa and Sonoma for wine business in particular.

Our point is that for purposes of recreation we are interested in trying to make that happen as well with commuting. Essentially moving people on ferries for whatever reasons they want to travel. But, those types of studies to try to get a handle on accurately projecting recreation and tourist travel require a different type of modeling than what we needed to do for this initial first cut.

Public: Its all based on MTC studies? 2

Tom: Right. But all that simply means is that this is where we are as we sit here today. But as we move forward throughout 2002, presuming that legislature does in fact accept this plan and WTA does continue to move forward as an agency. Than those types of studies are ones we would be interested in working with in communities around the bay to try and make happen. And see if identify those markets.

Public: Rail feasibility study will be done by May or January. A lot of the traffic is feeding into one of the fastest growing communities, American Canyon. 3

Public: The irony is that we once had a rail ferry connection from Vallejo to Napa and all the way up to Calistoga. 4

Public: I was hoping for the possibility to connect to the ferries in Vallejo to this corridor. Because there are a thousand members, officially, in the Napa Valley Commute Club who leave the valley everyday. And take into consideration all the new folks in American Canyon with the houses being built in huge arrays. 5

Steve: And also one common thread in each of your comments is about connections essentially. And we fully understand that. Our legislation mandated that we put together a plan for water transit that does in fact connect with other transit and as I think one of you said the devil in the details of making that happen. It is difficult. We had a working group as part of our study on intermodal connections with many and almost all of the transit agencies in the Bay Area. And that is going to be an ongoing thing where we intend to be essentially the catalyst in making it happen. Because we feel very strongly about that need and mission and the role we can play is being kind of the new kids on the block. Perhaps focusing some attention to that.

Our study says that we intend to build a water transit system where anybody can get on a boat anywhere and not only immediately find out how they get to another place and how

much it will cost but ultimately then what I get off the boat and what is my transit option from getting to that terminal to my ultimate destination? How much is it going to cost? And what are the schedules? It will require a lot of work with other agencies. But it is our intention to pursue that as vigorously as we can.

Public: So your organization, with my personal hat. I tried to take a boat from Vallejo to San Francisco and over to Jack London Square and it was a 15-minute difference connectivity time. And I had to wait two hours to catch the next boat. Is that what your agency is seeking to do, is be the umbrella for all the systems? 6

Steve: It is our intention to try and build a water transit system where everything works together. So you do have that connectivity within the water transit system. There are two components to it. One is the new service and the other, is the existing operators. We have an existing and continuing working relationship with Golden Gate, Vallejo, Alameda/Oakland and Harbor Bay and we will continue to do that. Our legislation mandates that we cannot impose service on existing operator. We cannot compete with an existing operator. So our ridership models show tremendous potential growth in ridership for Golden Gate service from Larkspur and Sausalito, the Alameda/Oakland service and Vallejo service. Our financial plan in our program has programmed new boats that could be used on those services. But they have to want them and we have to work together on them.

Public: Will you oversee future contracts of the operators and change the standards by which those operators work, like connection issues? 7

Steve: The existing operators will continue to manage their business as long as they choose to manage their businesses. But as far as our future on operations a lot of this remains to be seen as it unfolds.

But to get to the point about connectivity whether it is with different ferry services or even to land transit. It is a huge challenge. It is going to take a lot of work. We bring a

commitment to make it happen. We have a certain amount of legislative mandate. I mentioned that 25 percent of our budget is for land-side. We have the opportunity to create some land-side transit. But we are talking to and will continue to talk to the existing land-side transit operators to hopefully be able to create systems that do work together. It's a big job and will take a long time.

Public: With respect to the future in terms of Vallejo service, we will be adding a new boat in about a year. That will give us a much expanded schedule. We are very much aware of the boats that are a little iffy in service. I think having a new boat will help a lot. We will have our own back up boat. For us it was done by buying a used boat in addition to new ones. We will be using it exclusively as a back-up. That rail corridor between Vallejo and Napa - I am very interested in getting that reestablished. It is really great to establish that. Would be nice all the way up to Calistoga. 8

Public: It will take too many grape vines for that.

Adjourned.

EIR 171

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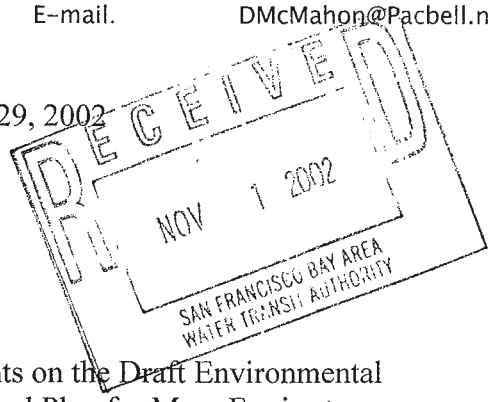

October 29, 2002

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

RE: Comments on the Draft Environmental Studies and Plan for More Ferries to Improve the Region's Public Transit System

Dear Sirs:

Please include this letter as part of the public comments received on your "Draft Environmental Studies and Plan for More Ferries to Improve the Region's Public Transit System." While I am in general very supportive of the development of an improved ferry system in the Bay Area, I am critical of the failure of the draft environmental document's failure to place the proposed system within the contexts of realistic appraisals of the safety and economic security of our public transportation system. I am also critical of the downplaying of environmental impacts and mitigation. 1 2

While California and the Bay Area have made great strides on improving the earthquake safety of Bridges in our public transportation system, we still have a very fragile and non-redundant transportation system (which for purposes of this letter encompasses all transportation modes and mass transit). While the major bridges in the Bay area are being retrofitted or replaced to hopefully survive a major earthquake, without large scale testing and/or experience from actual earthquakes, we do not know with certainty that they will. Moreover, the rest of the transportation system is designed to a lower standard. There have been no comprehensive analyses of the likely consequences of a major earthquake on the entire transportation system; instead there have been analyses of the most expensive parts of the system.

I believe that after a major earthquake, the chance of system failure is essentially 100 percent. The eventuality of system failure is likely to remain at 100 percent even after retrofitting /replacement of our bridges. For example, the approaches to the bridges are likely to have large movements, landslides, etc., and the highways are likely to have failures in multiple locations. Likewise, runways are likely to be heavily damaged, and suitable only for helicopter landings. Even if our bridges survive, we are not likely to be able to use them if other parts of the system fail. **The Draft EIR does not adequately quantify the likelihood or magnitude of transportation system failure due to a major earthquake.** 3

The economic impacts of transportation system failure would be catastrophic. The transportation system could be out of service for months or years. Consider for example that the 4

new East Span of the San Francisco-Oakland Bay Bridge is not yet complete, some 13 years after the Loma Prieta earthquake of 1989. As an example of the potential economic impacts, imagine if the Bay Bridge had been closed for 13 years (and this is only one piece of our transportation infrastructure). **The economic costs of the near certainty of transportation system failure due to a major earthquake have not been adequately addressed within the Draft EIR.** 4

Placed within the context of the near certainty of transportation system failure and its economic consequences, Ferries offer perhaps the most cost effective, flexible, and redundant solution. In fact, even if the Ferry system had no riders at all, a good case could be made to maintain Ferry Boats, docks, public access and infrastructure to insure that we have some sort of a back up transportation system when the expected major earthquake occurs. It is possible that more thorough analyses would show that even the Augmented Blue Ribbon System (Comprehensive) Alternative, Alternative 1, might not be adequate in capacity, redundancy, number of boats, etc., to be able to effectively respond to a transportation crisis. **The Draft EIR utterly fails to make the case that a healthy Ferry system is required to maintain economic stability and security in the event of a major earthquake in the Bay Area. Essentially no analysis has been performed on the redundancy, flexibility, number of required boats, docks, access, etc., required to maintain a transportation system after a major earthquake. The proposed Ferry system should be robustly redundant and essentially instantaneously scalable to meet the likely sudden increase in riders after a major earthquake.** 5

Given the scale of the system which I believe that we need to address our current, frail transportation system, the absence of any discussion of cumulative impacts within the EIR is laughable. If we build the system we need to maintain a transportation system that will remain functional after a major earthquake, it will be growth inducing, and there will be many more designated emergency Ferry sites and a future expanded Ferry sites than are currently designated in the most ambitious plan. **The cumulative impacts caused by emergency expansion and likely future growth (both within and caused by) the Ferry system should be addressed more realistically in the EIR.** 6

Sincerely,

David J. McMahon, C.E.

EIR 172



Citizens for the Eastshore State Park
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Albany, CA 94706

Phone: (510) 339-9028 Fax: (510) 526-2629

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SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

Dwight Steele
Chair Emeritus
(1914 - 2002)

Robert Cheasty
President

Norman La Force
Vice President

Tom Bates
Vice President

Sylvia McLaughlin
Secretary

Ed Bennett
Treasurer

October 31, 2002

Draft Program Environmental Impact Report Comments
San Francisco Water Transit Authority
120 Broadway
San Francisco, CA 94111
Sent also via fax: 415/291-3388
Sent also via email: email@watertransit.org

Dear Sir/Madame:

The Citizens for the Eastshore State Park (CESP) have questions and concerns as to the adequacy of the Draft Program Environmental Impact Report done in connection with "Expansion of Ferry Transit Service in the San Francisco Bay Area." CESP adopts the attached comments regarding the project and the DPEIR. We believe further serious study and consideration is required prior to moving forward with this project.

Respectfully,

Robert Cheasty
President

Supporting organizations include: League of Women Voters of Albany, Berkeley and Emeryville—California Native Plant Society—Ecology Center—Oakland Waterfront Coalition—Environmental Defense Fund—Citizens Committee to Complete the Refuge—Friends of Aquatic Park—Golden Gate Audubon Society—Oceanic Society—Regional Parks Association—Sierra Club San Francisco Bay Chapter—Save the Bay—Urban Creeks Council—Friends of Five Creeks—Berkeley Partners for Parks—CA State Parks Foundation—Citizens for the Albany Shoreline

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DELIVERY BY MAIL, FAX, AND E-MAIL

October 31, 2002

Attn.: DEIR Comments
San Francisco Water Transit
Authority
120 Broadway
San Francisco, CA 94111

RE: Comments on Ferry Service Expansion Programmatic DEIR.

Dear Sir/Madam,

I am submitting these comments on behalf of my clients, The Sierra Club, San Francisco Bay Chapter ("Sierra Club") and Golden Gate Audubon Society, Inc. ("Audubon", and collectively, "Clients"), regarding the above-referenced DEIR. Both Sierra Club and Audubon have a long-standing interest in the protection of the natural environment in and around San Francisco Bay. Consequently, they are extremely concerned about the potential impacts that the ferry expansion project could have on the Bay's ecology and natural resources. My clients consider the DEIR inadequate for a variety of reasons, which are discussed in detail below. My clients ask that the Authority revise the DEIR to address the points raised and then recirculate it for comments on the revisions. Alternatively, my clients suggest that the Authority should seriously consider major revisions to the ferry expansion project itself to deal with its many problematic aspects. In that case, a new DEIR should be prepared for the revised project. 1

1. PROJECT PURPOSE AND NEED

The DEIR begins with a discussion of the claimed reasons why the project is needed. However, many of these reasons are either not adequately supported, or simply incorrect. Further, even the flawed analysis in the EIR indicates that the proposed project will fail to support most of the claimed justifications.

The DEIR asserts that the project is needed to alleviate capacity constraints and congestion on Bay Area highways and bridges. However, as is discussed in more detail below, the DEIR fails to consider alternative approaches that would appear far more suited to meeting this need than any of those proposed. Further, the DEIR fails to discuss a major concern for such long-range transportation - the flexibility to adapt to changes in

future conditions. While ferry routes themselves may be changed over time, the proposed ferry terminals would represent major investments of money and energy, as well as raising significant environmental concerns. If commute patterns change in the future, the proposed system of ferry terminals could become just as irrelevant as the previous ferry system's connections to the now-defunct streetcar systems.

The DEIR also points to the potential risks that might be posed by a natural catastrophe, and the potential for a ferry system to assist in dealing with those risks. However, the EIR includes no analysis of the extent to which any of the proposed alternatives would assist in post-disaster recovery. Nor does the DEIR consider whether other transportation alternatives might do as well or better in coping with disasters. Further, the DEIR fails to discuss the degree to which the ferry system's components might increase the risk of disaster, most particularly the risks of ferry upset due to collision, weather, or mechanical failure, and the potential of ferry boats and terminals to serve as targets for terrorist activity. The latter is particular cause for concern in the current post-9/11 world situation. The EIR should include discussion of past history of ferry vulnerability, both in the Bay Area and elsewhere.

The DEIR notes that an expended ferry network would increase transportation options. However, so would a system of unicycle rentals, or dogcarts. The question is the practicality of the proposed system, and its ability to improve the Bay Area's overall transportation balance. The analysis in the EIR, as inadequate as it is, suggests that even alternative 1, the most extreme alternative examined, would have little impact. On the other hand, this alternative would have enormous costs, fiscally, environmentally, and in increased energy use. One must question the practicality of such an alternative. 1

Parenthetically, the DEIR references the Bay Area's historic ferry system as a precedent for the proposed expansion. The EIR fails, however, to discuss the differences in circumstances and design between that system, which was integrated with an extensive non-polluting electric light rail network to provide efficient transit service to the higher density inner East Bay communities, to the current proposal, which would connect primarily with single occupancy autos to serve lower density suburban regions. The differences in efficiency and impacts are obvious.

2. INADEQUATE AND INACCURATE PROJECT DESCRIPTION

The DEIR describes and discusses four project alternatives, three that increase ferry transit and a no project alternative. However, Alternative 1, and to a lesser extent alternatives 2 and 3, are plagued by ambiguities in the project description.

Alternative 1 in particular sets out an extensive listing of proposed routes and terminal sites. However, after briefly

discussing some of the significant impacts that would result from this network, it suggests as mitigation that a significant portion of the terminals and routes be either eliminated or significantly curtailed. In essence, the DEIR has created a new "Alternative 1a" which, the DEIR claims, reduces many of the most significant impacts of Alternative 1. However, the DEIR is not consistent in describing what this Alternative 1a would consist of, or what its comparative impacts would be. Thus, for example, the DEIR notes those routes that would have the most significant dredging impacts and suggests that they be eliminated or reduced in scope. It then discussed how this would reduce dredging impacts. The DEIR separately discusses air quality impacts and proposed eliminating route whose low ridership would lead to increased pollution compared to the no project alternative. The DEIR does not, however, consider the dredging impacts of this reduced Alternative 1, not the air quality impacts of the alternative 1a proposed to reduce dredging impacts. The EIR needs to provide consistent descriptions of alternatives and their comparative impacts.

Likewise, the DEIR suggests the use of low displacement vessels to reduce dredging impacts. However, the DEIR does not examine what other impacts, specifically noise impacts, would be associated with these modified vessel alternatives. Again, if the project is to include use of low displacement vessels, and specifically hovercraft, the noise and other impacts (e.g., energy use, transportation efficiency, wake effects) of these alternatives need to be set out so that meaningful comparisons can be made. 1

3. ALTERNATIVES ANALYSIS

As mentioned above, the DEIR supports the proposed project as being needed to deal with constraints in the existing transportation system. However, the DEIR fails to discuss any non-ferry alternative for addressing this issue. Given that improving the overall transportation situation is the primary motivation for the project, it is imperative that comparisons with other possible solutions be included.

The DEIR fails, for example, to discuss the feasibility, efficacy, and impacts of an alternative that would focus on improving other public transit, and specifically bus transit in the Bay Area. There are already major public transit routes with which the ferries would compete for ridership. In particular, transbay bus transit is a feasible and relatively cost-effective alternative to ferries as a way of increasing the efficiency of use for highways and bridges. The EIR should discuss an alternative that would focus on expanding and improving bus transit, including specifically transbay bus service. The alternative should include options for expanding the current system of transbay routes and terminals as well as possible incentives to encourage transbay bus ridership (for example, providing a dedicated bus/HOV lane on bridges during peak commute

hours). Nor does the EIR consider the potential for expansion of rail service, either through Caltrain, the proposed high-speed rail project, or new light rail routes, to alleviate congestion.

The DEIR also fails to consider alternatives that would focus on other non-physical way of dealing with current transportation problems. For example, the EIR should discuss the potential for financial incentives, such as congestion pricing and employer tax credits, to move traffic off the bridges during the peak commute hours by shifting commuters to alternative transportation such as transbay busses, expanding flextime use, or increasing telecommuting.

Finally, the EIR fails to consider or discuss changes in land use policy as an alternative to reduce transportation problems. This failure is particularly striking given that ABAG is currently considering a new "smart growth" regional livability footprint project. That project is explicitly aimed at reducing the impacts from future growth, but the compact development strategies being proposed could also help alleviate current transportation problems, and particularly the congestion associated with long commute patterns.

4. DREDGING IMPACTS

While the DEIR correctly notes the extensive dredging impacts of the project, particularly those of Alternative 1, the proposed mitigation measures are inadequate. 1

Proposed Mitigation D-1.2, uplands or wetlands disposal of dredge spoils, is too speculative to be considered adequate mitigation. As of now, there are not identified sufficient upland or wetland disposal sites to accommodate the proposed dredge spoil production, not to mention the expected cumulative dredge spoils, including other Bay dredging projects. It is therefore improper to consider this "mitigation measure" as being effective in reducing the impact to less than significant levels. If the EIR is unwilling to commit to implementing Mitigation D-1.1 by removing the dredging-intensive routes from the plan (the use of zero draft vessels cannot be considered as a mitigation measure without consideration of the impacts from using zero draft vessels - see comments below), Impact D-1 must be considered significant.

Even *with* the proposed reduction in dredging by elimination of the most dredging-intensive routes, project dredging would still amount to >10% increase in annual maintenance dredging, plus initial dredging. This is still a significant impact!! Even if in-bay disposal is in accordance with LTMS, where is remaining dredge material going? The EIR needs to identify the possible potential sites and the corresponding potential impacts.

The DEIR does not provide an adequate discussion of cumulative dredging impact. Do the calculations include dredging for Bay Bridge reconstruction? Both dredging and filling have similar and overlapping impacts on the Bay's ecology.

Consequently, the EIR needs to consider the cumulative impact of all current & proposed dredge & fill projects (including specifically the proposed expansions of Oakland & SF Airports, as well as private shoreline development plans throughout the Bay Area). Given the regional nature of this project and the programmatic nature of the EIR, it needs to look broadly at future dredge and fill projects throughout the Bay Area.

Impact D-2: Under Mitigation D-2.1, one cannot at this point conclude that implementation of BMPs will necessarily suffice to mitigate water quality impacts. As acknowledged, for example in Sections 3.5.2.4 and 3.5.2.5, BMPs such as the use of silt curtains cannot be relied upon to eliminate dredging impacts. Consequently, one cannot conclude that dredging impacts from Alternative 1 or 2 can be mitigated by use of BMPs to the point where no significant impact would occur.

As noted earlier, if mitigation by use of shallow draft vessels/hovercraft is used, other associated impacts, such as noise, wake effects, risk of upset & poorer reliability need to be considered. If this mitigation measure is to be proposed, it must be considered consistently and all associated impacts need to be evaluated.

Finally, as will also be discussed below, the EIR needs to consider the potential impacts related to current and flow changes in the Bay as a result of project-related and other dredging and filling projects. Dredging/filling can dramatically change the bottom contour of the Bay in the dredged/filled areas. This will affect the Bay's currents and tidal flows, and may well change the locations and amounts of sediment deposition. The deposition of sediment is an important factor in the Bay's natural ecology. The deposition of sediment is of vital importance in the Bay's mudflats, which, as the DEIR points out, are of central importance to the Bay's ecology, particularly as a feeding area for migrating shorebirds. (See comment letter from the Point Reyes Bird Observatory for more discussion of this point.) The EIR needs to discuss the potential effects of project dredging on mudflat areas, not only as to direct impacts from dredging within mudflat areas, but also indirect effects due to current changes caused by dredging. 1

5. WAKE IMPACTS

The analysis of wake impacts needs to consider not only direct erosion impacts, but also biological impacts on shoreline flora and fauna. In particular, impacts on shorebirds and shoreline vegetation such as Pacific cordgrass, eelgrass, and pickleweed need to be considered.

The proposed mitigation for impacts on clapper rail is inadequate because it fails to consider impacts not only on current clapper rail nesting sites, but also on potential clapper rail nesting sites and habitat. As an endangered species, the clapper rail's management is directed towards not only

maintaining current populations and habitat, but providing for the recovery of the species and associated expansion of nesting and habitat areas. The EIR should have included discussion, through consultation with the trustee agencies, Cal Dept. of Fish and Game and the U.S. Fish & Wildlife Service, of identified critical habitat areas for the clapper rail (and other endangered species). These critical habitat areas should also have been protected by appropriate avoidance zones. The EIR needs to be revised accordingly.

6. WATER QUALITY

In addition to discussing inorganic water quality contaminants, the EIR also needs to discuss possible organic and bacteriological contaminants. In particular, there is no discussion of potential in-Bay disposal of "blackwater" or "greywater" from ferry bathroom/sanitary facilities. Indeed, there is no discussion of how ferry sanitary wastes will be disposed of. If sanitary wastes will be off-loaded and transported elsewhere for treatment, the EIR needs to discuss necessary facilities and the possible risk of upset, with impacts and mitigation.

As noted above, dredging could have indirect impacts through changing the strength and location of Bay currents. Among those changes could be effects on the suspension and deposition of sediment material. In particular, if dredging increases the velocity of some Bay currents, it could result in increased suspension of sediment, and in sediment staying in suspension for significantly longer times. This would significantly increase the turbidity of the Bay, which, as the DEIR points out would have adverse impacts on a variety of plant and animal species. These potential impacts need to be discussed, and, if significant, mitigation measures or alternatives identified to reduce or avoid the impacts. 1

7. BIOLOGICAL IMPACTS

As the DEIR points out, shallow waters are importance to phytoplankton. This means that any loss or disturbance to shallow waters (e.g., dredging, hovercraft or other ferry use, construction of docking & terminal facilities) needs discussion in terms of impacts on phytoplankton. The shallow shoreline areas are also important spawning grounds for herring, & impacts on herring spawning also need to be discussed. (See comments above on indirect impacts of dredging through current changes.)

It is improper for the DEIR to limit discussion of listed species to areas in the vicinity of proposed terminals. Ferry operations in other areas, including open waters & areas near shorelines & shallow bay areas could also impact on listed

species. In particular, impacts on mudflat areas, as discussed earlier, could adversely affect listed shorebirds, including the California Clapper Rail. Ferry impacts on rafting birds and on birds swimming in open water areas could include impacts on other listed species, including the Brown Pelican, common loon, California least tern, elegant tern, and double-crested cormorant.

The DEIR includes no discussion of the open bay as habitat for migrating waterfowl - i.e., so-called "rafting" behavior. Rafting of migrating waterfowl in open waters is a well-documented phenomenon. Ferry routes could adversely affect rafting waterfowl either by provoking flight and associated energy expenditure or, even more seriously, by actually impacting and injuring or killing rafting birds. At the very least, the EIR needs to require as mitigation that bridge personnel will maintain a constant watch for water-resting waterfowl and will avoid their proximity, even if that means adjusting the vessel's routing. Where total avoidance is not possible, the EIR should require that ferries slow to a speed where their close approach to rafting birds is less likely to provoke flight, even if this results in schedule delays.

Where wetlands would be impacted by the construction or operation of ferry terminals, alternative terminal sites should be thoroughly investigated, and a site impacting wetlands should only be chosen if no alternative site is feasible. If no alternative site is available, the feasibility of eliminating the ferry terminal should be considered. 1

Cumulative wetlands impacts, including specifically wetlands impacts from Bay Bridge East Span and Oakland & SF Airport project need to be considered. What will be cumulative wetlands impact? Assuming mitigation of all impacts is necessary, what will be cumulative impact of such a large amount of fill/replacement? To what extent can one fully mitigate wetlands' role as habitat? For example, will migrating birds use an alternative wetlands site located miles away from the original site? What about spawning in tidal wetlands areas? As noted in the PRBO comment letter, any proposed wetlands mitigation needs to be "in-kind". That is, if mudflats will be eliminated, then new mudflat areas should be established. Establishment or enhancement of salt marsh areas will not mitigate the loss of mudflats.

Cordgrass impacts - what will be impacts from eliminating invasive spartina alterniflora? What is this species' value as habitat? The EIR needs to consider and mitigate impacts of eliminating these populations, preferably by replanting with the native Pacific cordgrass. The EIR needs to consider the Cumulative impacts on Pacific cordgrass, including impacts from: 1) all ferry terminals, 2) ferry operations (e.g., wake impacts), 3) Bay Bridge East Span project, Oakland & SF Airport expansion projects, 4) any other Bay shoreline projects either approved or under review.

As noted earlier, the EIR needs to consider indirect effects of dredging on special aquatic sites: In addition to impacts identified, dredging may result in changes to circulation patterns that could impact wetlands, mudflats, and eelgrass area. (E.g., elevation of amounts of sediment deposition could reduce water depth and eliminate areas of eelgrass or mudflats, conversely, current changes causing sediment resuspension may destroy current wetlands-mudflats-eelgrass areas. Project-specific EIRs need to include study of potential effects of dredging on Bay currents. If impacts cannot be avoided, alternatives eliminating detrimental fill, including elimination of damaging route or terminal, should be considered. Since replacement of eelgrass and mudflats areas have not been shown to be reliably successful, the proposed mitigation cannot be considered adequate to reduce impacts to less than significant level.

Loss of benthic habitat due to dredging: Where dredged areas contain contaminated sediment, dredging could resuspend and spread contamination, resulting in damaging impacts on benthic populations beyond the immediate dredged area. This impact is not considered in DEIR. Again, the EIR needs to consider cumulative impact on the benthosphere from this plus other dredge & fill projects.

1

8. AIR QUALITY IMPACTS

The EIR needs to assess the cumulative air quality impacts of this project in conjunction with other current and proposed projects. In particular, the cumulative air quality impact analysis needs to consider expected impacts from the Oakland and San Francisco airport expansion projects. The EIR needs to discuss toxic air contaminant impacts, particularly those associated with diesel exhaust fumes. These fumes have recently been acknowledged to cause serious health effects. The EIR needs to discuss the extent to which adverse health impacts due to the release of toxic air contaminants may still occur in spite of the proposed mitigation measures.

The EIR should also discuss whether the proposed air quality mitigation measures will result in any secondary impacts. For example, to what extent will the equipment required to mitigate diesel exhaust impacts result in an extra weight burden on the ferries, causing lower operating energy efficiency and increasing associated energy impacts?

9. LAND USE IMPACTS

The proposed ferry terminal site at either University Ave. or Gilman Street in Berkeley could impact on the newly-established Eastshore State Park. In particular, the Gilman Street site would be likely to adversely affect the park

atmosphere for the adjoining areas. This would be a significant impact. Mitigation would be to move the ferry site to the base of University Avenue, either adjoining the Ramada Inn at the existing ferry dock area or at or near the Berkeley Pier. The latter, however, would require extensive new construction and could impact on visual, historic, & cultural resources.

There is an issue of disproportionate impact in that the local air quality impact from PM cold starts would occur in areas adjoining the proposed ferry terminals, many of which are located in low income minority population areas.

10. AESTHETICS IMPACTS

Proposed new Ferry terminals Impacts in the GGNRA, near Candlestick Park, and at/near the Eastshore State Park could have a significant aesthetic impact by placing a visually discordant element into the landscape at these sites. The EIR needs to discuss the extent to which such impacts could be mitigated by implementing design criteria, and evaluate whether even a well-designed terminal would have significant aesthetic impacts, particularly at GGNRA or the Eastshore State Park.

11. GEOLOGICAL IMPACTS

The proposed mitigation for liquefaction impacts (removal or engineered modification of liquefiable substrate) could itself have significant impacts. These impacts need to be acknowledged and mitigation proposed. 1

12. NOISE IMPACTS

The impact analysis includes no discussion of noise impacts from hovercraft, whose noise output is acknowledged to be very high. Hovercraft cannot be included as a possible mitigation for dredging impacts unless their noise and other impacts are properly studied.

The EIR fails to discuss cumulative noise impact, including the increased noise due to increased traffic to/from ferry terminal locations, especially in residential areas. There is no substantial evidence presented to support the EIR's conclusion that there would be no significant noise impacts on birds or marine mammals from ferry operations, especially those in the vicinity of seal resting areas and areas where waterfowl raft in the Bay.

13. TRANSPORTATION IMPACTS

The EIR acknowledges (as it must) that even the implementation of alternative 1 would have no significant effect in reducing VMT. This seriously undercuts one of the basic

underlying rationales for this project. Based on this result, the project's desirability needs to be reevaluated.

Given that there is a need to restrict vehicle parking through either parking fees or reduced parking capacity at terminals, there is potential for overflow parking to impact adjoining neighborhoods. This would be a significant impact. As mitigation, especially given the prevalence of low income and minority communities in the vicinity of ferry terminals, the ferry project should pay to implement residential permit parking enforcement in adjoining neighborhoods.

14. ENERGY IMPACTS

The analysis needs to consider cumulative energy impacts for the Bay area. This is especially important given the current energy shortages and the need to reduce overall energy usage. Given this background, ANY increase in energy usage should be considered significant. 1

15. GROWTH INDUCING IMPACTS

The project is likely to result in significant growth inducement at and near proposed ferry terminals. This growth could result in the displacement of current low-income residents and existing businesses. This would be a significant adverse impact. As mitigation, ferry terminals should not be considered for approval unless and until the local land use agency has prepared and approved a specific plan for the terminal area that mitigates potential growth inducing impacts, using such measures as zoning controls

Thank you for the opportunity to comment on this DEIR. We look forward to receiving a copy of the revised document once reanalysis is complete. Please keep us informed of future events related to this project.

Most sincerely,

Stuart M. Flashman

Stuart M. Flashman

samTrans

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EIR 173

October 31, 2002

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

SUBJECT: Comments on the Draft Program Environmental Impact Report (August 2002) and Draft Implementation and Operations Plan

Dear Water Transit Authority:

Thank you for sending us a copy of the Draft Program Environmental Impact Report (EIR) for the Expansion of Ferry Service in the San Francisco Bay Area and a copy of the Draft Implementation and Operations Plan (IOP). We have reviewed the reports and have the following comments:

ENVIRONMENTAL IMPACT REPORT COMMENTS

1. In Section 3.13 Energy - there is a good discussion of how the different Ferry Expansion alternatives contribute to the overall energy consumption. A statistic not given in the document is the energy consumption per passenger mile traveled (PMT) comparison between ferries and other forms of transit. Please provide that in a table in the Final EIR. 1

2. A thorough discussion of how the expanded ferry service would interface with local transit is lacking in the document. Please address public transit access at the destination terminal more explicitly, i.e. Oyster Point, Redwood City, etc. It would be helpful to include estimated costs (capital and operating) of the transit access interface as well. The mitigation proposals on page 3.6-17 for cold start emissions from parking lots should include a proposal for efficient interface with public transit. 2

3. Should ferry service become very successful on the San Francisco-South San Francisco – Redwood City routes, and if there were ferry equipment failures, bus bridges would be necessary to temporarily handle the ferry customers. Strategic contingency planning such as this should be discussed in the EIR. 3

IMPLEMENTATION & OPERATIONS PLAN COMMENTS

1. Page 3, Col. 2, Para. 3 – This paragraph states that "25 percent of the operating budget is for landside connections". How will the funds be used, and will it be allocated to landside transit providers? 4

2. Page 4, Col. 2, last Para. – This paragraph states that ferries will draw most of its riders from vehicles, not from existing transit riders. This is repeated on Page 11, Col. 1, Para. 2, but 5

SAN MATEO COUNTY TRANSIT DISTRICT
1250 San Carlos Ave. – P.O. Box 3006
San Carlos, CA 94070-1306 (650)508-6200

contradicted in the following statement: "Many Peninsula commuters are using shuttles to travel to-and-from Caltrain, and they are eager to do the same with water transit" (Page 33, Col. 2, Para. 1). This statement infers that commuters who currently use Caltrain would be willing to take water transit instead. While SamTrans and the JPB support the goal of increasing transit ridership, it should not simply move current transit riders from one mode to another. Increasing water transit ridership should not come at the expense of existing transit modes, but should help to increase TOTAL bay area transit ridership. If the market research conducted for this study shows that ridership for ferry service will, for the most part, not be diverted from other transit services, please clarify the statements above so that this finding is consistent throughout the IOP document. 5

3. Page 8, Col. 3, last Para. – This paragraph states that seven out of ten people are "willing to pay increased bridge tolls if the money is used for congestion-relief projects". The presentation of survey results dated November 2001 described the methodology as a survey of 1400 registered voters in seven Bay Area counties that voted on Regional Measure 1 in 1988. While the survey results show a strong preference in that specific sample to increasing bridge tolls, applying the results toward the general Bay Area population may not be accurate. We request clarification on this statement, or a rephrasing of it to better reflect the sample through which it was drawn. 6

4. Page 14, Fig. 4 – What are the "Minimum Demand Criteria"? Please provide an explanation. 7

5. Page 15, Fig. 6 – Please explain how the "Investment for Comparison" of the ferry routes were determined. Specifically, how are the other investments an adequate comparison when they may attract different markets, and how were the ridership and cost per new rider determined for the alternative investments? 8

6. Page 17, Col. 1, Para. 1 – Please explain the amount shift in the statement, "In the Hwy. 101 San Mateo Corridor, water transit service would primarily take traffic off the highway, with a smaller shift from existing transit systems". 9

7. Page 50/51, Figs. 31/32 – The market segment maps for 1998 and 2025 look identical. Please review and clarify. 10

8. Page 52, Fig. 33 – The figure shows zero capital costs in years 2015-2018. Please explain. 11

Thank you for the opportunity to comment on the DEIR and Draft IOP for the WTA's proposed ferry expansion project. We look forward to working with you to provide effective transit access to and from the proposed ferry terminal sites with bus and paratransit services and with access to our Caltrain service. Please feel free to contact me or staff members Erik Ólafsson at (650) 508-6368 or Diana Lee at (650) 508-7704 if you have questions.

Sincerely,

Ian McAvoy
Deputy Chief of Development

Hornblower

EIR 174

October 31, 2002

President Charlene Haught Johnson,
and Members of the Authority
WATER TRANSIT AUTHORITY
120 Broadway
San Francisco, CA 94111

RE: Draft IOP for the Water Transit Authority

Honorable Haught Johnson:

We have reviewed the IOP and the supporting documents that the Authority has produced over the last two years. We commend the staff and Authority for the thoroughness of its work to date and look forward to working on toward implementation of the program.

We offer the following observations about the IOP and the Authority's efforts to date:

- **Organization Structure.** While we agree that the institution should be focused on the public good, the organization should also look at being performance oriented. Staff should be rewarded for its successes. The organization should seek the most economical solutions rather than simply spending the public's money. 1

  Moreover, it appears that the myriad of recommendations from the WTA clearly exceed its intended authority. For example, the manning of vessels is a requirement subject to Coast Guard regulations rather than the policy directives of the Authority. The WTA should focus on coordinating ferry service on San Francisco Bay rather than trying to control all aspects of operating a water transit system. 2

- **Significant shift in the economy** since the Blue Ribbon Task Force and preliminary analysis of the WTA. How does this fundamental shift in the economy effect the economics of the IOP ? Any way to structure the agency so that during poor economic times subsidy levels do not go up ? 3

- **WaTOD's.** Opposition from underlying community about density along the Bay's edge (ie blocking views, increasing run-off, etc.). Need specific plans for underlying jurisdictions in conjunction w/ WTA to implement. What says BCDC and State Lands about increased density in their respective jurisdictions? 4

- **Terminal Access.** Access to floats should not be limited to the WTA vessels. Freeboards should be set in a manner to allow a wide variety of vessels access to terminals in times of need, and as a means of generating additional revenue to offset operating expenses. 5

- **Vessel Acquisition Plan.** Why does capital spending stop in the 11th year? Vessel technology will only improve as WTA gains more experience operating the vessels. New technologies should be added, as they become available. Capital expenditures should be shown throughout the life of the IOP rather than stopping at some point in the future 6

- **Business opportunities with the new Authority.** The IOP suggests that additional routes and business opportunities should be run and controlled by the Authority. The Authority should run certain routes on the Bay, while others may make more sense to be operated by others and coordinated with the Authority. For example, ferry service to and from Alcatraz makes more sense to be operated by the NPS in governing the total number visitors on the island at any one time; or existing institutions that operate ferry services such as Golden Gate Bridge, the City of Vallejo and Alameda. 7

  One of the fundamental goals for the Authority should be growing Bay Area, or California based industry, as a means of promoting economic growth in the region, rather than controlling the operations of a new system as a public entity. Ferry systems such as in New York City should be looked at as a model to enhance both public and private service, on certain routes. 8

Thank you for the opportunity to comment on the IOP. Please call if we can provide additional information or answer any questions, Joe Wyman (415)983-8247.

Sincerely,

Terry A. Macrae

EIR 175

City of Vallejo
Public Works Department

555 Santa Clara Street
Vallejo, CA 94590
(707) 648
Fax: (707) 648-4691

FAX TRANSMISSION COVER SHEET

Date: 10/31/02

To: Tom Bertken, Chief Exec Officer

Fax No.: (415) 291-3388

Re: Review of WTA Draft EIR + IOP

Sender: Pam Belchamber

YOU SHOULD RECEIVE 11 PAGE(S), INCLUDING THIS COVER SHEET. IF YOU DO NOT RECEIVE ALL THE PAGES, PLEASE CALL THE NUMBER ABOVE.

Baylink

MEMORANDUM

Date: October 29, 2002

To: Tom Bertken, Chief Executive Officer
San Francisco Water Transit Authority

From: Pamela Belchamber, Transportation Superintendent
Marty Robbins, Marine Services Manager
Vallejo Baylink

Subject: Review of WTA Draft EIR & IOP

Per your request the subject documents have been thoroughly reviewed. The following concerns, comments, questions, opinions, and corrections are offered for your use.

In summary, the documents appear to be thorough, adequately researched, and are well presented. It is hoped that our review comments will, in some way, contribute to WTA's final product.

That being said, the devil is in the details; and both documents are broad and rather general. The EIR is necessarily so because it addresses the system as a whole. We understand that specific routes, terminals, and facilities will require detailed and specific environmental study prior to project approval, therefore the broad and generalized nature of the current document is understandable.

The IOP is likewise light on hard numbers and detailed analysis. However, we know that a great deal of work has been done to arrive at the various conclusions, budgets, schedules, and viabilities. We also understand that operational issues will have to be revisited again during the implementation phase of any future ferry project.

We offer our comments based on our experience implementing a high speed ferry service in the San Francisco Bay, particularly in the area of vessel technology, safety, and operations. We look forward to working with the WTA over the next few years in your efforts to establish new ferry service on the San Francisco Bay.

Please do not hesitate to call me if you have any questions or concerns about Vallejo's comments on the EIR and IOP.

First, for the DRAFT EIR:

Page Number	Comment	
ES-3	Under D-1.1 there is mention regarding the use of shallow draft vessels such as hovercraft. There is a reason that hovercraft and other shallow draft vessels have nearly zero utilization. The vessels of this type have proven to be unreliable, extremely noisy, and extremely costly to operate and maintain. No mention is made to bottom scouring in any of the environmental analysis. The noise issues for hovercraft in particular do not seem to be addressed.	1
ES-4	For D-4.3, seasonal dredging restrictions are fact of life. All WTA dredging projects will likely be limited by season and will likely have to be addressed in its timeline planning efforts?	2
ES-4	NAV-1.1 mentions that safe navigation instructions are identified based on consultation with a San Francisco Bar Pilot. While the SF Bar Pilots as a group certainly have a wealth of marine experience, potentially they represent only one facet and viewpoint of Bay Area navigation. Perhaps the EIR should solicit more input from a wider spectrum of marine operators, including "passenger only" ferry captains.	3
ES-5	NAV-2.2, is this mitigation measure intended to augment bridge manning over entire selected routes, or just portions of said routes. It is believed that the WTA is recommending two person bridge manning, does this translate to a third person is on the bridge for selected routes and/or does this mean that the USCG manning requirements for a given vessel should be route-specific. Is there an increase in total crew requirements based on boat size and speed. What is the operating cost impact of WTA's recommendation.	4
ES-5	NAV-3.2, this is already common practice.	5
ES-6	WW-1.4, use of surface effect and hovercraft in wake sensitive areas "where noise is not of concern" is not a solution, Noise will always be a concern in an environmentally sensitive area.	6
ES-6	GGBH&TD and Vallejo-Baylink have operated for years in wake sensitive areas. Best practices from those two operators should be sought and implemented as additional mitigation measures.	7
ES-8	Oil spill protection measures are fully developed and mature among existing ferry operators. There is little mention in either WTA document regarding the number and potential locations for fueling and oily waste handling facilities.	8
ES-9	For B-8.1, it is unrealistic to presume that any dredging project would be so urgent or time sensitive that the dredging "must" occur during spawning seasons.	9
ES-10	Mitigation measure B-11.1 mentions an alternative whereby ferry	10

	service or routes would be reduced in frequency to avoid disturbance of roosting and foraging waterfowl in shallow areas of the Bay. If so, follow-on service reductions, unless very infrequent and temporary, would then have a negative impact on WTA viability.	10
ES-10	B-15.1, dedicated lookouts for whales should only be used based upon receipt of specific reports and sightings. B-15.2, this technology for whale detection does not currently exist in this application.	11
ES-11	Impact A-1, assignment of S for Significant for Alternative 3 overstates the impact level. At most the level should be PS.	12
ES-11	For A-3, parking mitigation should include landside transit facilities to accommodate both local and express bus service. Intermodal connectivity at the ferry terminal is critical as demonstrated by bus/Bart and bus/ferry at existing transit service locations.	13
ES-11	A-1.2, these mitigation measures come with substantial economic and performance penalties and are largely unproven, have these issues been fully factored into the overall air quality picture?	14
ES-12	Numbers are reported throughout the Air Quality sections which are unclear and leave questions. Some specific information regarding calculations, or tables of assumptions, etc., should be included here.	15
ES-12	Reference is made to mitigation factor A-1.3 in several areas but A-1.3 does not exist.	16
ES-12	PS as a level of significance for A-8, Alternative 3 needs to be explained.	17
ES-13	V-2 Aesthetics in general are highly subjective. Listing any of these impacts as PS seems to be a matter of opinion and not fact.	18
ES-15	G-2, 3, 6, and 7 list PS for Alternative 3, these concerns raised here are site specific and should be addressed as such in the EIR for each project location.	19
ES-16	For NOI-1.1, WTA should set noise standards well above established regulatory standards, not only for reasons of safety and well being, but to provide comfort to their patrons.	20
ES-16	Impact NOI-2 is of very little practical concern as long as the L_{MAX} = 60 dBA @1000 feet is achieved, and it is not difficult to achieve. This noise phenomenon is very random and unpredictable in nature. Listing it as PS seems high.	21
ES-16	For impact T-2, listing it as U seems inappropriate. To me, this is definitely a "S". PARKING is ALWAYS a significant problem in all respects. Not meeting projected parking demand could significantly limit ferry ridership and result in different negative impacts.	22
ES-17	For impact E-2, for all Alternatives, but especially for Alternative 3, the level of PS seems too high, the overall energy consumption of ferry operations in the Bay is and will continue to remain statistically insignificant, therefore L seems to be the correct impact level.	23
ES-17	For Growth Inducement impact GRO-1, the level of impact for	24

	Alternative 3 is PS. Appropriate growth, i.e. infill, is consistent with the desires of some communities, such as Vallejo. The level of impact may be small, but to say there would be no impact is incorrect.	24
3.2-1	Section 3.2.1.2, first paragraph should include mention of marine construction barges and cranes, dredges, and deep draft commercial shipping.	25
3.2-3	Under Hazards to Navigation, second paragraph, the referenced guidelines are germane to large deep draft vessels and escorts and contain little applicability to ferry operations. The ad-hoc Bay Area Ferry Operators (BAFO) group is a more appropriate resource for ferry specific practices and guidelines when it comes to ferry operations and navigational hazards.	26
3.2-4	Proper training of ferry operating crews is orders of magnitude more cost effective at minimizing accidents than additional hardware, equipment, or written procedures.	27
3.2-5	Tidal currents do have an impact on high speed ferry operations, but is only significant at low operating speeds. Tidal currents as high as 6-7 knots are common in Mare Island Strait.	28
3.2-6	Mention is made of windsurfing. However, there is no mention of the potentially more serious problem of personal watercraft and wake jumping. Also, there seems to be a new sport developing akin to windsurfing, but it uses kites to propel the rider and board, as opposed to a sail on the board. This new sport presents additional challenges as the person on the board without a sail makes visibility much harder. With conventional windsurfers, the sail is what first catches the eye. With this new sport, the kite is some distance up in the air and therefore much harder to see given the limited overhead visibility afforded by ferry boat pilothouses.	29
3.2-6 and throughout Section 3.2, & Table 3.2-8	In 3.2.1.4 there is mention that ferry/vessel traffic accounted for approximately 68% of total traffic. This seems extremely high. Does this refer to 68% of just the commercial component of total marine traffic? This number carries over into 3.2.2.2 and is therefore a key component of the entire analysis. Accuracy should be checked.	30
3.2-14	Under Mitigation NAV-1.1, subparagraph 7, being in constant communication is mandated by USCG, and is characterized by monitoring VHF channels 13, 14, and 16.	31
3.2-15	Many of the recommended mitigations are already mandated by the USCG. Indicating items that the WTA wishes to pursue over and above what current regulations require would help focus and better define the proposed mitigations.	32
3.2-16	Under subparagraph 14 include provision for outfitting all WTA vessels with portable defibrillators. With only minutes to take action when someone is experiencing serious heart problems, there is not enough time to find a dock and get cardiac first aid from some shore based entity.	33
3.2-17	Even though windsurfers and other waterborne recreational activities	34

	present some increased level of risk, the relationships already formed are solid and well performing that the risk should be graded L, less than significant. The statement that this activity will never be risk free is true; however, the probability is so extremely low that PS seems unjustified.	34
3.2-19	At first glance, Mitigation NAV-3.1 seems like a good idea. However, your outreach efforts will fall on the deaf ears of the irresponsible minority. Waterborne recreationalists are generally highly responsible. But the scofflaws are prone to take dangerous risks, and no amount of education or other outreach will mitigate their impact. The only defense against this reckless minority is crew training and vigilance.	35
Table 3.2-1	Marinas along the Mare Island Strait were left off the listing and ignored in the analysis.	36
Section 3.2	The Navigation section seems to ignore the whole issue of marine construction activity. Marine construction projects are prevalent throughout the Bay Area and deserve serious attention and analysis in the EIR.	37
3.3-10	In the second bullet item, reference is made to a criteria of "greater than 50 percent of the average sustained wind wave height on a monthly basis." However, should the criteria rather be based on wind wave ENERGY vs. wave height?	38
Section 3.3	Wake effects on marine construction projects are ignored, similar to effects on navigation as mentioned above.	39
Page 3.3-17	MJ/m should read MegaJoules per meter	40
Section 3.6	Greenhouse gases such as CO_2 are ignored?	41
3.6-13	There is an assumption made that emissions for cars, trucks, buses will continually improve through 2025, but that the ferry fleet emissions will stagnate at the Year 2007 EPA Tier 2 standards. This does not seem to be correct.	42
3.6-15	Under Mitigation A-1.2, the effect of increased power and energy requirements for vessels equipped with SCR and soot traps was factored into the emissions analysis? If so, how was this done? Note: there is no operational data available for such installations.	43
3.6	Was the approach of buying emissions credits considered as an alternative to the whole program of alternative fuels and emissions reduction goals and technologies?	44
Table 3.6-2	MARAD, in their Energy & Emissions Newsletter No. 01, reported that an ocean going vessel can produce up to 80 tons of NO_x and 7 tons of THC per day while in transit, and up to 40% of these values while berthed. If these numbers reported by MARAD are true, then the values listed in the table for Ships are in error and grossly understate this component to Bay Area marine emissions.	45
Section 3.6	Why is "S" for a significant level of environmental impact for Impacts A-1,4, 5 & 6 for ferry operations, particularly under	46

	Alternative 3, given the statistical insignificance of ferry emissions in the face of the total Bay Area emissions inventory?	46
Table 3.11-3	Note numbering needs to be corrected.	47
3.12-4	It is reported that Solano County will experience a 75% increase in VMT over the baseline. What is the source of this data? (see next comment)	48
3.12-5	Fourth subparagraph under 3.12.2.2 reports that under Alternative 1 that there will be a small increase in the number of person trips across the Bay Bridge. It would be very helpful if such anomalies could be explained after they are stated. Does this mean in the Bay Bridge "Corridor?"	49
3.12-6	Second line states another apparent anomaly without explanation.	50
3.12-6 and other areas of Section 3.12	Under impact T-1, the reported 18% arrival for foot passengers seems to be overly optimistic for non-San Francisco origins. Perhaps A conservative estimate here seems justified in the WTA's plans for "WaTODs" (water transit oriented developments).	51
Section 3.12	Parking and the effects of peak traffic near ferry terminals (especially during evening commutes when a packed boat full of people all attempt to leave the terminal neighborhood simultaneously) should not be underestimated. The impacts on community environment warrant "S" or significant impact grading than any other environmental concerns being studied.	52
Table 3.12-10	Please explain the 231% increase for Vallejo for VMT under the no-build alternative. This increase is much higher than projected increases in Vallejo ferry patronage.	53
Table 3.12-15	Please explain how bridge traffic for Carquinez/Benicia increases slightly as a result of Alternative 3 in 2025. Granted this is statistically insignificant, but does the modeling explain this?	54
Table 3.12-17	Please explain how VMT for Vallejo increases under 2025 "no build project" as opposed to under Alternative 3.	55
Table 3.13-3	For Passengers/Run, please explain how the numbers were derived, and how the number for ferries decreases so dramatically from Alternative 4 to Alternative 3.	56

Now for the Implementation & Operations Plan

Page Number	Comment	
Cover Page 2	Having ferries in service that are ten times cleaner than today's fleet is an admirable goal. However, this comes at a cost in terms of vessel economics, reliability, and safety. Since the technology necessary has yet to be proven, the goal may not be achievable in a single step. A more prudent course would be to phase in emissions reductions incrementally over time, evaluate the results, and revise goals accordingly depending what is technologically achievable and economically feasible.	57
Cover Page 2	At this time, the "zero emission ferry" concept is worthy of R&D efforts only. Focusing on this concept as the cornerstone of the WTA's overall strategy may not be technologically nor economically feasible at this time. If zero emission ferries become feasible in time, then certainly they should be adopted. R&D in the marine business is an endeavor with many pitfalls. There have been many cases where certain concepts have turned out to be technological and/or economic deadends. which lead down a steep and slippery slope to failures that have permanently discolored otherwise "noble" ventures. The *M.V. Harbor Bay Express II* is a case in point. At this point in marine technology, the "zero emission ferry" is a concept, not a proven reality. No one really knows if the concept is technically feasible, and we don't yet know the economics. In reality, it is quite possible that the performance of such a vessel could seriously limit usefulness in real world applications. The WTA should consider the possible negative effect of such a novelty. It could drain attention, money, and resources from less glamorous programs that could more effectively and efficiently address congestion relief and reduce environmental impacts l in the long term.	58
Cover Page 3	Of the Ferry Vessel Technology experts listed, how many have actually been directly involved in the design, construction, and/or operation of high speed ferryboats?	59
2	Ferries in the United States and the Bay Area do indeed have an unparalleled safety record under USCG and Subchapter H, T, and K rules. What is the rationale for the recommendation that WTA abandon these rules in favor of the IMO-HSC Code, rules that would make high speed ferries inherently more costly to build and operate? Some have also made the claim that the USCG rules are antiquated even though the San Francisco Bay has a near perfect safety record. Have the additional costs of the proposed IMO-HSC safety standards been compared against the likely benefits? Stepping aside from hardware issues, it is well known that proper training of operating personnel makes the real difference in terms of vessel safety. Adopting a more stringent set of rules on paper sounds impressive; however,	60

	any effective safety program always emphasizes the human element, not just the rule book.	60
2	The plan estimates that the first new service could begin within three years of funding. It takes two years to contract for and build vessels. So a route would have to be identified, studied, and permitted in one year. The terminals would have to be studied, permitted, contracted for, and built in parallel with the vessels. Three years seems overly optimistic, particularly for locations where they may be significant local environmental issues.	61
3	It is stated that new vessels ten times cleaner than existing vessels can be deployed within three years. However, the identified technology (SCR with soot traps) still remains unproven in this application. Costs, reliability, maintainability, and safety issues are still unresolved. The technology is not "off the shelf" as stated in later sections of the report.	62
3	Fuel cell technology "may" lead to some sort of zero emissions ferry. The applicability of this vessel , if produced, remains to be seen.	63
3	On-board emissions monitoring of all Bay Area ferries is a costly and burdensome program. A more cost-effective approach is to conduct yearly checks with portable equipment to verify baseline performance and that strict maintenance regimes have been followed. The on-board equipment needed for monitoring is expensive, delicate, and would add unnecessary weight and cost to vessels.	64
3	None of the five technologies for achieving 85% reduction have been proven viable at this time. Only one has actually been placed into service, and that application still has major unresolved technical issues.	65
4	As mentioned previously, site and route specific terminal environmental studies will be required. Typically such studies require a minimum of 2-3 years to complete, but can take much longer when there are significant local environmental issues.	66
4	"Whale collision avoidance sonar" is an interesting concept, but such technology does not exist.	67
11	Emissions controls for the 85% goal have a long way to go before they are proven, so why is the statement made that they are "available and affordable?"	68
11	The EPA Tier II standards are reported to be three times cleaner than the existing fleet. Please provide documentation of this assertion.	69
12	Regarding fare box recovery and subsidy. What goals for farebox recovery been established? What policies would be put into place to safeguard funding for existing ferry operators?	70
16, Figure 7	WTA Alternate 2 shows $10.11 subsidy per $16.11 rider cost ... or a farebox of 37%. Is this going to be the benchmark for WTA efficiency? Most current operators produce much better results. The proposed provision of environmental monitoring, clean air strategies, upgraded safety codes, better transit connections, and absence of "low-hanging fruit" appears to indicate that to be quite expensive? By the way, the term "low-hanging fruit" is inappropriate for a public document, and should be deleted.	71

	There is no mention of cases where express bus service may be appropriate for supplementing ferries, such as is the current case with Vallejo Baylink, where supplemental buses can take advantage of the existing I-80 HOV lane. Certainly there are other cases where supplemental express buses can take advantage of the existing HOV network, particularly across the Bay Bridge.	72
17, Figure 8	As previously mentioned, the anticipated timelines appear to be "best case scenarios", and thus appear to be overly optimistic.	73
37	Loading passengers two abreast is too slow. Terminals and boats should be set up for four abreast as a minimum in order to achieve 5 minute load/unload.	74
37	Bow loading certainly adds elements of flexibility, however side loading can be just as efficient, as Vallejo Baylink has proven.	75
37	How will the WTA ensure coordination with existing ferry operators in terms of critical vessel and dock dimensions?	76
37	Please identify possible locations where the proposed WTA ferry fleet could fuel and berth overnight? Have the costs of operating and maintenance facility(ies) been incorporated into operating cost estimates? Does the operating cost estimate include the expense of deadheading from a central location to the routes served? Has possible operation of the new ferry routes by existing transit operators been addressed, i.e., such as by AC Transit and the San Mateo County Transit District? Proven systems, i.e. Golden Gate and Vallejo operate both bus and ferries as part of fully integrated transit system. With the pending introduction of Translink, area-wide fare and schedule integration is quite "doable" like in Hong Kong, Switzerland, and a number of other European regions, assuming that the "will" to do so exists in the Bay Area.	77
38	This section states that SCR with soot traps is an "immediately deployable" technology. Yet this technology has yet to be deployed in the United States. As mentioned previously, major safety, reliability, cost, maintainability, and performance issues remain. The term "existing off-the-shelf technology" is inaccurate.	78
40, Figure 23	For consistency we recommend using "grams per kilowatt-hour" (g/kW-h) for consistency, rather than "grams per brake horsepower-hour."	79
40	States that natural gas does not have regulatory approval for use on U.S. passenger ferries. This is not entirely true. The USCG has approved CNG demonstration projects. The real drawbacks to natural gas are: low energy density, cost, weight penalties, lack of infrastructure, lack of engine support, lack of experience, lingering safety concerns with both liquefied (cryogenic) and compressed gases, and ongoing maintenance and reliability issues (as seen in bus fleet applications).	80
40	The other three "85% options" bulleted are still theoretical at this time.	81
42	"Key owner requirements" are silent with respect to overall vessel efficiency, reliability, and maintainability?	82
43	Vessel acquisition cycle presented and discussed seems at odds with the	83

	notion of acquiring best value and design/build concept? After safety, reliability is the next most important consideration in vessel acquisition. If a ferry service is not reliable, then it will fail. "Reliability", as a criteria, appears missing.	83
43	Regarding Vessel Maintenance, a fleet of 31 vessels would require a full service, full time shipyard for heavy maintenance. Since high speed vessels require yearly painting, a dedicated drydock would be essential. Have the costs for maintenance facilities been included in the capital cost estimate? What about overnight berthing, fueling, and light maintenance facilities for the proposed 31-vessel fleet?	84
45	As previously mentioned, "whale detection sonar" is a technology that does not currently exist.	85
52	Economics, totals and budgets, and projections are provided … but no details as these were derived are provided. Has the WTA made conservative or aggressive estimates? Until we have them it is difficult to put any stock in the bottom lines presented.	86
54	Has the cost of emissions reductions been quantified in terms of dollars per ton?	87
54	What are the plans and costs for fueling facilities? What fuel price and inflation factors are included in the economic analysis? Have the complexities and regulatory issues of large scale (>40,000 gallon) fuel storage been addressed?	88
55	Since a budget for operations and subsidies has been developed, please provide information regarding the proposed fare structure.	89
59 Figure 37	Vessel (and terminal) design should be left to industry. Facility design should be under Operations, not Planning. Same for maintenance and repair functions. Bus planning should be under Planning, as should bus and ferry scheduling. Maintenance scheduling should be an Operations function.	90
59, Figure 37	The Safety & Training Office should either report directly to the CEO or have department head status equivalent to the others. As depicted it is buried somewhere in the Administration and Business Services department and suffers there.	91
	"Contacts" should be "Contracts?" What provision does the IOP make for contracting out ferry operations to the private sector? Private sector contracting has worked quite well with Vallejo Baylink, Harbor Bay, and the Alameda-Oakland Ferry (that sufficient financial resources to support that route are not currently available is a different issue than private contracting, per se). Private sector operations have an excellent track record in New York City region, and around the world. There is no indication in the IOP document that private sector contracting options have been considered.	92
	Where is the marketing function located?	93
	What level of staffing is estimated into the operations budget for the "full build-out" and other alternatives?	94

EIR 166

COMMUNITY DEVELOPMENT CITY OF ANTIOCH CALIFORNIA *P.O. Box 5007, Antioch, CA 94531-5007*

October 29, 2002

Water Transit Authority
EIR Comments
120 Broadway,
San Francisco, CA 94111
email@watertransit.org

RE: Comments on the WTA Draft Programmatic EIR

Dear Water Transit Authority:

Thank you for providing the City of Antioch the opportunity to comment on the Water Transit Authorities Draft Programmatic EIR for the expansion of ferry service in the Bay Area. Please accept the following City comments.

3.2.1.3 Existing Recreational Uses

Please provide a more precise location of windsurf launch sites in relation to the City of Antioch. Section 3.2.1.3 and table 3.2-2 imply that there will be conflicts between Windsurf users and the ferry service in Antioch. 1

Section 3.2.1.3 Existing Recreational Uses discusses impacts to recreational uses and potential conflicts between the recreational uses and ferry services. Under the heading Windsurfing Sites the launching facilities and the relationship between windsurf activities and ferry service are discussed. While the tone of this section portrays a good relationship, the existence of potential conflicts between these two uses is implied. 2

This section refers the reader to Table 3.2-2 - Bay Area Windsurf Launch Sites
This table notes that Sherman Island "has several launch sites along the levees" and is "near Antioch". The reference in the chart implies that the Windsurf Launch Sites are "near Antioch". Sherman Island is a large land area that has banks along the San Joaquin River, the Sacramento River, and the waterways of Horseshoe bend, Sherman Lake, Mayberry Slough and Threemile Slough. While the south side of Sherman Island is indeed across the San Joaquin River from the City of Antioch, the nearest Windsurf 3

Building Services Phone (925)779-7065 – Fax (925)779-7034
Planning Services Phone (925)779-7035 – Fax (925)779-7034
Capital Improvement Phone (925)779-7050 – Fax (925)779-7003
Neighborhood Improvement Phone (925)779-7042 – Fax (925)779-7034
Land Development/Engineering Phone (925)779-7035 – Fax (925)779-7034

facility that the City staff is aware of is off of the Sacramento River, on the northern side of Sherman island at Threemile Slough. 3

3.3.2.2 Potential Impacts to Shorelines

Please include information and refer to the deep-water channel that exists in the San Joaquin and Sacramento Rivers from the North Bay to the ports in Stockton and Sacramento. 4 Please also include information on the Cargo ships and other large vessels that travel the deep-water channel and compare the wake impacts of these large vessels with that of proposed ferry service to Antioch. 5

Impact WW-1 New routes and increased frequency of ferry trips across the Bay could increase the wave height (energy) at some shorelines, potentially causing increased erosion. Impacts could potentially be significant for sensitive shorelines (tidal marshes and mudflats) that are within 1,500 meters of a ferry route. 6

Mitigation WW-1.6 notes that " If it is not possible to reduce impacts to less than significant levels using the previous mitigation measures, the proposed routes with potentially significant erosional wake wash impacts could be removed from consideration or terminal locations could be changed. The routes that are most likely to have unmitigable wake wash impacts are those from San Francisco to Pittsburg and Antioch. These routes are within 1,500 meters of the shoreline beside long stretches of tidal marsh." 7

Please strike the words of the first sentence "using the previous mitigation measures". This sentence refers to proposed mitigations WW. 1-1 through WW. 1-5. While the noted mitigations are likely sufficient and diverse enough to result in reducing impacts to a level of insignificance, it would be preferable to not limit the mitigation of potential shoreline impacts to these 5 mitigations.

Impact LU-2

The potentially significant impacts that could permanently disrupt or divide existing neighborhoods are overstated for the City of Antioch. Please provide further, more complete analysis of the City of Antioch Land Use patterns, including the primary traffic routes in and out of the likely terminal location in the Rivertown area. 8

Impact LU-2: Installation of new ferry terminals could disrupt or divide already established neighborhoods. This impact has the potential to be significantly negative or positive, depending on how much the community supports or opposes the location of the terminal. 9

The table included in this section notes that 50% of the travel distance from the proposed terminal site to the nearest highway (SR-4) will be through a residential district. The auto routes to the proposed ferry location at the Antioch Marina are the same that are used to reach the downtown Rivertown area. The two primary routes from SR-4 to the downtown are "A" Street and Somersville Road. Both of these routes are bounded by commercially designated properties from the SR-4 on and off ramps to the Rivertown district, where the Antioch Marina is located. 10

Impact LU-3

Impact LU-3: The implementation of the program alternatives could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities or substantial disruption of established low-income or minority neighborhoods.

It would be unlikely that the location chosen for the ferry terminal within Antioch would result in a significant level of displacement of homes or business, if any direct impact was realized at all. The Rivertown area is part of a large mixed use waterfront development area, where additional business and residential opportunities are planned. 11

Impact G-9

Impact G-9: The WTA ferry expansion program could potentially impact the geologic environment, including energy or mineral resources. At a program level of review, none of these issues present any potentially significant impacts.
Sand and Gravel Resources. Half Moon Bay and Antioch are classified as MRZ-3 areas containing sand and gravel resources. This indicates that the locating shore facilities at these locations could restrict future development of these sand and gravel resources. The Bay Area has other available sources for these materials. 12

The terminal would be located in the City of Antioch Rivertown district. This district does not permit the types of uses involved in extracting or processing sand and gravel resources.

As a general comment, the City understands through meetings with WTA staff that the ridership estimates for the Antioch terminal site are based solely upon City of Antioch population and demographics. The City of Antioch is proposed as the easternmost terminal location for the ferry service expansion, and as such, the Antioch terminal would also serve the residents of the City of Oakley and City of Brentwood. Please revise the ridership estimates for the proposed Antioch terminal to include the residents of the communities east of the City of Antioch. 13

The City of Antioch is looking forward to working with the WTA on their ferry project. If you have any questions for the City concerning these comments, please contact me at (925) 779-7035, or via e-mail at falbro@ci.antioch.ca.us.

Sincerely,



Frank Albro
Associate Planner

EIR167

TRANSPORTATION SOLUTIONS DEFENSE AND EDUCATION FUND

16 Monte Cimas Avenue Mill Valley, CA 94941 415-380-8600

October 31, 2002
By U.S. & E-Mail

EIR Comments
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Draft Program EIR

Sirs:

The Transportation Solutions Defense and Education Fund, TRANSDEF, is a non-profit organization focused on improving regional transportation, air quality and land use in the Bay Area. We are pleased to be able to comment on the Draft Program EIR. These comments are divided, both for your convenience and your ability to focus, into clusters: Document Scope, Merits Comments, Factual Corrections, and Typographical Corrections. References to pages are stated with a colon, as in 3.6-15:

Document Scope

The EIR should have included an overview of the public scoping comments. It is unacceptable to provide readers with only a reference to summaries available in another volume. This is critical, because readers need to evaluate whether the EIR is responsive to concerns expressed during the scoping process. 1

The Purpose and Objectives were improperly limited to only water transit solutions, rather than to solving a transportation problem: congested bridges. By so doing, the management team guaranteed an environmental document that, at best, could only show that significant environmental impacts were limited. By choice, a major opportunity was squandered, leaving the EIR incapable of demonstrating the environmental benefits of ferry service expansion.

TRANSDEF's scoping comments called for the EIR to explicitly evaluate a bus alternative. The express bus element of the Bay Crossings study might have made an acceptable alternative, with the added benefit of having the network definitions already completed. The key here is presenting the bus data in juxtaposition with the ferry data. This is substantively different than displaying comparative cost information in the IOP, as the impacts of a bus alternative would be comprehensively studied in an EIR, compared to ferry for all the impact analysis categories. Without such an analysis, the EIR fails to demonstrate any clearcut environmental, financial or transportation benefits for an expanded ferry program. 2

Whether the Legislature "asked" for such an analysis or not, a wise project team would have assembled such an alternative, to definitively answer the question "is this ferry project a good idea?" The lack of comprehensive information leaves that question open to mere opinion. The case for ferries has not been made in the EIR. 2

TRANSDEF also asked for an environmental justice analysis in the EIR, and didn't receive one. The experience of Golden Gate Transit is that public subsidies for ferry passengers are significantly higher than those for bus riders. Given this history of consistent cost differentials, a ferry expansion plan must investigate potential disparate impacts in public benefits, to answer the key Title VI question, "who will benefit?" No demographic analysis of projected passengers was done in response to this question. The absence of a bus alternative for comparison further hinders an evaluation of the ferry alternatives for environmental justice considerations. 3

Another missing analysis–one that would also have helped the credibility of the ferry expansion project itself–is a comprehensive analysis of WaTOD. This innovative principle was invented in house by WTA. TRANSDEF suspects that WaTOD defines a niche in which new ferry service is part of an environmentally superior response to the Bay Area's huge housing shortage. WTA would provide a significant public service by including WaTOD in the EIR, establishing the concept's credibility with careful analysis. 4

Some data was summarized without a reference to tables available in the same EIR volume. Page 3.6-16 included "Summary of Impact A-2" without indicating that the data was available later in the EIR. 5

Finally, the transportation modelling failed to prominently identify projected vessel occupancies by route, a determinative factor under the various scenarios. Table 3.13-3 is the most illuminating data in the entire EIR. It clearly indicates that average occupancies drop dramatically with the expansion of the ferry system. Without a thorough discussion of occupancy, this table can only be read to indicate that the cream of potential ridership has already been captured, and that any further gains will be at much greater expense. (See 3.13-5) 6

Merits Comments

The Draft Program EIR was nicely done, nicely designed, and well-proofread. Congratulations on a good looking document.

3.6-19: Mitigation A-6.1, reducing bus service so as to reduce emissions, was especially stupid. Including it in the EIR demonstrated poor professional judgment. Delete it. 7

3.11-11: Please consider active noise cancellation as a mitigation for all impacts. Call us if unfamiliar with this technology. 8

3.12-5: The transportation analysis does not indicate any strikingly positive results. Positive impacts are tiny. It would appear that very little is accomplished by expanding the ferry system. This is why it is so important to provide comparative data from a bus mode. Perhaps the only viable rationale for ferry expansion is WaTOD. Unfortunately, the EIR does not document the positive environmental impacts of the concept. 9

3.12-7: Include a parking management plan, feeder buses and parking charges in Mitigation T-1.1. 10

4-5: The analysis and mitigation of growth-inducing impacts was excellent. 11

Factual Corrections

2-7: Port Sonoma is the subject of great controversy. It has not received community support, although its boosters occupy prominent positions. Environmentalists are very concerned about its impacts on wildlife habitat and growth inducement in Southern Sonoma. 12

3.6-2: Please add a description of summer inversions. These are the source of ozone exceedances. 13

3.6-12: The EMFAC version is officially known as "San Francisco Bay Area EMFAC 2000." 14

3.6-12: PM_{10} increases with VMT. Given the significant projected increase in VMT, and the linear relationship between VMT and PM_{10}, PM_{10} must be expected to increase significantly in the future. Is this sentence referring to the emissions factor for PM_{10}? 15

3.6-16: San Francisco Bay Area EMFAC 2000 is not approved by CARB for use outside the Bay Area. 16

3.12-2: The sentence "MTC encourages the integration of expansion of existing systems..." is garbled. MTC does encourage the expansion of existing systems, as well as the integration of existing systems (albeit by technical rather than political means), but does not encourage the integration of expansion of existing systems. 17

3.12-4: Explain why VMT numbers in Tables 3.12-7 and -8 are incompatible with VMT from the 2001 RTP EIR. If this is because of differences in models, that raises questions about the validity of all model results. 18

3.12-6: Please verify that the drive access VMT referenced here is included in the EIR's air quality calculations, along with its cold starts. 19

Table 3.12-5: Please clarify whether modelled trips on BART and other modes are constrained by capacity. If not, please explain their validity. 20

4-1: Something is very wrong with the statement that Marin and San Francisco will not have a housing shortage. They have extreme shortages right now. This may be a bungled attempt to reference planned growth in jobs and housing, but even that is way out of balance. 21

4-1: Identify whether the identified increase in household income is in constant dollars. 22

4-2: Gnoss Field is not in Sonoma County, and is not planned by the Sonoma County Permit and Resource Management Agency. By combining Gnoss Field and Port Sonoma, numerous misstatements occur throughout the EIR, including the reference to Gnoss Field being a large agricultural area. 23

Typographical Corrections

2-6: Change "of" to "or" in #5.

3.6-10: Delete "are" from "None of the new standards...."

3.7-6: "Northern Pacific Railroad" should be "Northwestern Pacific Railroad"

3.7-6: "Marine Ships" should be "Marinship"

Table 3.7-1, pg. 2: "Northern Pacific Railroad" should be "Northwestern Pacific Railroad" 24

3.13-4: The data in the Summary of Impact E-1 do not track with the data in the table above. Is this a failure to revise multiple occurrences of data?

4-2: The table's two right-most column headings are reversed.

TRANSDEF appreciates this opportunity to comment on the Draft Program EIR. We hope that the FEIR will be expanded to include the material we suggested, as that would provide a strong rationale for ferry expansion. We are available by phone should there be any questions pertaining to these comments.

Sincerely,

David Schonbrunn,
President

STATE OF CALIFORNIA GRAY DAVIS, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

FIFTY CALIFORNIA STREET, SUITE 2600
SAN FRANCISCO, CALIFORNIA 94111
PHONE: (415) 352-3600
http://www bcdc.ca gov

EIR 168
EIR 168

October 31, 2002

Thomas Berken, Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

SUBJECT: Draft Programmatic Environmental Impact Report. Expansion of Ferry Transit Service in the San Francisco Bay Area.

Dear Mr. Berken:

The San Francisco Bay Conservation and Development Commission ("BCDC") appreciates the opportunity to review and comment on the Draft Programmatic Environmental Impact Report for the Expansion of Ferry Service in the San Francisco Bay Area ("DEIR"). Although our Commission has not had the opportunity to review the DEIR and therefore these are staff comments, they are based on BCDC's law, The McAteer-Petris Act, and the provisions of its *San Francisco Bay Plan* ("Bay Plan"). Given the potential for both positive and adverse impacts of locating ferry terminals along the Bay shoreline, it is important that the siting and design of these facilities is done in a way that both protects and enhances the Bay as a regional resource, while ensuring the viability of an expanded ferry transportation system on the Bay. From our staff review of the DEIR it is clear that the Water Transit Authority ("WTA") also acknowledges the importance of achieving both of these goals. 1

BCDC has participated in the process of developing the DEIR and the plan as a member of the Technical Advisory Committee and of several Ad Hoc committees that were formed to address specific issues. BCDC has been impressed with the WTA's public process and its willingness to work with regulatory agencies, local governments, non-government organizations and members of the public in a constructive manner. In addition, we commend the WTA's for its firm commitment to the improvement of air quality associated with ferry vessel emissions. These commitments include deploying ferries within three years that are ten times cleaner than existing ferries and establishing a regional fleet of ferries that will attain air quality standards that are 85 percent better than the U.S. Environmental Protection Agency's ("EPA") 2007 standards for marine vessels. We also applaud the WTA for the other sound transportation commitments that the agency has made, including increasing intermodal access to ferry terminals and reducing the use of automobiles for these trips.

BCDC's Authority. In addition to the comments on the specific sections of the DEIR, we have some general comments that pertain to the entire document. The DEIR refers to BCDC in many sections of the document as a local, rather than a state agency. BCDC is a state Commission and the McAteer-Petris Act (Government Code Section 66600-66682is a state law. 2 The most recent edition of the Bay Plan was not used to prepare the DEIR and therefore the DEIR does not make reference to all of the relevant sections of the Bay Plan. Specifically, the DEIR does not include a description of the Bay Plan designated priority 3

use area designations (e.g., ports, water-related industry, waterfront parks), nor does it include a discussion of the Bay Plan policies on water quality; navigational safety and oil spill prevention; tidal marshes and tidal flats; fish, other aquatic organisms and wildlife and subtidal areas. 3

Additionally, as a member of the Technical Advisory Committee and several of the Ad Hoc committees that were set up to address specific issues, BCDC felt that the DEIR would have benefited from more references to the significant amount of research and analysis that the WTA accomplished on issues such as air quality, intermodal transportation connections, terminal design and biology. The specific comments on the following pages offer suggestions for where we believe additional information would be beneficial in the preparation of a Final EIR including discussions on impacts that are not currently included in the DEIR. 4

Dredging. As discussed in the DEIR, dredging and the disposal of dredged materials can effect the environmental health of San Francisco Bay. In many places in the DEIR, the use of hovercraft ferries is discussed as a means to minimize the amount of dredging needed to create access channels to possible ferry terminal sites and to minimize the amount of dredging required to maintain those channels. However, even though hovercraft may minimize the amount of dredging required for certain possible ferry terminal sites, there are other potential environmental effects associated with hovercraft. Mitigation D-1.1 points out that the amount of dredging under ferry system development alternatives 1 and 2 could be reduced by the use of hovercraft. In addition, Mitigation D-2.2 suggests that the WTA could employ hovercraft in channels with contaminated bottom sediments to avoid the need for dredging these sediments and releasing the contaminates into the water column. Although these strategies have merit for reducing dredging impacts, there may be other kinds of impacts, e.g., noise, that would be associated with hovercraft use that should be analyzed as part of the Final EIR so that a complete range of impacts of possible ferry vessels can be presented on which choices can be made regarding the kinds of craft that would have the least overall adverse environmental effect on the Bay and its resources. 5

Following are comments on specific subsections of the dredging section.

Dredged Material Management Office. The disposal site SF-DODS is regulated by the U.S. EPA and possibly the U.S. Army Corps of Engineers, not the California Coastal Commission. SF-DODS falls outside the Coastal Commission's jurisdiction. 6

Regulatory Setting. As pointed out previously, BCDC is a state, not a local agency. Further, the McAteer-Petris Act is part of the Government Code, not the Public Resources Code. The Suisun Marsh Preservation Act of 1977("Marsh Act") should be cited as Public Resources Code Section 29000-29612. In addition, an essential part of BCDC's regulatory framework is the Commission's *San Francisco Bay Plan* ("Bay Plan") and in the Suisun Marsh, the *Suisun Marsh Protection Plan* and the Suisun Marsh local protection program. The Bay Plan contains a dredging policy section with findings and policies that guide the Commission in its regulatory actions involving dredging. Projects approved by BCDC must be consistent with the McAteer-Petris Act and the provisions of the Bay Plan. In the Suisun Marsh, projects in the primary management area (generally the waterways and managed wetlands) require a marsh development permit from BCDC and must be consistent with the Bay Plan, the Marsh Act and the Suisun Marsh local protection program. 7

Because a proposed ferry terminal is located at Half Moon Bay, within the jurisdiction of the California Coastal Commission, the DEIR should discuss the authority of the Coastal Commission, a state agency, for projects proposed along California's ocean coast. (CCC). The Coastal Commission also exercises authority under the provisions of the federal Coastal Zone Management Act of 1972, as amended. 8

Impacts Section 3.1.2.2. The DEIR should discuss the possible entrainment of special status species in dredge machinery during dredging. The DEIR should also address the potential entrainment of special status fish species in the different types of dredges normally employed in San Francisco bay Projects. We believe Impact D-4 would be an appropriate place to do the above. 9

Table 3.1-1. A new column should be added to table 3.1-1 entitle "McAteer-Petris Act." BCDC's primary state regulatory authority flows from the McAteer-Petris Act. The Coastal Zone Management Act of 1972, as amended ("CZMA") is the source of BCDC's federal authority. Under the new column, the Dredge Operations row should be amended by adding, "BCDC permit required of applicant"; in the In-Bay disposal row, "BCDC permit required of applicant" should be added; in the Upland Reuse row, "BCDC permit may be required of applicant" should be added as well as in the CZMA column. 10

Table 3.1-4. The Bel Marin Keys project is in the SEIS/R stage, not the DEIS/R stage. 11

Navigational Safety. The Bay Plan contains findings and policies on navigational safety and oil spill prevention. The findings identify the difficult challenges for operating vessels in the Bay, which include increasing vessel traffic, physically restricting shipping lanes, frequent shoaling, rapid weather changes, fog, strong currents, and physical obstructions. (Navigational Safety and Oil Spill Prevention, Finding b.). However, the findings also acknowledge that the active participation of the many state, federal and international agencies, organizations and businesses involved in maritime shipping activities in programs to improve navigation and to prevent marine accidents has contributed to an outstanding navigational safety record. (Navigational Safety and Oil Spill Prevention, Finding d.). The WTA should be recognized for its close work with the Harbor Safety Committee of the San Francisco Bay Region("Harbor Safety Committee") and continue to work with the maritime community in a joint effort to reduce navigational safety risks. Over the last ten years, the Harbor Safety Committee has been very effective at implementing changes in San Francisco Bay to make navigation safer, and continues to provide an excellent forum to discuss navigational safety. The Harbor Safety Committee members would welcome continued navigational safety discussion and would be able to provide ideas and insight into how to make ferry transportation as safe as possible. BCDC is confident that the WTA recognizes this resource and will continue in its discussions to reduce risks to all maritime users of the Bay. 12

The DEIR adequately addresses navigational hazards and casualties. However, the WTA should not underestimate the popularity of the Bay for all types of vessels, from windsurfers to fishing vessels to commercial ships to tugs and barges, and should seek input from each of the user groups in crafting specific plans for the proposed regional ferry system. 13 The DEIR states that impacts would be significant if they would interfere substantially with the recreational use of the Bay (Section 3.1) This discussion should be expanded to include all maritime users of the Bay. 14 The DEIR concludes the project could have potential significant impacts on navigation incidents, but that the level of significance is difficult to determine. Further, it recognizes that no system can ensure risk-free navigation 15

conditions in the Bay. In recognition of this, BCDC recommends that the WTA regard navigational safety as paramount and that the final EIR recommend that the eventual operators of the regional ferry system use all available precautions to minimize the navigational risks associated with an expanded level of ferry service in the Bay. 15

Wakes. An increase in ferry service could result in higher, more frequent and more forceful wave action along the shoreline. This increased wave action could require shoreline protection measures, such as structures to control erosion, rip rap and sea walls. The Bay Plan includes findings and policies for the protection of the shoreline. Some of the policies that may be relevant include, "[n]ew shoreline control projects and the maintenance or reconstruction of existing erosion control facilities should be authorized if: (a) the project is necessary to protect the shoreline from erosion…." (Protection of the Shoreline, Policy 1) Additionally, policy 4 states that shoreline protection measures should include provisions for nonstructural methods such as marsh vegetation where feasible.

In order to avoid the need to place new shoreline protection structures along the Bay shoreline, BCDC feels that the significance criteria for wakes should be expanded to include any impacts that would require the installation of shoreline protection structures. These structures contribute to bay fill and have adverse impacts on the shoreline where the structure is placed and on the shoreline around the structure. Shoreline protection structures may result in an increase in erosion, reduce the natural functions of the Bay and can adversely affect shoreline appearance. Additionally, levees should be added to the list of shoreline features (mudflats, salt marshes, narrow channels and sandy beaches) that could be adversely impacted because they may require shoreline protection from increased wave action from ferry service. Similarly, increased wave action may necessitate the reinforcement of rock riprap shorelines, which would also result in more bay fill. Rather than use shoreline protection structures to reduce the impacts of increased wakes, BCDC supports the WTA's plans to use route bending, vessel design and reduced speeds to prevent impacts. 16

Water Resources. Water Resources. Following are comments on specific subsections of the Water Resources section.

3.4.1.2 Water Quality. This section should include a description of the beneficial uses of the Bay's waters as described in the State Water Resources Control Board, San Francisco Bay Region's Basin Plan, such as recreational boating, fishing, navigation and aquatic habitat. 17

Although this subsection discusses the Regional Monitoring Program ("RMP") for San Francisco Bay, it does not include information that shows where the identified contaminants occur in the Bay. The location of the contaminants could be linked to areas in which dredging would be required to create and maintain navigational channels for ferries to proposed ferry terminal sites. The San Francisco Estuary Institute has this kind of information available in its Estuary Interface Pilot Study 1996-1999. 18

Throughout the Water Resources section of the DEIR, the word "constituents" should be changed to "contaminants" or "pollutants" to be consistent with the terminology used in regard to water quality and water pollution. 19

3.4.1.2 Regional Monitoring Program Findings. The DEIR states that the data collected over the past seven years indicates that there are contaminated areas in San Francisco Bay. However, the document does not include maps showing where these contaminants occur. The Final DEIR would benefit by including a figure that illustrates the areas of contaminants. 20

Although the statement in the DEIR that the Estuary is better than in earlier decades may be true, this statement only reflects a partial picture of contamination in the Estuary. The level of contamination in the Bay today is high enough to impair the health of the ecosystem. Samples tested and reported in the 2000 RMP showed that 90 percent of the fish tested contained PCB's at levels of concern for human health. San Francisco Bay is identified by the State Water Resources Control Board ("State Board") as impaired water body because of the numerous contaminants, including PCB's and mercury, found in the Bay. The State Board has included the Bay on its 303(d) list, which lists the impaired waterbodies in the state. Further, high pollutant levels have produced toxic effects in the Bay's fish, shellfish, bird and mammal species, and few reductions in toxic concentrations are evident, despite decreases in pollutant loads for many trace elements from municipal and industrial effluent and bans on production and restrictions on use. 21

3.4.1.2 Status of Sediment. In this subsection, the DEIR authors state, "…many trace elements are naturally at high levels in Estuary sediment, and may not be a problem." It is unclear what this statement refers to. The high levels may not be a problem in regards to water quality objectives? thresholds?, human health?, the health of the ecosystem? The statement should be clarified in the Final DEIR. 22

3.4.1.2 Medium-Priority Constituents. The DEIR should identify whether the fish advisory is for all of San Francisco Bay or for a portion of the Bay. This section should note that urban creeks tributary to San Francisco Bay are proposed to be included on the 2002 303(d) list for diazinon. 23

3.4.1.2 Low-Priority Constituents. The word "adverse" should be added before the word "effects" in the sentence, "[s]elenium is a low-priority constituent in the Central and South Bays due to effects in one branch of the food chain (the most sensitive indicator is hatchability in nesting diving birds)." 24

3.4.1.3 Sediment Quality. The DEIR states that "[w]hile pollutant loading to the Estuary from point and non-point sources has declined dramatically over the past two decades…." However, in BCDC's research and involvement in non-point source pollution issues, staff has not found trends and data to show that non-point source pollution has declined dramatically. It is true that point source pollution has declined dramatically, but research has not shown similar reductions in non-point source pollution. 25

3.4.1.4 Drainage and Runoff. The DEIR should spell out NPDES—National Pollutant Discharge Elimination System—the first time that it refers to the system. Additionally, this section should include a description of which regulatory body has NPDES permitting authority delegation from the U.S. EPA. In addition, the document should identify the NPDES permit that existing ferry terminals operate under. 26

3.4.1.6 Groundwater. When referring to the Bay Plan, the DEIR should identify BCDC as the regulatory body that administers the Bay Plan. It is unclear why this section includes a discussion of Dredging Policy 9 from the Bay Plan. Does this policy have implications for the proposal and, if so, what are these implications? 27

3.4.1.8 Regulatory Setting. The document should include a discussion of the 1987 amendments to the Clean Water Act, which deal with NPDES and non-point source pollution control programs. In addition, it would be advisable to discuss the Coastal Zone Management Act/ Coastal Zone Act Reauthorization amendments in the Final EIR as well as Section 6217 that addresses non-point source pollution in the coastal zone. 28

It is unclear why the Clean Water Act and the Federal Water Pollution Control Act are listed separately. This section would be clearer if it listed all of the Clean Water Act sections under one heading and summarized the sections that are relevant to the operation of ferries and ferry terminals. 29

3.4.1.8 McAteer-Petris Act. As noted in previous sections, the McAteer-Petris Act is a state, not a local law. Additionally, BCDC's jurisdiction includes. In addition to the Bay and the 100-foot shoreline band, salt ponds, managed wetlands, tidal marshes five feet above mean sea level, and certain named tributary waterways such as rivers. The DEIR refers to the "Federal Coastal Zone Protection Act." The correct title of the Act is the "Federal Coastal Zone Management Act." 30

Biology. Several sections of BCDC's Bay Plan pertain to the protection of the Bay's ecological resources. Increased ferry transit on the Bay has the potential to have significant adverse impacts on the Bay's ecological resources from the placement of new ferry terminals along the shoreline, the addition of new routes in the Bay, the increased frequency of the routes, dredging and the operation of the vessels. Depending on the location of the new terminals and routes, the new service could adversely impact tidal marshes and tidal flats, native, threatened and endangered species and the subtidal areas of the Bay. The Bay Plan policies on tidal marshes and tidal flats state that "[t]idal marshes and tidal flats should be conserved to the fullest possible extent. Filling, diking and dredging projects that would substantially harm tidal marshes or tidal flats should be allowed only for purposes that provide substantial public benefits and only if there is no feasible alternative." (Tidal Marshes and Tidal Flats, Policy 1) Another potentially applicable policy states "[a]ny proposed fill, diking or dredging project should be thoroughly evaluated to determine the effect of the project on tidal marshes and tidal flats, and designed to minimize, and if feasible, avoid any harmful effects." (Tidal Marshes and Tidal Flats, Policy 2)

The Bay Plan also contains specific policies designed to protect and preserve subtidal areas. The subtidal policies include "[a]ny proposed filling or dredging project in a subtidal area should be thoroughly evaluated to determine the local and Bay-wide effects of the project on: (a) the possible introduction of invasive species; (b) tidal hydrology and sediment movement; (c) fish, other aquatic organisms and wildlife; (d) aquatic plants; and (e) the Bay's bathymetry. Projects in subtidal areas should be designed to minimize and, if feasible, avoid any harmful effects." (Subtidal Areas, Policy 1) Policy 2 of the Subtidal Areas section of the Bay Plan states that subtidal areas that are scarce in the Bay or have an abundance and diversity of fish, other aquatic organisms and wildlife (e.g., eelgrass beds, sandy deep water or underwater pinnacles) should be conserved. Filling, changes in use and dredging projects in these areas should therefore be allowed only if: (a) there is no feasible alternative; and (b) the project provides substantial public benefits. In the Bay Plan's Fish, Other Aquatic Organisms and Wildlife policies there are more protections for tidal marshes, tidal flats, and subtidal habitats. Policy 1 states that these areas should be conserved, restored and increased in order to assure the benefits of Bay species for future generations. Policy 2 states that specific habitats that are needed to conserve, increase or prevent the extinction of any native, candidate, threatened or endangered species should be protected, whether in the Bay or behind dikes.

At a programmatic level, it is difficult to determine the potential for increased ferry service to have impacts on these habitats and species. Although the general locations of the potential terminals are known, the biology section does not describe the habitat types, species and potential impacts that the sites would have if implemented. Since the DEIR is programmatic, BCDC understands that the level of detail and analysis would not be significant at this time. However, enough information is currently known to provide a broad 31

overview of the habitat types and potential species that are found in the areas where the future terminals may be located. This overview could be similar to the one that is provided on Table 3.7-1, the Land Use and Community Matrix table. Without this information, it is difficult to analyze the potential for the system to have impacts on sensitive species and habitats. This information could have an impact on the decisions that are made regarding which ferry terminals and routes to pursue and which to remove from further consideration. 31

In order to better implement the policies described above, the Bay Plan also identifies wildlife refuges as priority use areas. As identified in our comments on the Notice of Preparation, BCDC is concerned that both of the alternatives that propose new ferry terminal sites include sites that would require the ferry routes to travel through portions of these wildlife refuge priority use areas, which include the national wildlife refuge, and that some routes may necessitate significant amounts of dredging and have the potential to induce growth in areas along remote areas of the Bay shoreline that contain significant natural resource value. The DEIR would benefit from more information on these sites to allow for a careful analysis of including these sites in the final plan for the expansion of ferry service in the Bay. 32

The Final Environmental Impact Report should also include information or a discussion regarding existing and proposed restoration areas around the Bay. There are significant restoration projects that are being planned and others which are in progress or have been completed. The DEIR should contain a discussion of these existing and future restoration sites and the potential impacts that expanding ferry service in the Bay would have on these areas. 33

The following comments are recommendations to improve the biology section of the DEIR to make it easier to evaluate the potential adverse impacts that increased ferry service may have on the Bay's ecological resources.

3.5.1.2 Habitat Types. This section would benefit by reviewing the *Baylands Ecosystem Habitat Goals* report ("Goals Report") habitat typology and organizing the description of habitat types similarly. For example, brackish marsh and salt marsh should be discussed as sub-categories of tidal marsh. The nomenclature for the different kinds of diked baylands (diked marsh, managed marsh, muted tidal marsh, agricultural baylands and salt ponds) should be made consistent with the habitat typology found in the Goals Report. Similarly, the habitat types on Figures 3.5-2 to 3.5-6 should correspond. 34

The discussion of tidal marshes does not include an overview of the functions and values associated with tidal marsh (e.g., as nursery habitat for salmonids and their importance to the Bay's food web). Also, the description of tidal marshes should refer to the current acreages included from the Goals Report In addition to current acreages, a discussion of how important this habitat is to numerous listed species and the concerted effort to restore these areas should also be included. 35

Bayflats are referred to in the Goals Report as "tidal flats" and include not only mudflats, but also shell flats and sand flats. On Figures 3.5-2 to 3.5-6 a clearer picture of the linkage between tidal flats and tidal marsh would occur if they were colored brown instead of blue. Currently their color makes them look like part of the Bay, instead of an area that is exposed at low tide. 36

Open bay habitat is not only a feeding area for Pacific herring, but also a critically important spawning area (p. 3.5-6). They spawn on a variety of substrates beyond eelgrass. 37
Figure 3.5-7 should be referenced in the discussion pertaining to the open bay. Examples of 38

the anadromous fish species which use the open bay should be discussed as well as the fact that the majority of them are listed as threatened or endangered. Examples of diving birds which depend on the bay should also be included. 38

3.5.1.3 Biological Resources. The section on plankton would be improved with scientific review. For example, ichthyplankton would seem to be a kind of zooplankton, but is represented as being its own category of plankton. 39

The section on fish does not represent the array of species found in the Bay which may be impacted by the project. A good reference source for the fish that are found in the Bay is the *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project* or the *California's Living Marine Resources: A Status Report* published by the California Department of Fish and Game. The National Marine Fisheries Service is also a valuable source for information on Bay-related fish species.

Additionally, the discussion pertaining to birds is does not adequately represent the array of species found in the Bay which may be impacted by the project. For example, the categories of "Waterbirds" and "Tidal Marsh Birds" are confusing. The second category should perhaps be "Shorebirds." Further a description of "Other Birds" such as grebes and pelicans should also be included. The *Baylands Ecosystem Species and Community Profiles: Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project* is a good source for a description of various birds and their habitat associations, which should be described in this section. Further, this section would be well-served by scientific review by scientists such as John Takekawa at U.S. Geological Survey ("USGS") or Gary Page at the Point Reyes Bird Observatory ("PRBO"). 40

On page 3.5-14 the sections on the portions of the Bay important to bird species should use more recent data than the 1992 report by SFEP (see work by John Takekawa from USGS or Gary Page at PRBO). Further, the figures at the end of this section relating to the distribution and abundance of various bird species (surf scoter, canvasback, shorebirds, black rail and California clapper rail) should be referenced and discussed in terms of their relevance to the proposed project. 41

3.5.1.4 Protected Species and Habitats. The section on "Regulatory Setting" (3.5.1.5) should precede the discussion on "Protected Species and Habitats" (3.5.1.4) to provide context to the reader as to the protections the species are offered under the various state and federal laws. 42

A discussion of candidate species under the federal and state endangered species act should be included here as various agencies have a responsibility to consider impacts on these species during their review of a proposed project, as well as California Department of Fish and Game protected and fully protected species. 43

A discussion of where each of these species are found or may be found in relationship to the proposed new ferry terminals would also be very helpful. 44

3.5.1.5 Regulatory Setting. Under the Federal Endangered Species Act, the discussion of various listing categories such as "proposed" seems out of date. Current information is available on the U.S. Fish and Wildlife Service's website at http://endangered.fws.gov. 45

On the top of page 3.5-27 the discussion of Essential Fish Habitat (EFH) should address the fact that the Bay is considered by statute as EFH for numerous managed fish species. The species for which the Bay is considered EFH should be listed and described in section 3.5.1.4. 46

3.5.2.1 Significance Criteria. "Critical Habitat" found in the second bullet from the top has not been defined. Critical habitat has a regulatory definition under the federal endangered species act, although the Bay's wetlands have not been defined as "critical habitat" for any species under the federal endangered species act. 47

The third bullet down should also include the "reduction of protected wetland habitat" as defined in Section 66610 of BCDC's McAteer-Petris Act ("marshlands lying between mean high tide and five feet above mean sea level"). 48

3.5.2.2 Potential Impacts on Habitat. Ongoing impacts, not just construction impacts, associated with the various ferry transit alternatives should be considered throughout this section on the Bay's biological resources. 49

Impact B-1. Loss of or disturbance to tidal flats, shallow subtidal areas and upland transition zones should also be considered as a result of dredging and construction of terminal facilities as they are interconnected habitat types likely to be affected together. 50

The final statement in the section on mitigation that "[t]otal area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation" does not account for the complexity of issues involved with mitigation, both biological and social. 51

Impact B-2. Along with S. alterniflora, four other varieties of non-native cordgrass exist around the Bay and could be spread through possible construction activities. In particular, Corte Madera Creek has a flourishing population of S. densiflora which should be discussed in this analysis. Also, the potential for ongoing maintenance dredging to spread non-native plant species should be discussed. 52

Impact B-3. The title should include the term "removal" as well as "disturbance" of Special Aquatic Sites. 53

BCDC's jurisdiction varies from the Corp's and should be discussed independently. 54

Impact B-4. Short-term and long-term dredging impacts on areas of the Bay which have important seasonal plankton blooms, including the South Bay, San Pablo Bay and Suisun Bay should be discussed independently in this section. 55

Also, the potential for increased ferry traffic to resuspend sediments in the water column and the associated effects on plankton should also be discussed. 56

Impact B-5. A greater discussion of the effects of maintenance dredging is needed; especially in terms of expected amounts of sediment and how often dredging will need to occur at various proposed new terminal locations. Also, a disturbance of benthic communities associated with dredging may prompt an invasion of the non-native Asian clam in areas which have not been invaded. This potential impact should be discussed as it may be significant, especially in areas of San Pablo Bay and the South Bay. 57

Impact B-6. A discussion of the non-native Asian clam needs to be referenced specifically here as its impacts are likely to be the most significant. 58

Also, under the "Summary of Impact B-6" the statement "…given that most nonnative species serve ecological functions similar to native species..." likely does not apply to the non-native Asian clam as it significantly changes the physical structure of those areas where it invades and also bio-accumulates toxins, which are then transferred throughout the food web. 59

Impact B-7. This section should include a discussion of which species are likely to be impacted by the building of new terminals. For example, do salmonids migrate in the vicinity of Port Sonoma? Also, how will maintenance dredging impact specific fish species and will environmental windows for dredging perhaps impact the viability of a particular site if dredging would be required often? 60

Where are Impact D-4, D-4.1, D-4.2 and D-4.3 discussed in the text? 61

Impact B-8. In addition to dredging, would new construction eliminate any currently valuable spawning habitat, if so, where? 62

Impact B-9. Are there any known effects on fish species associated with day-to-day ferry travel (noise and sedimentation), especially in turning basins and launch areas? If there is this impact should be discussed in relationship to sites where new terminals may be located and the kinds of fish found there. 63

Impact B-10. Shorebirds are wetland species. The title for this impact should include waterfowl, shorebirds and other birds (rails, pelicans, egrets, etc.). 64

A range of acreages which could be impacted for both tidal flats and tidal marsh in specific alternatives would be helpful, along with a range of species which may be affected. If acreages are too specific then just the birds associated with areas where potential terminals may be sited is a good start. The importance of these sites to various bird species, in addition, would also be helpful. This task could be met by better referencing the distribution and abundance figures found in the back of the section and relating them to the locations where terminals may be sited. For example, Gnoss Field and Port Sonoma (areas where new terminals are proposed) are located in areas where, according to Figure 3.5-12, a high abundance of black rails, a listed species, are found. 65

Impact B-11. This section needs to address not only the impacts of ferry traffic on waterfowl, but also on shorebirds. Significantly, the estuary is recognized as a Western Hemisphere Shorebird Reserve Network of international importance for more than a million shorebirds in migration. Also, the North Bay is of critical importance to shorebirds and waterfowl and should be discussed as such in relationship to areas where terminals may be sited. (see Figure 3.5-8, 3.5-9 and 3.5-10). For example, Figure 3.5-8 illustrates that routes to Gnoss Field and Port Sonoma would bisect areas of largest surf scoter abundance. 66

Impact B-12. A discussion of common marine mammal feeding areas in relationship to where dredging, including maintenance dredging, will occur is needed in this section. 67

Also, will ferry wake have any effect on turbidity in shallow feeding areas and an associated impact on marine mammal foraging? Locations where this may occur should be discussed. 68

Impact B-14. Harbor seal haul-out sites are utilized in the Bay not only for resting, but also for breeding and the raising of pups. Further, this section should point out that harbor seals are the only marine mammal that is a permanent resident in San Francisco Bay. 69

Further, Figure 3.5-15 is missing some known harbor seal haul-out sites such as Sister's Island and Tubbs Island. Also, this section should point out that long-term exposure to disturbance can result in the separation of mothers and pups (resulting in seal pup deaths which may have population-level effects) and the potential for outright abandonment of a haul-out site. 70

Impact B-16. Critical habitat is a regulatory term defined under the federal endangered species act which must be delineated for individual species through a federal process. Is the terminology in this section meant to refer to this designation as very few Bay Area species have had their critical habitat designated by the U. S. Fish and Wildlife Service? However, if the term is meant to refer generally to habitat critical to a species' survival then that should also be explained. In other words, the term needs to be defined. 71

Other operational (long-term) impacts, beyond wake effects, should be listed as well as their potential to affect resting, foraging and breeding of fish, other aquatic organisms and wildlife and plant species, such as eelgrass (see first sentence of the first paragraph). 72

Table 3.5-4 should be referenced here, although the table is of little use due to its generality in relationship to the proposed project locations and associated habitat types. Listed species should really be correlated with the habitat types discussed throughout the document and mapped in Figures 3.5-2 et seq. The Goals Report should be able to provide a great deal of this information (see Figure 3.2, Abbreviated Habitat Support Function Matrix). 73

The "Summary of Impact B-16" for Alternatives 1 and 2 should not only discuss the take of listed species due to new construction, but also long-term impacts and their significance associated with dredging and ferry operation on resting, foraging and breeding of listed species, including harbor seals, as well as impacts on eelgrass. Further, the Central Bay is very important to harbor seals and should be seen as an area where there is also a great potential for significant operational impacts (disturbance of harbor seal haul-out and pupping sites and foraging areas). 74 75

Land Use. BCDC is very supportive of locating new ferry terminals in areas where mixed land uses exist or are planned for development. The land use matrix indicates that many of the proposed terminals may be located in areas where mixed uses already exist or are planned and BCDC feels that these types of land uses are a perfect complement for ferry terminals and supports the WTA concept of the water transit oriented development, which is described in the Implementation and Operations Plan.

The DEIR correctly identifies the most significant potential land use impacts, which are the impacts of displacing existing communities by locating ferry terminals in areas where lands are already developed with other uses and the potential for disproportionate adverse impacts on low-income or minority neighborhoods. However, the DEIR fails to address the other potentially significant land use impacts and conflicts that the siting of a ferry terminal could have on the surrounding community and existing land uses. The land use conflicts between ferry terminals and recreational lands, industrial lands and other land uses could be significant. For example, locating ferry terminals near or in existing recreational lands 76

could displace existing public access or recreation sites, increase automobile and ferry traffic around these sites and reduce the amount of land and water available for recreation. More analysis on the impacts of a ferry terminal on surrounding land uses should be included in the DEIR, so that public policy decision makers can make informed decisions as to where to locate future terminals. 76

Although the DEIR identifies land use plans that make up the regulatory setting in the Bay Area, it does not discuss consistency with these plans, even at a programmatic level. 77
Within this section the DEIR accurately identifies the Bay Plan and describes two sections of the Bay Plan that would pertain to the expansion of the ferry system in the Bay. However, there is no mention of the Bay Plan designated priority use areas. These priority use areas are designated by the Bay Plan to reserve land that is already occupied by or may be needed for water-oriented uses. The priority use areas reserve lands for ports, airports, water-related industries, waterfront parks and wildlife refuges. If an inconsistent land use is proposed for one of these sites, then an amendment to the Bay Plan would be required and the Commission would have to approve the amendment. Given the potential for a future ferry site to be located within a priority use area, the DEIR should include a discussion of the Bay Plan designated priority use areas. 78

The Bay Plan also contains policies that pertain to land use along the Bay shoreline. The sections that are relevant to land use include public access, recreation and appearance, design and scenic views. The most relevant public access policy states "[i]n addition to public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible public access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, wildlife area or other use, except in cases where public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including adverse effects on Bay natural resources. In these cases, in lieu access at another location preferably near the project should be provided." (Public Access, Policy 2) The DEIR should include the potential adverse impacts that siting new ferry terminals could have on existing public access and mitigation measures to avoid these impacts. The DEIR should also include a discussion of how the WTA generally intends to accommodate public access within new terminals. 79

The Bay Plan includes protections for recreation sites along the Bay shoreline, with designated priority use areas and policies. The recreation policies identify the need for increased recreational areas to serve increased populations and water-oriented recreation activities and states that there is no practical estimate of the acreage that should be provided on the shoreline of the Bay, but it is assumed the largest possible portion of the total regional requirement should be provided adjacent to the Bay. (Recreation, Policy 1) Impacts to recreation areas and users from the increase of ferry service may not be consistent with this policy, particularly if new terminals will reduce the area currently dedicated to recreation uses. 80

The Appearance, Design and Scenic Views policy section of the Bay Plan includes a policy that is relevant to land use and the siting of certain types of facilities. Policy 4 states that "[s]tructures and facilities that do not take advantage of or visually complement the bay should be located and designed so as to not impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations." The WTA's goal to reduce parking required at the ferry terminals and to site it away from the shoreline is consistent with this policy. 81

3.7.1.1 Regional Setting. While BCDC requires public access that is sometimes coterminous with the Bay Trail, BCDC is not the agency that is working on the San Francisco Bay Trail. While BCDC supports the Bay Trail and works on many issues related to the Bay Trail, the San Francisco Bay Trail Project is being developed by the Association of Bay Area Governments. 82

3.7.1.3 Land Use Designations. The DEIR states that many of the existing and proposed ferry terminals are designated for industrial or open space/recreation lands. As mentioned above the DEIR does not describe the potential impacts on these land uses from siting a ferry terminal on or near these land uses. Locating a ferry terminal at or adjacent to a park or open space presents unique challenges, particularly in area such as the Berkeley/Albany site where a significant regional park, Eastshore State Park, has already gone through an extensive public planning process. The DEIR should describe the potential land use impacts to both land based and water based recreation and to the recreation and open space lands. 83

Aesthetics. New shoreline development, including the terminals, could block views to the Bay. As more detailed plans for each terminal develop, BCDC will review the proposed site planning to ensure that Bay views are not blocked. As noted in BCDC's *Public Access Design Guidelines*, views down street corridors to the Bay are particularly important to preserve. These guidelines should be reviewed as part of any ferry terminal design process. A copy of these guidelines is enclosed for the WTA to use. 84

3.8.1.2 Regulatory Setting. In addition to the policies in the Appearance, Design and Scenic Views policy section of the Bay Plan referenced in the DEIR, the Bay Plan maps also identify significant vista points around the Bay. 85

2.2.2.4 Parks and Open Space. The following sentence in the DEIR should read "…terminal design and layout should be carefully integrated with the surrounding landscape and historical structures to preserve, and take advantage of, existing views of the Bay and shoreline." 86

2.3 – Regulatory Setting. The Final EIR should note that BCDC has appointed a Design Review Board that evaluates projects and makes recommendations in light of the San Francisco Bay Plan Policies, including Public Access and Appearance, Design, and Scenic Views, and the Commission's adopted Public Access Design Guidelines. 87

Mitigation Measure V-1.1. BCDC suggests that the following measures be added to the WTA's governing objectives for ferry terminal designs are: 88

- Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares.
- Design terminal facilities to provide new or enhance point access areas or view areas such as piers, platforms and walkways.
- Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay.

Mitigation Measure V-2.1. The mitigation measure should read "[v]essels should be standardized to support system-wide operations and to work interchangeably at all terminals. Vessel berthing should be configured so as to allow maximum feasible visual access to the Bay. Ferry designs…." 89

Transportation. The Bay Plan includes findings and policies on transportation and specifically identifies ferry transportation as a potentially important resource for moving passengers and cargo from point to point within the region to reduce highway congestion. (Transportation, Policy 1) However, the Bay Plan also contains a finding that acknowledges the potential for impacts from increased ferry service. This finding states, "[f]erry boats and excursion boats account for the majority of vessel trips in the Bay. This type of vessel traffic in the Bay is projected to increase. Some ferry routes cross shipping lanes, water recreation areas or water areas used by birds, marine mammals, fish and other wildlife." (Transportation, Finding f) Although this finding identifies the potential impacts that ferry service could have on Bay resources, it is clear that with the appropriate implementation these impacts could be avoided or mitigated.

The transportation section of the DEIR does a good job describing the existing conditions around the Bay Area and the projections for the next 25 years. This provides a framework that establishes the need for transportation solutions, such as increased ferry service. However, the DEIR contains little discussion of the impacts the project would have on the existing transportation network. Some of these issues that new ferry service may raise include: (1)reducing travel times for those travelling across the Bay's bridges; (2)the relationship between other forms of transit and the ferry system, such as will existing bus lines have to be eliminated or diverted to serve ferry terminals ; (3)how will the WTA ensure that the riders of the new ferry system are coming from automobiles and not from other forms of transit; and (4)will the system run outside of commute hours and attempt to address the significant traffic impacts that the Bay Area experiences during the weekends. 90

The Implementation and Operations Plan describes measures to minimize local traffic impacts and the demand for parking spaces. These measures include parking charges, car-share programs and preferential parking for car and van pool participants. A discussion of these measures should be included in the DEIR and a description of the potential positive impacts that they could have for local traffic impacts and demand for parking. 91

The transportation section should include a description of the regulatory setting for transportation projects which would include the agencies responsible for funding, development, operations and maintenance for transportation projects around the Bay Area. 92

Generally, the DEIR should use the tables to illustrate points, referring to them in the text and including them in the main body of each section rather than at the end. The tables augment the information in the text and provide analysis that is not in the text. It would be more useful if the connection between the tables and the text was made and would help readers understand the information that is being presented. 93

Mitigation T-1.1 and T-2.1. There are potential mitigation measures that could reduce site-specific impacts that could be generally described here. Some of these measures are described in the Implementations and Operations Plan, such as intermodal access to the terminals and preferential parking for carpool and vanpool participants. The mitigation could also generally describe traffic calming measures that have worked in other areas, such as traffic circles, landscaping and design measures that can reduce the local impacts of traffic on existing communities. 94

Table 3.12-18. How was the potential parking available at each site determined? The Implementation and Operations Plan and the DEIR describe providing the appropriate amount of parking, but limiting the parking available to encourage riders to access the terminals using other modes of transportation. However, the demand percentage for the 95

majority of the sites is far below the number of spaces that are proposed for each terminal. Are these projections only for the beginning of the service? As ridership of ferry service grows, will these demand percentages change? 95

Growth Inducement. Under Public Services, the DEIR describes the impacts that locating a ferry terminal would have on existing public services, but does not describe the impact on locating a ferry terminal in an area without public services or with a lack of public services. The extension of public services can have significant impacts, from diverting resources from existing communities to serve new areas to inducing growth by introducing public services into non-urban areas. 96

Under the Population and Employment section, a discussion should be added of the impacts of siting terminals in undeveloped locations. The issues addressed by the DEIR seem to focus on whether ferry terminals might attract people from outside of the Bay Area to move to region. However, by introducing terminals in non-urban locations the impacts are greater in scope and include requirements for new or expanded public services and roadways, impacts to sensitive habitats and may shift the population within the region-inducing growth in non-urban areas. 97

Mitigation GRO-1.1 and GRO-1.2. It is unclear how the WTA is proposing to mitigate for growth inducing impacts. The DEIR includes the implementation of land use mitigation measure LU-1.1, which states that new ferry terminals should avoid the displacement of existing homes and businesses and require that an adequate CEQA review or other comprehensive planning process be presented to the WTA prior to the location of a ferry terminal at a particular site. It is unclear how these measures really address growth inducing impacts. Additionally, the mitigation measure described in GRO-1.2 includes a process of interaction between local governments and the WTA and it is also unclear how this process would avoid or address growth inducing impacts. Requiring local governments to have a plan prior to the development of a ferry terminal does not necessarily mitigate for or avoid growth inducing impacts. There are many land use plans that encourage growth in locations where the impacts to public services, sensitive habitats and species and to surrounding non-urbanized land uses (e.g., recreation lands, open spaces , agriculture) would be significant. The determination that the impacts of growth inducement would be less than significant after the mitigation measures proposed is not supported by the information that is currently provided in the DEIR. 98 99

BCDC continues to strongly support the development of a ferry transportation system that is done in a way that is sensitive to the Bay's resources, locating the terminals in urbanized locations, increasing the opportunities for intermodal access to the terminals and contributing to the range of transportation options that are available to the Bay Area community. Ferry transportation provides people with an opportunity to see and experience the Bay up close and could increase people's understanding of the Bay's role in the economy, ecology and community of the Bay Area.

Thank you again for the opportunity to review and comment on the Draft Programmatic Environmental Impact Report and the ability to participate as a member of the Technical Advisory Committee. If you have any questions please contact me directly at (415) 352-3645.

Sincerely,

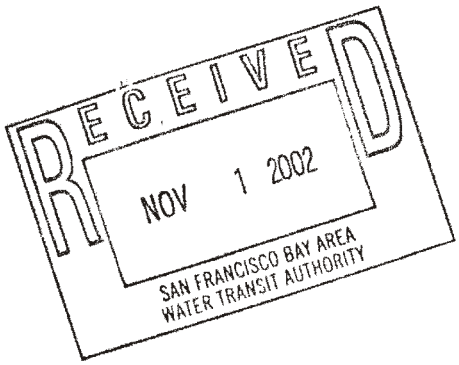
LINDY L. LOWE
Coastal Planner

LLL/gg

EIR 169

Tristan Bettencourt

From: Zeller, William [WHZ2@pge.com]
Sent: Thursday, October 31, 2002 3:49 PM
To: Email (E-mail)
Cc: Mary Francis Culnane (E-mail)
Subject: Draft ERI & IOP Comments



Draft WTA EIR Comments Rev 2.d..

<<Draft WTA EIR Comments Rev 2.doc>>

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October 31, 2002

Mary Frances Culnane
Manager, Marine Engineering
San Francisco Bay Area Water Transit Agency
120 Broadway
San Francisco, CA 94111

Re: Comments on the Draft Program Environmental Impact Report and Implementation & Operations Plan

Dear Mary:

Thank you for the opportunity to comment on the Draft Program Environmental Impact Report (ERI) and the Implementation & Operation Plan (IOP) for the Expansion of Ferry Transit Service in the San Francisco Bay Area.

Summary of Observations:

The proposed alternatives range from an aggressive Alternative #1 to the "No Build" Alternative #4. The IOP however, proposes a fifth alternative that appears to be somewhere between Alternatives #2 & #3 but is not addressed in the EIR. This If the IOP alternative were the one favored by the WTA it would be best to include it in the EIR. 1

Currently our limitation on time and resources do not allow us to thoroughly review the methodology utilized in providing information and conclusions stated in the report tables. Our comments will be limited to an overview of the reports major findings. Generally speaking Alternative #1 has the largest regional impacts, both positive and negative. Alternatives # 2 & #3 have similar impacts however to a lesser degree. 2

The Bay Area water transit applications are unique because there are no destinations that are not accessible via the road transit options. Due to this fact, it would be beneficial to compare the water transit option with other transit options in the Bay Area. By doing so, the results would assist in the determination of which is the most cost effective and environmentally benign method of increasing the transit capacity in the Bay Area. 3

Based solely on the information presented in the ERI Alternative #1 it appears the system will provide extremely small benefit (0.001% decrease in Vehicle Miles Traveled) while significantly and adversely impacting air quality (4% increase in NOx) while increasing the total energy consumption (1.43% increase in energy used per Passenger Mile Traveled), at a cost of well over $665 million. The study further shows that a majority of the new ferry passengers will be drawn from existing modes of transit not from private cars. 4

In terms of energy, the question is not only one of how much is consumed but also the source of that energy. The vast majority of the petroleum we import is used in the transportation sector. All natural gas used in California is produced in North America. Many countries around the world are taking aggressive steps to shift from imported petroleum to domestically produced fuels for use in the transportation sector. Therefore lessening their dependency on Middle East oil and improving their balance of trade positions. 5
Today, as we prepare to go to war in the Middle East for the second time in slightly more than a decade, energy dependency and long term pricing is a concern we should address seriously. We

as a society should take every opportunity to reduce the amount of imported petroleum we consume. Governmental agencies have traditionally taken a leadership role in this effort. 5

Observations of Specific EIR Sections:

Section 3.6 - Air Quality

The EIR shows that all of the proposed Alternatives increase the emissions of criteria air pollutants in the bay area by a significant amount, approximately 4% in the case of NOx under alternative #1. This is a surprisingly large impact considering the small contribution ferries make to the Bay Area's transit system. Studies recently completed by CARB and WestStart both found that ferries in the bay area would have to reduce emissions 85% below the 2007 EPA standard in order to not adversely impact air quality. It should also be noted that the CARB study found that even at this emission level new ferries will emit 4.3 times the NOx and twice the PM10 as 2007 model year transit buses on a per passenger mile basis. 6

Mitigation A-1.2 discussed in this section is likely to have the largest impact on reducing ferry emissions to a level 85% below the applicable 2007 EPA standard. Unfortunately, this technology is still under development and has not yet been tested in the marine environment. Based on previous experience with diesel engine manufacturers in the over the road sector and absent any R&D work by the WTA, it is unlikely propulsion systems that exceed published standards by such a large margin will be available. 7

Neither EIR nor the IOP seem to take into account that current SCR technology is extremely heavy, expensive, and complicated to operate and maintain. The additional weight of an SCR system is estimated to be between 3 and 4 tons per boat resulting in a significant horsepower increase, possibly as much as 50%, in order to maintain performance. This increase in horsepower is likely to increase the green house gas emissions and fuel consumption well beyond what is projected in the EIR. It should be noted that SCR's currently in use on the Baylink have only attained NOx reduction levels of 50%, well below the WTA goal of 85%. 8

Diesel Particulate Matter (DPM) traps also have not been tested in the marine environment. While effective at reducing DPM, these traps create their own secondary emission streams, the most notable an NO2 slipstream. 9

Section 3.6.2 references EMFAC2000 as the vehicle emissions model used for these projections. That version has been replaced by a newer version of the model, EMFAC2002 that should be used for this EIR. 10

Section 3.12 – Transportation

The EIR defines congestion relief benefits in terms of Passenger Miles Traveled (PMT), (Table 3.12-11), and measures changes the in a range of hundredths and in one case thousandths of a percent. It would seem unlikely that this minute level of congestion relief would be measured and the average commuter probably would be unimpressed. 11

The analytical methods used by URS are questionable. Ridership levels in the tens of millions per day are projected 23 years into the future are presented without a benefit of a confidence interval. These computations assume mathematical significance down to hundreds PMTs. This is not mathematically justifiable. A confidence interval of only $\pm$1% in the PMT figures used in 12

Table 3.12-11 would introduce an error nearly 2 million miles, totally swamping the benefit attributable to ferries by nearly a factor of 10. 13

It appears the majority of the projected 40 thousand daily ferry riders will be drawn from existing transit alternatives. Based on data presented in Table 3.12.13, the implementation of Alternative #1 will result in a net decrease in ridership for all non-ferry modes of transit equaling 121,467 passengers. Even under Alternative #2, that number drops to 19,938 passengers or approximately half of the total projected ridership. 14

Section 3.13 - Energy Consumption

As in the case of air emissions all three options proposed result in a measurable and significant increase in petroleum consumption in the Bay Area. Data presented in the EIR confirms the fact that even the newest ferries require 2 to 4 times the horsepower per passenger seat of capacity versus over the road transit buses. 15

Recommendations:

In closing we would like offer the following recommendations:

- The EIR be amended to include an Alternative that matches the Alternative recommended in the IOP. 16
- We strongly urge the WTA extend the EIR comment period to allow Bay Area Air Quality Management District's comments to be incorporated into the EIR review. 17
- Given the fact that proposed emission performance of the WTA ferries is well beyond any applicable emission standards and the technology proposed to meet those performance levels is not in use today, we recommend that the WTA initiate a pilot test to prove the proposed standards can be met. A pilot test should be conducted by employing the two most promising technologies, Diesels with SCR's and PM Traps and Natural Gas engines with catalytic converters 18

Again thank you for the opportunity to comment on this review. Please give me a call if you have any questions.

Sincerely,

Bill Zeller
Program Manager

Bcc: Norm Stone
Kent Harris
Jim Larson
Sam Altshule

EIR 170

ALAMEDA COUNTY CONGESTION MANAGEMENT AGENCY

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SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

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Mayor
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City of Union City
Mayor
Mark Green

Executive Director
Dennis R Fay

October 30, 2002

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

SUBJECT: Comments on the Draft Implementation and Operations Plan and Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service in the San Francisco Bay Area

Dear ~~Mr. Bertken~~ Tom:

The ACCMA has reviewed the Draft Implementation and Operations Plan (DIOP) and Draft Program Environmental Impact Report (DPEIR) for the proposed expansion of ferry transit service in the San Francisco Bay Area. We respectfully submit the following comments.

- The DPEIR should demonstrate how the proposed ferry system reduces congestion by transportation corridor in addition to using regional reduction in VMT. The DIOP and DPEIR describe the Bay Area highway and transit systems inability to handle current and future demand. The DPEIR lists travel times in various travel corridors and lists the 25 most congested corridors in the Bay Area (in Table 3.12-4). Comparing the proposed WTA Alternative 1 ferry system to Table 3.12-4 of the DPEIR shows that about 6 of the 25 congested Bay Area corridors parallel the proposed ferry routes. A comparison of the proposed ferry system and the location of congestion in Alameda County appear to show that the ferry system will have little impact in relieving congestion except in the I-80 corridor, which is one of the 22 congested locations in Alameda County. The a.m. and p.m. peak hour LOS F segments identified in the 2002 LOS Monitoring Report for Alameda County are attached for your information. Most of our congestion occurs in central, south and east Alameda County where no ferry service is provided or recommended. Reference to the most congested corridors should focus on those where ferry service is proposed. 1

- Table 3.12-14 of the DPEIR appears to show that 55 percent of the ferry ridership in the Bay Bridge corridor will come from BART and AC Transit. Total ferry ridership for WTA Alternative 1 is about 44,000 riders, of which 23,000 use existing ferry services. Of the 21,000 new ferry riders approximately 2

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41 percent (8,720) come from existing transit services (not ferry) in the Bay Area. The DPEIR should clearly show net new transit riders and discuss what mitigation is proposed to make up for the revenue losses to existing transit service. This is important in terms of making regional investment choices. Alameda County needs to balance the expense of new ferry service with any additional expense to existing transit as a result of implementing new ferry service. 2

- Table 5 of the DIOP presents cost effectiveness measures for Bay Area Transit Operators. This table should also show the cost effectiveness measures for WTA Alternative 1 (all routes combined) for comparative purposes as well as cost effectiveness for net new riders. Without WTA Alternative 1, it is not possible to compare the relative cost effectiveness of the service being provided. 3 Table 7 of the DIOP presents some comparison of costs per rider between WTA Alternative 2 and the Bay Crossing alternatives. Cost for Alternative 1 should be provided as well. 4

- The DPEIR should show what an equivalent investment in non ferry alternatives, such as BART or buses, would buy in terms of service and ridership. Also, do the cost include capital replacement? 5

- For mitigation measures D-1.1 (eliminating Gnoss Field, Moffett Field, SF International Airport and Oakland International Airport/Coliseum terminals), A-1.1 (eliminating low ridership routes) and A-3.1 (limiting the number of cars parking at terminals), the impact on ridership as a result of the reduction in number of terminals, basic route service, and amount of parking should be quantified and analyzed with respect to cost-effectiveness. 6

- The DPEIR addresses regional impacts, but does not address local impacts at the same level stating that the effectiveness of transportation and air quality impacts after mitigation cannot be quantified because the number and design of the ferry terminals is not defined. However, the DIOP and the DPEIR clearly show the number and location of ferry terminals, and base the ridership projections on the assumed number and size of these locations. Based on the assumptions for ridership and parking demand in the DIOP and DPEIR, types and costs of transportation mitigation measures needed to accommodate terminal impacts and handle parking demand at the local level need to be addressed. This could be handled similar to the way stations are addressed in BART extensions environmental documents. 7

- The funding of terminal construction and mitigating impacts of terminal activity need to be addressed in the DPEIR. The DIOP, Figure 34, assumes an average 8

cost of $10 million per terminal, which include costs for waterside facilities and a limited amount of parking. Because ridership projections are based on additional terminal facilities, it is reasonable to include the full costs and impacts of these new terminals; therefore, the terminal costs should also include land acquisition, parking facilities and transportation mitigation. The implementation and funding of the ferry service and construction of terminals should assume adequate parking rather than assuming parking will be reduced or spillover into neighborhoods as stated in Impact T-2. Provisions should also be made with the transit operators in terminal locations where existing bus service cannot be rerouted to accommodate terminal access. 8

- Page 3.12-2 and 3, Current Highway Bottlenecks: The first paragraph in the section is incorrect. Caltrans' Highway Congestion Monitoring Program was not discontinued in 1998. Reports are available through 2001. 9

- Page 3.6-12, Section 3.6.2: The air quality assessment should compare the different rates of emissions by travel mode. As noted below, 66 percent of ferry passengers are assumed to drive to terminals. It is inconsistent to assume 66 percent of passengers will drive to the terminals and then not address cold starts in the document by stating that not enough information is available about terminal locations. 10

- Impact T-1, page 3.12-6: The most aggressive ferry option would have a daily ridership of about 49,000, of which 66 percent are assumed to drive, 16 percent are assumed to arrive by bus or rail and 19 percent are assumed walk. How were the mode splits for accessing the terminals determined? How does the model work with respect to bus access? How will bicycle access be accommodated to the terminals and what percentage will arrive by bike? A clear discussion of the ridership estimates and how they were developed needs to be presented in the DPEIR. 11

- The DIOP and DPEIR imply that the new ferry service will provide congestion relief to the congested corridors and assumes 66 percent of passengers will drive to the terminals. Is the result of this that congestion is just being moved around? For example, in the I-80 corridor, which has been identified in Caltrans 2001 HiComp report as the most congested corridor in the Bay Area, are passengers using I-80 to access the Berkeley terminal or does the model assume passengers will only be coming from Berkeley? 12

- Page 3.12-7, Mitigation T-2.1: Local jurisdictions should also participate in the study to develop a terminal specific plan. This plan needs to also include a 13

financial plan and the cost to fully develop the terminals needs to be assumed in the costs of the project.

Thank you for the opportunity to review the DPEIR. Please do not hesitate to contact me or Beth Walukas at 510/836-2560 if you require additional information.

Sincerely,

Dennis R. Fay

Dennis Fay
Executive Director

cc: Chron
Jean Hart, Deputy Director
Beth Walukas, Senior Transportation Planner
file: CMP - Environmental Review Opinions - Responses - 2002

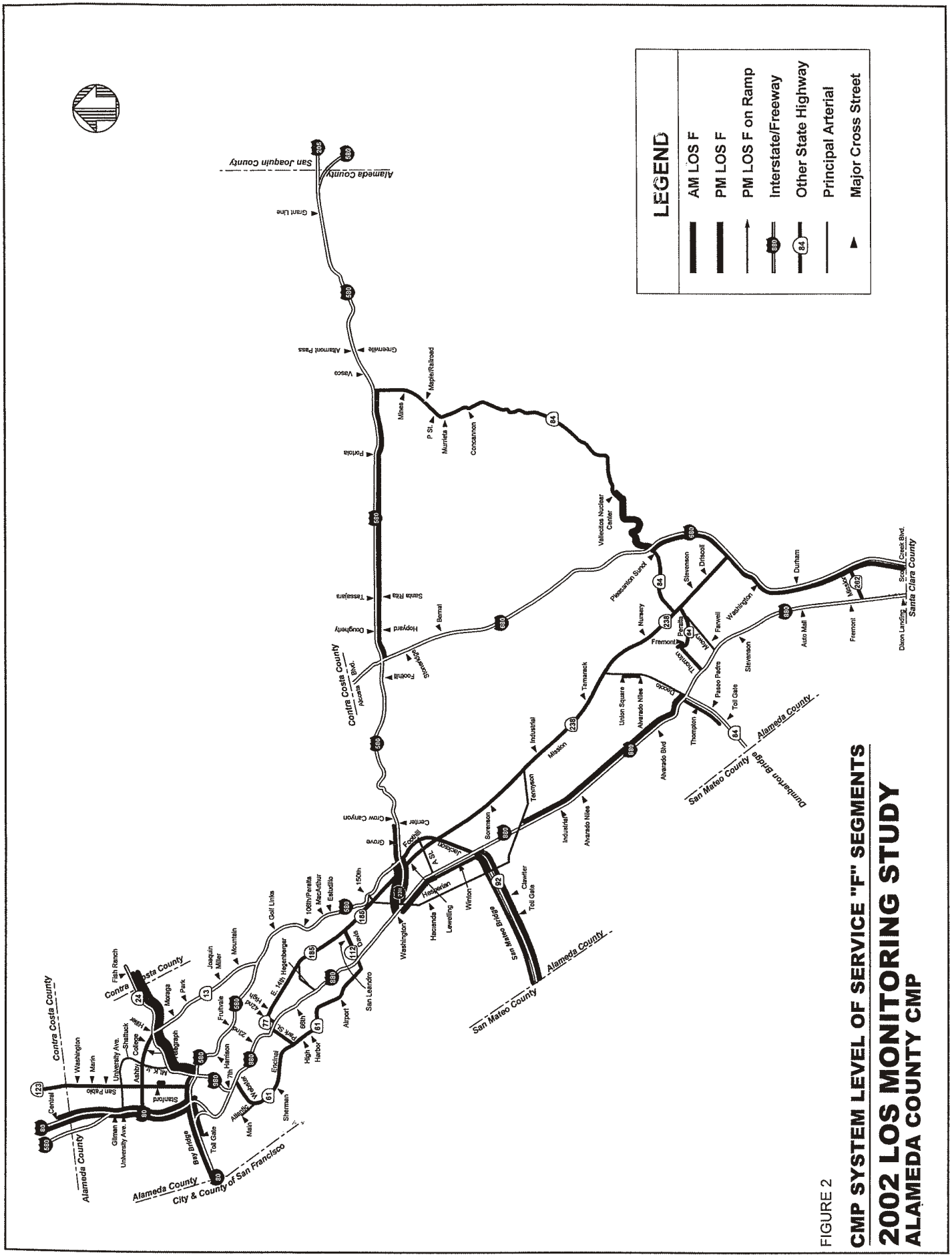

FIGURE 2

CMP SYSTEM LEVEL OF SERVICE "F" SEGMENTS

2002 LOS MONITORING STUDY
ALAMEDA COUNTY CMP

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EIR 161

DELIVERY BY MAIL, FAX, AND E-MAIL

October 31, 2002

Attn.: DEIR Comments
San Francisco Water Transit
Authority
120 Broadway
San Francisco, CA 94111

RE: Comments on Ferry Service Expansion Programmatic DEIR.

Dear Sir/Madam,

I am submitting these comments on behalf of my clients, The Sierra Club, San Francisco Bay Chapter ("Sierra Club") and Golden Gate Audubon Society, Inc. ("Audubon", and collectively, "Clients"), regarding the above-referenced DEIR. Both Sierra Club and Audubon have a long-standing interest in the protection of the natural environment in and around San Francisco Bay. Consequently, they are extremely concerned about the potential impacts that the ferry expansion project could have on the Bay's ecology and natural resources. My clients consider the DEIR inadequate for a variety of reasons, which are discussed in detail below. My clients ask that the Authority revise the DEIR to address the points raised and then recirculate it for comments on the revisions. Alternatively, my clients suggest that the Authority should seriously consider major revisions to the ferry expansion project itself to deal with its many problematic aspects. In that case, a new DEIR should be prepared for the revised project. 1

1. PROJECT PURPOSE AND NEED

The DEIR begins with a discussion of the claimed reasons why the project is needed. However, many of these reasons are either not adequately supported, or simply incorrect. Further, even the flawed analysis in the EIR indicates that the proposed project will fail to support most of the claimed justifications. 2

The DEIR asserts that the project is needed to alleviate capacity constraints and congestion on Bay Area highways and bridges. However, as is discussed in more detail below, the DEIR fails to consider alternative approaches that would appear far more suited to meeting this need than any of those proposed. Further, the DEIR fails to discuss a major concern for such long-range transportation - the flexibility to adapt to changes in 3

future conditions. While ferry routes themselves may be changed over time, the proposed ferry terminals would represent major investments of money and energy, as well as raising significant environmental concerns. If commute patterns change in the future, the proposed system of ferry terminals could become just as irrelevant as the previous ferry system's connections to the now-defunct streetcar systems. 3

The DEIR also points to the potential risks that might be posed by a natural catastrophe, and the potential for a ferry system to assist in dealing with those risks. However, the EIR includes no analysis of the extent to which any of the proposed alternatives would assist in post-disaster recovery. Nor does the DEIR consider whether other transportation alternatives might do as well or better in coping with disasters. Further, the DEIR fails to discuss the degree to which the ferry system's components might increase the risk of disaster, most particularly the risks of ferry upset due to collision, weather, or mechanical failure, and the potential of ferry boats and terminals to serve as targets for terrorist activity. The latter is particular cause for concern in the current post-9/11 world situation. The EIR should include discussion of past history of ferry vulnerability, both in the Bay Area and elsewhere. 4

The DEIR notes that an expended ferry network would increase transportation options. However, so would a system of unicycle rentals, or dogcarts. The question is the practicality of the proposed system, and its ability to improve the Bay Area's overall transportation balance. The analysis in the EIR, as inadequate as it is, suggests that even alternative 1, the most extreme alternative examined, would have little impact. On the other hand, this alternative would have enormous costs, fiscally, environmentally, and in increased energy use. One must question the practicality of such an alternative. 5

Parenthetically, the DEIR references the Bay Area's historic ferry system as a precedent for the proposed expansion. The EIR fails, however, to discuss the differences in circumstances and design between that system, which was integrated with an extensive non-polluting electric light rail network to provide efficient transit service to the higher density inner East Bay communities, to the current proposal, which would connect primarily with single occupancy autos to serve lower density suburban regions. The differences in efficiency and impacts are obvious. 6

2. INADEQUATE AND INACCURATE PROJECT DESCRIPTION

The DEIR describes and discusses four project alternatives, three that increase ferry transit and a no project alternative. However, Alternative 1, and to a lesser extent alternatives 2 and 3, are plagued by ambiguities in the project description. 7

Alternative 1 in particular sets out an extensive listing of proposed routes and terminal sites. However, after briefly

discussing some of the significant impacts that would result from this network, it suggests as mitigation that a significant portion of the terminals and routes be either eliminated or significantly curtailed. In essence, the DEIR has created a new "Alternative 1a" which, the DEIR claims, reduces many of the most significant impacts of Alternative 1. However, the DEIR is not consistent in describing what this Alternative 1a would consist of, or what its comparative impacts would be. Thus, for example, the DEIR notes those routes that would have the most significant dredging impacts and suggests that they be eliminated or reduced in scope. It then discussed how this would reduce dredging impacts. The DEIR separately discusses air quality impacts and proposed eliminating route whose low ridership would lead to increased pollution compared to the no project alternative. The DEIR does not, however, consider the dredging impacts of this reduced Alternative 1, not the air quality impacts of the alternative 1a proposed to reduce dredging impacts. The EIR needs to provide consistent descriptions of alternatives and their comparative impacts. 7 8

Likewise, the DEIR suggests the use of low displacement vessels to reduce dredging impacts. However, the DEIR does not examine what other impacts, specifically noise impacts, would be associated with these modified vessel alternatives. Again, if the project is to include use of low displacement vessels, and specifically hovercraft, the noise and other impacts (e.g., energy use, transportation efficiency, wake effects) of these alternatives need to be set out so that meaningful comparisons can be made.

3. ALTERNATIVES ANALYSIS

As mentioned above, the DEIR supports the proposed project as being needed to deal with constraints in the existing transportation system. However, the DEIR fails to discuss any non-ferry alternative for addressing this issue. Given that improving the overall transportation situation is the primary motivation for the project, it is imperative that comparisons with other possible solutions be included. 9

The DEIR fails, for example, to discuss the feasibility, efficacy, and impacts of an alternative that would focus on improving other public transit, and specifically bus transit in the Bay Area. There are already major public transit routes with which the ferries would compete for ridership. In particular, transbay bus transit is a feasible and relatively cost-effective alternative to ferries as a way of increasing the efficiency of use for highways and bridges. The EIR should discuss an alternative that would focus on expanding and improving bus transit, including specifically transbay bus service. The alternative should include options for expanding the current system of transbay routes and terminals as well as possible incentives to encourage transbay bus ridership (for example, providing a dedicated bus/HOV lane on bridges during peak commute 10

hours). Nor does the EIR consider the potential for expansion of rail service, either through Caltrain, the proposed high-speed rail project, or new light rail routes, to alleviate congestion. 10

The DEIR also fails to consider alternatives that would focus on other non-physical way of dealing with current transportation problems. For example, the EIR should discuss the potential for financial incentives, such as congestion pricing and employer tax credits, to move traffic off the bridges during the peak commute hours by shifting commuters to alternative transportation such as transbay busses, expanding flextime use, or increasing telecommuting. 11

Finally, the EIR fails to consider or discuss changes in land use policy as an alternative to reduce transportation problems. This failure is particularly striking given that ABAG is currently considering a new "smart growth" regional livability footprint project. That project is explicitly aimed at reducing the impacts from future growth, but the compact development strategies being proposed could also help alleviate current transportation problems, and particularly the congestion associated with long commute patterns. 12

4. DREDGING IMPACTS

While the DEIR correctly notes the extensive dredging impacts of the project, particularly those of Alternative 1, the proposed mitigation measures are inadequate.

Proposed Mitigation D-1.2, uplands or wetlands disposal of dredge spoils, is too speculative to be considered adequate mitigation. As of now, there are not identified sufficient upland or wetland disposal sites to accommodate the proposed dredge spoil production, not to mention the expected cumulative dredge spoils, including other Bay dredging projects. It is therefore improper to consider this "mitigation measure" as being effective in reducing the impact to less than significant levels. If the EIR is unwilling to commit to implementing Mitigation D-1.1 by removing the dredging-intensive routes from the plan (the use of zero draft vessels cannot be considered as a mitigation measure without consideration of the impacts from using zero draft vessels - see comments below), Impact D-1 must be considered significant. 13

Even *with* the proposed reduction in dredging by elimination of the most dredging-intensive routes, project dredging would still amount to >10% increase in annual maintenance dredging, plus initial dredging. This is still a significant impact!! Even if in-bay disposal is in accordance with LTMS, where is remaining dredge material going? The EIR needs to identify the possible potential sites and the corresponding potential impacts. 14

The DEIR does not provide an adequate discussion of cumulative dredging impact. Do the calculations include dredging for Bay Bridge reconstruction? Both dredging and filling have similar and overlapping impacts on the Bay's ecology. 15

Consequently, the EIR needs to consider the cumulative impact of all current & proposed dredge & fill projects (including specifically the proposed expansions of Oakland & SF Airports, as well as private shoreline development plans throughout the Bay Area). Given the regional nature of this project and the programmatic nature of the EIR, it needs to look broadly at future dredge and fill projects throughout the Bay Area. 15

Impact D-2: Under Mitigation D-2.1, one cannot at this point conclude that implementation of BMPs will necessarily suffice to mitigate water quality impacts. As acknowledged, for example in Sections 3.5.2.4 and 3.5.2.5, BMPs such as the use of silt curtains cannot be relied upon to eliminate dredging impacts. Consequently, one cannot conclude that dredging impacts from Alternative 1 or 2 can be mitigated by use of BMPs to the point where no significant impact would occur. 16

As noted earlier, if mitigation by use of shallow draft vessels/hovercraft is used, other associated impacts, such as noise, wake effects, risk of upset & poorer reliability need to be considered. If this mitigation measure is to be proposed, it must be considered consistently and all associated impacts need to be evaluated. 17

Finally, as will also be discussed below, the EIR needs to consider the potential impacts related to current and flow changes in the Bay as a result of project-related and other dredging and filling projects. Dredging/filling can dramatically change the bottom contour of the Bay in the dredged/filled areas. This will affect the Bay's currents and tidal flows, and may well change the locations and amounts of sediment deposition. The deposition of sediment is an important factor in the Bay's natural ecology. The deposition of sediment is of vital importance in the Bay's mudflats, which, as the DEIR points out, are of central importance to the Bay's ecology, particularly as a feeding area for migrating shorebirds. (See comment letter from the Point Reyes Bird Observatory for more discussion of this point.) The EIR needs to discuss the potential effects of project dredging on mudflat areas, not only as to direct impacts from dredging within mudflat areas, but also indirect effects due to current changes caused by dredging. 18

5. WAKE IMPACTS

The analysis of wake impacts needs to consider not only direct erosion impacts, but also biological impacts on shoreline flora and fauna. In particular, impacts on shorebirds and shoreline vegetation such as Pacific cordgrass, eelgrass, and pickleweed need to be considered. 19

The proposed mitigation for impacts on clapper rail is inadequate because it fails to consider impacts not only on current clapper rail nesting sites, but also on potential clapper rail nesting sites and habitat. As an endangered species, the clapper rail's management is directed towards not only 20

maintaining current populations and habitat, but providing for the recovery of the species and associated expansion of nesting and habitat areas. The EIR should have included discussion, through consultation with the trustee agencies, Cal. Dept. of Fish and Game and the U.S. Fish & Wildlife Service, of identified critical habitat areas for the clapper rail (and other endangered species). These critical habitat areas should also have been protected by appropriate avoidance zones. The EIR needs to be revised accordingly. 20

6. WATER QUALITY

In addition to discussing inorganic water quality contaminants, the EIR also needs to discuss possible organic and bacteriological contaminants. In particular, there is no discussion of potential in-Bay disposal of "blackwater" or "greywater" from ferry bathroom/sanitary facilities. Indeed, there is no discussion of how ferry sanitary wastes will be disposed of. If sanitary wastes will be off-loaded and transported elsewhere for treatment, the EIR needs to discuss necessary facilities and the possible risk of upset, with impacts and mitigation. 21

As noted above, dredging could have indirect impacts through changing the strength and location of Bay currents. Among those changes could be effects on the suspension and deposition of sediment material. In particular, if dredging increases the velocity of some Bay currents, it could result in increased suspension of sediment, and in sediment staying in suspension for significantly longer times. This would significantly increase the turbidity of the Bay, which, as the DEIR points out would have adverse impacts on a variety of plant and animal species. These potential impacts need to be discussed, and, if significant, mitigation measures or alternatives identified to reduce or avoid the impacts. 22

7. BIOLOGICAL IMPACTS

As the DEIR points out, shallow waters are importance to phytoplankton. This means that any loss or disturbance to shallow waters (e.g., dredging, hovercraft or other ferry use, construction of docking & terminal facilities) needs discussion in terms of impacts on phytoplankton. The shallow shoreline areas are also important spawning grounds for herring, & impacts on herring spawning also need to be discussed. (See comments above on indirect impacts of dredging through current changes.) 23

It is improper for the DEIR to limit discussion of listed species to areas in the vicinity of proposed terminals. Ferry operations in other areas, including open waters & areas near shorelines & shallow bay areas could also impact on listed 24

species. In particular, impacts on mudflat areas, as discussed earlier, could adversely affect listed shorebirds, including the California Clapper Rail. Ferry impacts on rafting birds and on birds swimming in open water areas could include impacts on other listed species, including the Brown Pelican, common loon, California least tern, elegant tern, and double-crested cormorant. 24

The DEIR includes no discussion of the open bay as habitat for migrating waterfowl - i.e., so-called "rafting" behavior. Rafting of migrating waterfowl in open waters is a well-documented phenomenon. Ferry routes could adversely affect rafting waterfowl either by provoking flight and associated energy expenditure or, even more seriously, by actually impacting and injuring or killing rafting birds. At the very least, the EIR needs to require as mitigation that bridge personnel will maintain a constant watch for water-resting waterfowl and will avoid their proximity, even if that means adjusting the vessel's routing. Where total avoidance is not possible, the EIR should require that ferries slow to a speed where their close approach to rafting birds is less likely to provoke flight, even if this results in schedule delays. 25

Where wetlands would be impacted by the construction or operation of ferry terminals, alternative terminal sites should be thoroughly investigated, and a site impacting wetlands should only be chosen if no alternative site is feasible. If no alternative site is available, the feasibility of eliminating the ferry terminal should be considered. 26

Cumulative wetlands impacts, including specifically wetlands impacts from Bay Bridge East Span and Oakland & SF Airport project need to be considered. What will be cumulative wetlands impact? Assuming mitigation of all impacts is necessary, what will be cumulative impact of such a large amount of fill/replacement? To what extent can one fully mitigate wetlands' role as habitat? For example, will migrating birds use an alternative wetlands site located miles away from the original site? What about spawning in tidal wetlands areas? As noted in the PRBO comment letter, any proposed wetlands mitigation needs to be "in-kind". That is, if mudflats will be eliminated, then new mudflat areas should be established. Establishment or enhancement of salt marsh areas will not mitigate the loss of mudflats. 27

Cordgrass impacts - what will be impacts from eliminating invasive spartina alterniflora? What is this species' value as habitat? The EIR needs to consider and mitigate impacts of eliminating these populations, preferably by replanting with the native Pacific cordgrass. The EIR needs to consider the Cumulative impacts on Pacific cordgrass, including impacts from: 1) all ferry terminals, 2) ferry operations (e.g., wake impacts), 3) Bay Bridge East Span project, Oakland & SF Airport expansion projects, 4) any other Bay shoreline projects either approved or under review. 28

As noted earlier, the EIR needs to consider indirect effects of dredging on special aquatic sites: In addition to impacts identified, dredging may result in changes to circulation patterns that could impact wetlands, mudflats, and eelgrass area. (E.g., elevation of amounts of sediment deposition could reduce water depth and eliminate areas of eelgrass or mudflats, conversely, current changes causing sediment resuspension may destroy current wetlands-mudflats-eelgrass areas. Project-specific EIRs need to include study of potential effects of dredging on Bay currents. If impacts cannot be avoided, alternatives eliminating detrimental fill, including elimination of damaging route or terminal, should be considered. Since replacement of eelgrass and mudflats areas have not been shown to be reliably successful, the proposed mitigation cannot be considered adequate to reduce impacts to less than significant level. 29

Loss of benthic habitat due to dredging: Where dredged areas contain contaminated sediment, dredging could resuspend and spread contamination, resulting in damaging impacts on benthic populations beyond the immediate dredged area. This impact is not considered in DEIR. Again, the EIR needs to consider cumulative impact on the benthosphere from this plus other dredge & fill projects. 30

8. AIR QUALITY IMPACTS

The EIR needs to assess the cumulative air quality impacts of this project in conjunction with other current and proposed projects. In particular, the cumulative air quality impact analysis needs to consider expected impacts from the Oakland and San Francisco airport expansion projects. The EIR needs to discuss toxic air contaminant impacts, particularly those associated with diesel exhaust fumes. These fumes have recently been acknowledged to cause serious health effects. The EIR needs to discuss the extent to which adverse health impacts due to the release of toxic air contaminants may still occur in spite of the proposed mitigation measures. 31

The EIR should also discuss whether the proposed air quality mitigation measures will result in any secondary impacts. For example, to what extent will the equipment required to mitigate diesel exhaust impacts result in an extra weight burden on the ferries, causing lower operating energy efficiency and increasing associated energy impacts? 32

9. LAND USE IMPACTS

The proposed ferry terminal site at either University Ave. or Gilman Street in Berkeley could impact on the newly-established Eastshore State Park. In particular, the Gilman Street site would be likely to adversely affect the park 33

atmosphere for the adjoining areas. This would be a significant impact. Mitigation would be to move the ferry site to the base of University Avenue, either adjoining the Ramada Inn at the existing ferry dock area or at or near the Berkeley Pier. The latter, however, would require extensive new construction and could impact on visual, historic, & cultural resources. 33

There is an issue of disproportionate impact in that the local air quality impact from PM cold starts would occur in areas adjoining the proposed ferry terminals, many of which are located in low income minority population areas. 34

10. AESTHETICS IMPACTS

Proposed new Ferry terminals Impacts in the GGNRA, near Candlestick Park, and at/near the Eastshore State Park could have a significant aesthetic impact by placing a visually discordant element into the landscape at these sites. The EIR needs to discuss the extent to which such impacts could be mitigated by implementing design criteria, and evaluate whether even a well-designed terminal would have significant aesthetic impacts, particularly at GGNRA or the Eastshore State Park. 35

11. GEOLOGICAL IMPACTS

The proposed mitigation for liquefaction impacts (removal or engineered modification of liquefiable substrate) could itself have significant impacts. These impacts need to be acknowledged and mitigation proposed. 36

12. NOISE IMPACTS

The impact analysis includes no discussion of noise impacts from hovercraft, whose noise output is acknowledged to be very high. Hovercraft cannot be included as a possible mitigation for dredging impacts unless their noise and other impacts are properly studied. 37

The EIR fails to discuss cumulative noise impact, including the increased noise due to increased traffic to/from ferry terminal locations, especially in residential areas. There is no substantial evidence presented to support the EIR's conclusion that there would be no significant noise impacts on birds or marine mammals from ferry operations, especially those in the vicinity of seal resting areas and areas where waterfowl raft in the Bay. 38

13. TRANSPORTATION IMPACTS

The EIR acknowledges (as it must) that even the implementation of alternative 1 would have no significant effect in reducing VMT. This seriously undercuts one of the basic 39

underlying rationales for this project. Based on this result, the project's desirability needs to be reevaluated. 39

Given that there is a need to restrict vehicle parking through either parking fees or reduced parking capacity at terminals, there is potential for overflow parking to impact adjoining neighborhoods. This would be a significant impact. As mitigation, especially given the prevalence of low income and minority communities in the vicinity of ferry terminals, the ferry project should pay to implement residential permit parking enforcement in adjoining neighborhoods. 40

14. ENERGY IMPACTS

The analysis needs to consider cumulative energy impacts for the Bay area. This is especially important given the current energy shortages and the need to reduce overall energy usage. Given this background, ANY increase in energy usage should be considered significant. 41

15. GROWTH INDUCING IMPACTS

The project is likely to result in significant growth inducement at and near proposed ferry terminals. This growth could result in the displacement of current low-income residents and existing businesses. This would be a significant adverse impact. As mitigation, ferry terminals should not be considered for approval unless and until the local land use agency has prepared and approved a specific plan for the terminal area that mitigates potential growth inducing impacts, using such measures as zoning controls 42

Thank you for the opportunity to comment on this DEIR. We look forward to receiving a copy of the revised document once reanalysis is complete. Please keep us informed of future events related to this project.

Most sincerely,

Stuart M. Flashman

EIR 162

DEPARTMENT OF
ECONOMIC AND
COMMUNITY DEVELOPMENT
(650) 829-6620
FAX (650) 829-6623

October 31, 2002

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, California 94111

Subject: **Comments on the Draft Program Environmental Impact Report (EIR), Expansion of Ferry Transit Service in the San Francisco Bay Area**

Dear Draft Program EIR Preparer:

Thank you for providing the City of South San Francisco with a copy of the Draft Program Environmental Impact Report (EIR) for the above referenced project. As required by the California Environmental Quality Act (CEQA), the City of South San Francisco has reviewed the document and is providing the following comments.

It is our understanding that the San Francisco Bay Water Transit Authority (WTA) proposes to enhance and expand the use of ferry transit in the San Francisco Bay Area, including new service to the Peninsula at Oyster Point Marina in South San Francisco and Redwood City. The proposed plan is consistent with the City's General Plan policies that require the City to reduce traffic congestion by promoting alternative transportation modes – such as shuttle, rail and ferry service -- and an aggressive Transportation Demand Management program for all employers. 1

On Tuesday evening, October 1, 2002, the Water Transit Authority (WTA) held a Public Hearing to present the Implementation and Operations Plan (IOP) and to receive comments from interested individuals and agencies on the Plan. The participants included Vice Mayor Gonzalez, Councilmember Matsumoto, and City staff. The life science company representatives included Genentech, Bay Area Bioscience Center, Hines, Ocular Sciences, and Rigel. The agencies speaking on the proposed plan included the San Mateo County Harbor District, the Peninsula Congestion Relief Alliance, the South San Francisco Chamber of Commerce, and the Redwood City/San Mateo County Chamber of Commerce.

To: San Francisco Water Transit Authority
Re: Draft Program EIR Comments
Date: October 31, 2002

While supporting the need for an expanded water-transit system, all the speakers noted that the Implementation and Operations Plan, which proposes only one route to and from Oyster Point Marina -- the San Francisco route. The Plan does not adequately acknowledge the strength of potential ridership from the East Bay, due to local business growth in the East of 101 Area. They indicated that the Implementation Plan should be expanded to include a direct Oyster Point Marina and East Bay route. Members of the WTA Board and staff acknowledged the comments and indicated that they will work with the local participants to promote the direct Oyster Point Marina – East Bay route. The City has concerns regarding the information presented in the Draft Program EIR, discussed below.

WTA's assumptions, using MTC's projections on ridership, are incorrect

- The WTA's "Implementation and Operations Plan" and Draft Program EIR does not adequately address the recent and anticipated growth in the biotechnology industry in South San Francisco. 2
- The South San Francisco General Plan (adopted October 1999) projects that the City's East of 101 area will grow to over 24,000 employees by 2020. The majority of biotechnology and high-technology employment will originate in the East Bay. The Draft EIR ferry should emphasize trans-bay single node crossings from the East Bay to Oyster Point Marina and Redwood City rather than through San Francisco. 3
- Based on the South San Francisco General Plan buildout and employment growth, Oyster Point Marina will serve as a destination terminal rather than a feeder terminal to San Francisco. 4

The EIR does not adequately provide realistic Trans-Bay alternative routes from the East Bay to the Peninsula

- Why didn't the Plan and the EIR evaluate proposed ferry routes across the bay from San Leandro to South San Francisco in terms of channel depth, dredging requirements and wave action? 5
- The Ridership Sensitivity Analysis identified an unconstrained daily ridership of 3,077 between South San Francisco and San Francisco but there are only 300 parking spaces. Assuming 50% of the riders use the terminal as an origin and the other 50% use the terminal as a destination it appears the vehicle occupancy rate would be unrealistically high. What vehicle occupancy rate was projected? If additional parking is needed who will pay for the improvements? 6 7
- If 50% of the riders drive to Oyster Point Marina, the Level of Service (LOS) along the local collector street will reach a LOS of F. Who will pay to improve the local roadways to accommodate the increase in traffic? 8

To: San Francisco Water Transit Authority
Re: Draft Program EIR Comments
Date: October 31, 2002

- If the analysis assumed 50% of the riders came to South San Francisco from the East Bay via San Francisco, how many nodes would the riders have to stop at before they arrived in South San Francisco? What was the average length of travel time, including all layovers? 9

The Implementation Plan and the EIR indicate that San Francisco will be the hub to Ferry Service in the Bay Area, which will add travel time and reduce the system's usability.

- The Plan and the EIR do not adequately address the "opportunity cost" of for individuals traveling from the East Bay to the Peninsula or from the Peninsula cities to San Francisco. 10
- What is the average length of time your survey participants were willing to travel? 11
- How many nodes must an individual encounter in order to travel from the place of origin to the place of employment? 12
- If the ferry travel time to the Peninsula is greater than the average length of time the east to west bay riders are willing to accept, how will the WTA convince the elected officials that $1 per vehicle toll bridge fees be directed to support the ferry system? 13
- Which alternative is feasible if the $1 per vehicle toll bridge fee is not allocated to the ferry system? 14
- Has a feasibility study been conducted to identify the most efficient size vessel given the congestion management mandate to encourage employers to offer their employee's staggered work hours? 15

If you have any questions, feel free to call me or Michael Lappen, Senior Planner, at 650-877-8535. Thank you for your cooperation.

Sincerely,

Marty Van Duyn
Director of Economic and Community Development

cc: City Council, City of South San Francisco
Michael A. Wilson, City Manager
South San Francisco Chamber of Commerce

To: San Francisco Water Transit Authority
Re: Draft Program EIR Comments
Date: October 31, 2002

San Mateo County Harbor District
Peninsula Congestion Relief Alliance
Bay Area Bioscience Center

PORT OF SAN FRANCISCO

EIR 163

October 31, 2002

Charlene Haught Johnson, President
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Draft "Implementation and Operations Plan" and Draft Environmental Impact Report

Dear Ms. Johnson:

On behalf of the Port of San Francisco, I would like to commend you and your staff on the recently released "Draft Implementation and Operations Plan ("IOP")" for expanding water-transit service in the San Francisco Bay Area. The Port supports the state's objective to develop a cost-effective, convenient and environmentally responsible ferry system to enhance the public transit systems that serve San Francisco and the Bay Area. 1

Consistent with these objectives, the Port of San Francisco recently completed the first phase of the Downtown San Francisco Ferry Terminal project which focuses upon the role of the Ferry Building area in enhancing regional ferry service to and from downtown San Francisco. Approximately 10 years ago, during the aftermath of the Loma Prieta earthquake, the Port recognized that ferry ridership is likely to increase as highway congestion worsens, and is likely to increase even further if frequency of service is improved. (Source: Downtown San Francisco Ferry Terminal Project, Conceptual Design Final Report, July 1994) In 1995, the Port undertook the analysis and design of a Downtown San Francisco Ferry Terminal capable of accommodating the then anticipated growth in commuter ridership. Rather than a single-purpose transportation facility, the Ferry Building area is a vital mixed-use area that must simultaneously provide for the expansion of downtown ferry service, provide convenient passenger transfers between modes; and, at the same time, become an active destination in its own right. Over $17 million in federal, state and local funds have allowed for the design and construction of the Downtown Ferry Terminal Phase 1 improvements. The first phase of improvements is complete which includes two new, majestic portals which lead ferry passengers to fully-accessible, covered gangways and floats that provide for standardized docking facilities to four ferry vessels, concurrently. The improvements more than double the previously existing ferry landing accommodations. The layout and architectural design of the new terminal facilities compliment the historic Ferry Building, reflect today's use of ferries and anticipate future expanded use of the ferry system.

Furthermore, the historic Ferry Building (a national register landmark) has been recently restored and is expected to be open to the public in the spring of 2003. The restoration allows pedestrian movement through the building from The Embarcadero to the Ferry Terminal areas,

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and provides retail and market uses on the ground floor to satisfy the ancillary needs of ferry passengers. The Ferry Plaza is included in the long-term lease and program for the Ferry Building as a site for staging the popular Farmer's Market two days per week which, in conjunction with the permanent ground floor marketplace, is expected to draw thousands of residents and visitors to the waterfront. The building also includes approximately 250 square feet on the ground floor for passenger waiting, ticketing or other transit-related services that may be programmed by service providers to accommodate the needs of transit passengers.

Although the Port's long-range plans for the Ferry Building Area and Downtown Ferry Terminal anticipate growth ferry ridership and allow for 6 additional berths beyond the 4 that presently exist, the IOP anticipates "ferry operations nearly five times higher than today" at the San Francisco Downtown Terminal (pp. 35, Draft IOP). Although the IOP does not provide specific terminal design criteria or guidelines for downtown San Francisco, the plan includes conceptual designs for San Francisco's terminal which clearly anticipate significant changes to the Downtown Terminal to accommodate passenger waiting, front and side loading docks, and potential new retail and restaurant uses beyond what is already included in the historic Ferry Building and adjacent Piers projects. 1

The Port's commitment to water-transit is evidenced by the goals of the Port's *Waterfront Land Use Plan*, the implementation of the Downtown Terminal Project and the Ferry Building restoration which provides increased access between the Bay and downtown San Francisco and retail amenities for ferry passengers. Given the great effort already invested in the long-term planning and facility improvements in the Ferry Building area, the Port is very focussed on ensuring that future improvements spawned by the WTA planning process build upon and enhance the significant investments that already have been made, including the new Downtown Ferry Terminal Gates B and E. We look forward to working cooperatively with WTA toward expanded water-transit service for the Bay Area in a manner that does not duplicate or inhibit the vision to be realized by the opening of the Ferry Building, the future restoration of the Agriculture Building, and the ongoing operations of the World Trade Club. These landside developments provide commercial amenities and services that will serve ferry riders and visitors alike. Based upon the Port's experience with the design of the Downtown Terminal and with long-range land use planning and leasing in the Downtown/Ferry Building Area, we believe a number of issues must be considered in order to create a successful terminal in San Francisco, including:

- Pedestrian circulation that is consistent with the vital mix of land-side uses and provides safe, efficient paths of travel to downtown and connections with other modes of transit; 2
- Sheltered waiting areas that are consistent with the adjacent land-side uses; 3
- Land-side transit interface requirements, including pedestrian crossings of The Embarcadero, MUNI, BART and Golden Gate Transit connections, drop off and pick up zones for taxis and vehicles; 4

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- An analysis of future demand for parking, and planning study to identify locations and/or strategies to address parking needs; 5
- Comprehensive land use and site planning, including integration with long-range land use plans and tenant requirements; 6
- Terminal design features that meet state-of-the-art environment standards and emergency preparedness requirements (i.e. power supplies, lighting, pump systems, etc); 7
- A convenient, centralized location for vessel maintenance, fuel dock, crew training, etc. 8

The Port is looking forward to the next phase of terminal expansion and is of the understanding, however, that the cost of re-evaluating the Downtown Terminal design, possibly re-designing and constructing the necessary improvements to accommodate a five-fold increase in ferry ridership will not be a financial burden borne by the Port. We understand that the WTA is prepared to work with the Port and other cities and counties within the region to apply for and secure local, state and federal funds that may be available to make a significant intermodal terminal and expanded water transit a reality for the San Francisco Bay area. 9

Finally, the Port recognizes that the "Draft EIR for Expansion of Ferry Transit Service in the San Francisco Bay Area" is a programmatic EIR and that site-specific environmental analysis will be performed to evaluate local conditions and implementation plans. The Port will review and comment on the project-level environmental analysis of the San Francisco terminal.

The Port applauds the WTA's efforts to assist the State of California with the adoption and funding of enhanced water transit facilities. We look forward to working with WTA to implement terminal facilities in San Francisco that are consistent with the vital mix of land uses and transportation systems along the waterfront.

Sincerely,

Douglas F. Wong
Executive Director

cc: Veronica Sanchez

EIR 164

Tristan Bettencourt

From: Chris Barry [cdbarry@hotmail.com]
Sent: Wednesday, October 30, 2002 8:07 PM
To: email@watertransit.org
Cc: morrison@watertransit.org
Subject: IOP Comments


WTA_IOP.doc


CV02b.doc

Daer Mr. Morrison;

Attached please find comments on the IOP. Please note my compliments on all of the fine work and study that has gone into this effort. My comments are mainly based on my own experience with commercial and military small vessel acquisition, construction, and fleet support and are offered as helpful suggestions only. They should not be taken in any way as reflecting any suggestion that the IOP is in any way defficient or inadequate.

I have also attached my resume for your information as regards my background that goes to these comments.

Thank you again for the opportunity to comment on the IOP and please feel free to contact me for any more information, clarification or other resources to help in your efforts.

Very Respectfully

Chris Barry

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8100 West End Drive
Baltimore MD 21226

October 30, 2002

Reference: Draft Implementation And Operation Plan

Steve Morrison
Project Manager
Implementation And Operation Plan
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Morrison:

Thank you for the opportunity to read this plan, and for your kindness in sending it.

I would like to apologize for not having the time to give this effort the review it deserves in the month that I have had it. Unfortunately, my duties relating to recent Coast Guard acquisitions involving fleet modernization and the events of 9/11 have taken a great deal more time than I had anticipated. In particular, I have not had a chance to review the vessels specifications nearly as closely as they deserve. I will continue to look at the report from time to time, however with your permission, I would be happy to offer you additional comments for unofficial use.

I would also like to thank you for gathering some of this information, especially as regards emissions, which I believe will continue to be useful in the marine community. 1

Alternative Fuels Appendix

I am offering a second copy of the following comments previously submitted (late):

This report is a very thorough, professional and comprehensive study of the subject of alternative marine propulsion and will probably become a valued reference for many other projects in the future. I would especially like to thank you for commissioning it and for making it readily available for a wide range of other users.

A couple of minor comments:

Page 279 Mr. Stan Stumbo is also a P.E.; No. 23201J, WA (I am a WA licensee as well as a CA licensee, so I have the WA directory). 2

Page 10 Natural gas actually has a higher energy content per pound than liquid petroleum fuels. The issue is its low volumetric energy content, which results in an effective weight penalty considering the containment required. The point of the statement is correct, but the detail might be clarified for the terminally picky. 3

I understand that there is basically an infinite range of potential technologies and combinations and permutations of them, so you had to make choices in what you consider, so please do not feel that I am criticizing your report for not including some other technologies. (I note for example, that you did not consider human or nuclear propulsion.) Mr. Paul Kamen, the Rev. Bryan Duffy and I have addressed most of these comments in the context of our paper "Ferries for the San Francisco Bay Area; New Paradigms From New Technologies", which I believe you have a copy of, but I would like to offer them as specific response to your report. I will be brief here, please refer to the paper for details. 4

Page 14 Note that there is a technology for removing pollutants from marine engine exhausts that is based on wet exhaust with filtering of the subsequent water discharge. The device is produced by Eco Sound in Florida. I do not have any independent assessment of its effectiveness, but it is a COTS device and may be worth investigating. 5

Page 17 Note that fuel cell technology often depends on reformers. Other commenters have mentioned the issue of efficiency of the reformer, but I have not seen any data on potential emissions from the reformer. I do not 6

know that this is a problem, but some of these processes involve high temperatures and may not perfectly reduce all of the feedstock to hydrogen, so there is a potential of emissions.

All — In general, upstream and downstream environmental effects are not discussed. Our paper mentions this in the context of agriculturally derived fuels, for example, and your report discusses this in the context of battery disposal. It is also exceedingly difficult to accurately assess these effects, so their omission is understandable, however, it is important to note that such effects may exist. 7

No page — Our paper considers Steam Augmented Gas Turbine, in which water is heated in the gas turbine exhaust and subsequently injected into the burners and possibly in various intermediate stages of expansion in the turbine. This technique increases efficiency and reduces NOx. Unfortunately, it was explored for combatant naval craft, wherein it has the fatal flaw of producing a very strong signature in the form of a hot steam plume (which is not only visible, but also emits high levels of far IR), and hence was dropped. However, it is an effective technology for other craft (and also for standby cycles in land power generation). It is not currently commercially available, but it may be possible to retrofit on industrial gas turbines, especially those currently used on offshore platforms (which are also designed to run on natural gas). Note that the Navy studies contemplated a retrofit. 8

No page — Although such a technology is probably not fully viable, conventional sail with fairly high powered conventional propulsion as an auxiliary might be a means of reducing net yearly emissions for certain very specialized routes. Similar studies have shown that sail assisted merchant vessels are viable for fuel savings, though not economic at current energy costs. However, environmental concerns may change the overall weighting of such an alternative. (Mr. Kamen and I are contemplating such a study as a submission to the upcoming Chesapeake Sailing Yacht Symposium, and if we go forward with it, we would appreciate any help in providing data that you may have.) 9

No page — Our paper also mentions steam propulsion. Note that steam can work with a wide variety of fuels, can have low emissions and is well established and proven in marine service. The main difficulties with steam involve the portion of the cycle between the condenser and the boiler, especially the deaerating feed heater and its interaction with the feed pump, as well as water conditioning for boiler feed. Both of these issues can be eliminated on a ferry by using a once through system for feedwater, since the ferry could be rewatered frequently. This also allows a direct contact condenser, (traditionally used on Great Lakes vessels) which is lighter, lower maintenance and produces lower temperatures, without the efficiency loss due to subcooling. A small ferry could also use small, simple turbines similar to those used now for auxiliary service in large plants. Finally, reverse reduction gearsets are practical in powers applicable to ferries so the problems of providing reverse power in a merchant ship (and the associated windage losses) are not applicable to a ferry. 10

Draft Implementation And Operations Plan

Note that mitigation of traffic congestion constitutes removal of a disincentive to growth and may thereby increase other impacts in proportion to the effectiveness of a ferry system. This is no good reason not to implement such a system, but in all honesty, it should be noted. 11

Safety of ferry transit in general is probably much better than is stated, and should be noted. The Washington State Ferry system has had no passenger fatalities in 50 years of operations. 12

The costs of the ferries themselves are probably overstated whereas the cost of terminal are probably understated Note that this author's shipyard produced a 149 passenger, 25 knot ferry for less than $750,000 adjusted to current dollars prior to instituting modern shipbuilding productivity methods. 13

Provision should be made for allowing non-assistance companion animals (i.e. pets such as dogs) aboard. Public transit is virtually closed to companion animals and allowing such riders on open deck areas would be very beneficial to a small, but vocal minority of users. 14

More emphasis should be given to the beneficial effect of alternatives for reducing congestion for drivers who continue to use their cars. Shrank and Lomax (2001 Urban Mobility Report, Texas AMU) has useful information supporting this view. 15

Draft Implementation And Operations Plan: Speed

To those of us in the Bay Area for the Spaulding ferry construction, 25 knots gives a sense of déjà vu. Caution is suggested:

The issue of most cost effective speed is a very complex one and should be evaluated very carefully. A Nordsrom/Mercier/Savitsky analysis of a typical 149 passenger catamaran ferry suggests changing speed from 12 knots to 23.9 knots (the algorithm is not defined above this speed) increases required horsepower roughly linearly from 142 BHP/hull to 1,176 BHP/hull. Even though the boat goes faster, this corresponds to a large increase in fuel (1.4 NM/gallon versus 5.6 NM/gallon) and maintenance cost. In addition, the larger engines are substantially more expensive in first cost. Engines up to about 700 BHP have a large market, mainly for over-the-road use (the 700 BHP engines are typically heavily turbocharged and intercooled blocks normally running 350 – 450 BHP when naturally aspirated – they are more expensive that the naturally aspirated engines but not nearly as costly as the larger blocks required for 1,000+ BHP). Above this size, the market and the number built shrinks drastically and costs, both total and per horsepower increase rapidly. Note that at 17.9 knots, the required BHP is 617 per hull, which still allows a reasonably large choice of engines. Higher speeds also increase other costs, as the weight of fuel and engine increases (roughly by a factor of ten in this case) and due to increases in required insulation, noise control efforts and similar ancillary effects. (These calculations and plots are available on request.)

At this speed, a 6 nautical mile trip (Berkeley to San Francisco) requires 20 minutes top speed running time vice 15 minutes for 23.9 knots (and 30 minutes at 12 knots). When time for low speed maneuvering, mooring and unmooring, and loading and unloading, is considered, this difference is small. Note also that the sensitivity analysis does not distinguish between running times and reduced headways except in terms of value of traveller's time, and since this includes the time required for the land links of the journey, the advantage of high speeds is proportionately even less.

Reduced headways can be achieved by either fast craft or by more slow craft. Here the increase productivity of a fast craft has to be balanced against a combination of costs dependent on per vessel travel distance (mainly fuel), those on per vessel travel time (mainly crew and vessel financing, insurance and similar costs) and system costs not strongly affected by the total number of vessels (such as terminal acquisition and operations cost). The faster craft will make more voyages per day, and perhaps more important, more voyages in the peak period, so that crew costs and other daily cost will be spread over more passengers, which might overwhelm the higher fuel and engine costs. However, this depends greatly on the relative proportions of these costs. A simple analysis comprising only fuel and crew costs, with all other vessel cost differences due to speed neglected suggests that the cost of reducing the trip time based on speed increase to 23.9 knots from 17.9 might be over a dollar per hour, though it radically changes as the passenger throughput increase due to speed eliminates an entire vessel to handle the assumed rush hour traffic. This is less than the value of time suggested by the mode choice model, which thus supports higher speeds, but it is important to realize that speed is expensive and may not have enough overall contribution to reduced trip time to justify its high cost, particularly as regards environmental issues as well. This matter needs to be very carefully examined.

More slow vessels could even reduce total trip time. For example, a commuter will generally time their home departure based on two standard deviations in variance of travel time to the terminal, which should ensure that they arrive at the ferry before it is scheduled to leave more often than about about 95% of the time. This means that on average, they will wait at the terminal this period of time. If the headway between ferries is less than this, they will experience a shorter trip. Note that this also goes to the decision about the passenger capacity of the craft.

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Draft Implementation And Operations Plan: Size

Size, passenger capacity, should also be examined carefully. Land transit theory suggests that if a larger vehicle can be filled it is always best. This is not necessarily true for marine systems, mainly because the right of way for marine systems, i.e., the waterways, is neither very costly nor particularly restricted, unlike rails or freeways. In addition, Coast Guard guidelines set crew sizes and regulatory criteria in steps based on passenger capacity. A vessel over 149 passengers has to have at least three crew and must meet 46 CFR SubChapter K versus SubChapter T. This latter change substantially increases cost and weight especially as it requires structure with fire resistance equivalent to steel. In practice, this eliminates fiberglass construction and requires substantial insulation on aluminum, increasing weight and cost. It aslo increase other areas of cost.

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Draft Implementation And Operations Plan: Vessel Types

Based on the above considerations, it may be wise to consider other vessel types. I would also suggest that a low speed steel vessel with a passenger capacity near 350 be considered as well as a slower 149 passenger craft. Note also that steel construction need not be automatically eliminated. High speed steel craft are common in patrol

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craft roles (the 30 knot US Coast Guard 110 WPB Island and the 25 knot 87 WPB Marine Species class patrol boats are steel) as well as ferries in Europe. Note that high strength steel construction (ABS AH 36 steels) is near the weight of aluminum, especially when the additional weight of insulation required on aluminum is considered. 18

Also note that there is an assumption that catamarans are the ideal type. This is not necessarily the case. The previously discussed catamaran was compared to a monohull of similar size and capacity and the BHP requirements of the monohull were actually less than the catamaran for speeds over 19 knots, and the study does not consider the deleterious effect of possible interference between the two hulls of the catamaran (note also that the proposed terminal design has a tendency to force a hull spacing smaller than that considered ideal for avoiding this effect). Catamarans are also heavier and much more expensive per passenger than monohulls. Catamarans are generally better damped in roll than monohulls and have shorter roll periods. However, active roll damping fins (the 110 Island class are so equipped) are very effective and well proven at these speeds for monohulls, as are roll damping tanks and active rudder roll damping, and may be well suited for a ferry. Catamarans are poorly damped in pitch however, and it is more difficult to damp pitch than roll. 19

Draft Implementation And Operations Plan: Market Segmentation

The use of the phrase "Joe Six Pack" to describe a market segment should be reconsidered. Ferry systems are already considered elitist by some parts of the Bay Area community and this might be considered disparaging and further play to this sentiment. Note also that this is the only phrase that includes a gender identity. 20

Draft Implementation And Operations Plan: The Vessels

This author believes that a much greater number of shipyards than eleven can produce a suitable vessel, based on experience with procurements of very complex Coast Guard vessels. There are probably more than 22 yards in the US that could produce adequate vessels. 21

This author also notes that construction of some ferries in the Bay Area or at least California is feasible if WTA encourages it through a strategy such as a partial set-aside. This author believes the difficulty of constructing these craft might be overestimated. 22

Though a "design and build" procurement strategy is currently very common, it is not the only possibility and each strategy has advantages and disadvantages. For example, separate design and build competitions means that the "best" builder and the "best" design are combined rather than possibly forcing a trade-off between the best builder who has a poor design and the best design badly built. In addition, "design and build" forces a builder to trade the cost of valuable initial design work (which may not be reimbursed) against the possibility of winning the contract. Some builders will also decline to bid, thereby reducing competition. This increases the risk of poor performance or cost overruns because the builder is not offering a fully developed design; for example, few builders would go to the expense of doing model tests for a proposal. Though model tests are wisely required after award, if they show the design has a performance problem, it is now a serious problem. Note that this does not preclude a builder/designer offering a design and then offering to build it. Separate design and build phases also allow WTA to redirect design efforts to include features later found desirable or to address issues discovered during design by teaming with the designer rather than by issuing changes during construction (which may require rework and may include "delay and disruption" charges). 23

Terminal Architecture and Engineering Generic Terminal Design Prototype

The entire terminal could be floating, thereby reducing land costs and shore impact. 24

"Park and Ride" remote terminals with a shuttle to the quayside may mitigate the impact of parking at the terminal. This was had been proposed for the Potomac "River Jet" ferry system. 25

Note that entering a separate holding area may add a perceived transfer to the trip and may reduce patronage. If it is possible (from a schedule point of view) to allow people to board as they arrive at the terminal, the deterrent effect of a mode transfer will be minimized. Schedules may not permit this when ferry dwell times at the station are small during rush hour, but this may substantially increase perceived level of service for off-hours, which could help level ridership and contribute considerably to the overall success of the system. 26

149-Passenger, 25-Knot Passenger-Only Ferry Request for Proposal

As noted above, I have not had the time to fully review this document, and my comments here may be incorrect as I certainly have missed certain aspects of the document. Please forgive any errors on my part in this regard. 27

Note in general that this is an expensive and sophisticated craft. Such a high level of sophistication may not be required, especially if a lower speed is adopted. This craft is probably substantially more expensive and sophisticated than many 149 passenger vessels in successful service throughout the United States. Such sophistication not only increases first cost, but ongoing maintenance costs, and may adversely impact reliability as well. However, first cost is a relatively small component of total operational costs and the additional sophistication may be wise if it increases level of service and thereby patronage. Note also that some tests, standards, and practices required are unusual for vessels this size, including high performance military craft. Though such test may be appropriate for larger ferries, they may be of little value for this smaller craft. 28

Page 42 refers to a 350 passenger ferry

The document does not appear to address precedence and applicability of references and their sub-tier references. 29

AWS welding qualifications are at least as good as those of a classification society and should be offered as an alternative. Note also that ASTM and IACS have general structural quality standards that could be invoked . 30

A fairness standard should be invoked. Half the NAVSHIPs requirement has proven both achievable and acceptable. There are also ASTM and IACS standards (the former is similar to NAVSHIPS, and can be halved for a better appearance). Techniques for remedying unfairness should be detailled. 31

Note that very short runs, especially at 25 knots, may not warrant food services as the run might last only fifteen minutes or so. 32

Limits on page 2-7 will tend to force a narrow hull spacing that might result in deleterious interhull wave interference. This might adversely impact seakeeping and may even increase heave motions. 33

Note that providing second deck generally will require an additional deck hand under guidance in the Coast Guard Marine Safety Manual. 34

Page 105-2 requires that "a registered Professional Engineer shall certify that all drawings and other design documents that are required as deliverables to the WTA..." This touches on an area of considerable controversy and change, and the WTA should consult competent counsel as regards the issue involved in professional engineering registration, especially in the maritime field. 35

Note that only the states of Washington and Oregon offered registration in naval architecture and marine engineering (NAME) until 1999. Since 1999, states which have a general licensing law, i.e. those that do not license within title or disciplines, have offered an examination in NAME (California licenses within disciplines, so NAME is not offered in this state), but only about 63 people nationwide have even taken the exam. A few naval architects have obtained licenses by examination in other disciplines, or by obtaining a license in Washington and applying for reciprocity in some other state, (this is not possible in California) but registered P.E.s with expertise in naval architecture are relatively rare.

A number of naval architects and shipbuilders have places of business in states (like California) with discipline based engineering registration laws that have not yet recognized NAME as a discipline. These engineers are thus registered in another state, either Washington or a state with general registration that allows examination in NAME rather than their own state. It may be illegal for these engineers to stamp drawings based on an out-of-state registration. Please note that this is not a theoretical matter; in addition to California NAMEs licensed in Washington only, a number of noted specialist firms in fast ferry design or construction operate in Rhode Island, a discipline state, but are licensed in Connecticut, Massachusetts, or Maine, which have general licenses. 36

A foreign design firm may have engineers registered as "Chartered Engineers" or some equivalent. Are such certifications and Canadian provincial "Professional Engineer" licensure equivalent to U.S. registration? 37

Finally, since the WTA staff is reviewing deliverables for technical merit, (note paragraph at 125 on page 105-4) and the WTA has herein stated that P.E. registration is appropriate, WTA staff in responsible charge of such reviews will be required to be registered, specifically in the State of California, as well, and to have appropriate experience in NAME. This may present difficulties, especially because California does not license NAME specifically. The WTA should either consider asking the State Board of Registration for Professional Engineers and Land Surveyors to add NAME to the disciplines authorized in California, or eliminate this provision (though 38

this may not be possible, if other language in the specification produces a presumption that the services requested constitute "engineering" in the meaning of California state law). 38

There are numerous provisions giving the WTA "Imperial Mandates" regarding rework, non-acceptance of work, removal of workers, etc. In federal practice, exercising such initiatives has lead to substantial Requests for Equitable Adjustments. Again, in federal contracting, the Equal Access to Justice provisions have made even frivolous REAs expensive. If rules analogous to these provisions are typically applicable to state contracts, these options should be exercised with great caution, or the specification should be modified to better define criteria for rejecting work, etc. 39

Although reduced emissions and good fuel economy are probably linked, fuel economy might be separately incentivized. The price of fuel will probably at least double and more likely triple with respect to inflation during the vessel's lifetime. 40

The general specifications do not appear to be organized in a work breakdown numbering system. Two such systems are in common use in the U.S., that of the Maritime Administration and the Navy Extended Ship's Work Breakdown Systems (ESWBS). These systems assign a fixed number to certain specific systems (i.e. ESWBS 245 is propellers) and make coordinating weights, costs, drawings, etc. against a consistent numbering system feasible. The specification should be recast in one of these systems and they should be required of the contractor. Both systems are described in Society of Allied Weight Engineers Recommended Practice RP-14 (available online from http://www.sawe.org) as well as the germane government publications. 41

There are a number of industry standards that may be included entire in the specification in addition to those cited. These standards include criteria promulgated by ASTM, SAWE and others. RP-14 cited above provides a weight control standard, for example. Full compliance to ASTM F1166, (Human Engineering) especially, should be considered. As another example, use of the proprietary phrase "Detacouple" (which belongs to DuPont), may be replaced by "MIL-J-24445" as this is the only current non-branded specification for explosive or high pressure bonded steel/aluminum structural bonding strips. A central list of all cited standards and specifications and their sources would also be appropriate. 42

Contractors should be given options other than ABS class. Det norske Veritas is well regarded, particularly in the area of high speed craft. Lloyds, and Germanischer Lloyds may also be considered. Finally, vessels as small as 149 passengers are frequently not classed. 43

Page 1-5, note that many engines and much other equipment may be supplied with metric information or even readouts. 44

Non-toxic anti-fouling, "slick" or "hard coat" paints may be considered. These paints work reasonably well in areas without ice and with mild fouling and do not emit toxic materials. In addition, these paints do not contain copper and do not therefore present a corrosion hazard to aluminum hulls. 45

The Coast Guard has experimented with applied thin films as an alternative to paints. This may be appropriate for the anti-glare finish on page 2-9. 46

The Coast Guard has developed a standard for aluminum bead blasted finish for bare aluminum which is relatively inexpensive, and aesthetically pleasing which might be specified. Bare aluminum may have unsightly watermarks or directional finishes. 47

Is compressed air engine start required? Note that even large Paxman engines are commonly battery started on military craft. 48

Polyurethane or polyurea based coatings are often superior to epoxy based coatings for resistance of damage due to high flow and may be preferable for jet inlet finishes (page 2-9). Coast Guard and Navy sources have comparative tests available to evaluate these alternatives. 49

Offering more seats that the permitted number of passengers will prevent loss of seating capacity due to small groups occupying the six seat tables on page 4-4. 50

Note that specific guidance on ADA compliance for passenger vessels has recently become available and should probably be cited. 51

Are surface piercing propellers allowed? 52

Propeller specifications should be included. ISO 484-2 Class 2 is one such specification, though this requires some minor modification to be usable for COTS propellers. Class 1 propeller may be appropriate as an alternative. Not that more or less standard propellers (i.e. segmental section, constant pitch, with are straight helical generatrices) are probably near their limits for the required speed, but more sophisticated propellers may create long term supportability issues, particularly if they are proprietary. 53

Shafting material for propeller driven craft should be specified. Materials equivalent to Aquamet 22 HS have good proven service and are suggested. (Note that Aquamet is proprietary. The generic alloy designation can be provide for this material upon request.) Shaft bearings and seal systems should also be specified. Note that dripless seals with longitudinally split type shaft borne components are well proven and easily supported (Johnson Duramax "Mac" seal, is one type). 54

External non-skid systems based on separate glued down "tiles" or "strips" vice painted non-skip treatments have proven to be very successful in Coast Guard service, especially because damage to one tile only requires replacement of the damaged tile, not repainting the entire area. 55

Though expensive, titanium piping is becoming more common and may be appropriate considering the issues of self corrosion, inducing galvanic attack on aluminum, and weight. 56

Note that copper bearing pipe and fitting is often forbidden on aluminum craft. Even if isolated from aluminum structure, condensate drips can deposit small amounts of copper corrosion product which will cause substantial galvanic damage. An alternative approach is to lag the pipe to prevent such drips. 57

An infra-red imaging system may not be able to detect debris adequately if it is at the temperature as the water. 58

Is a Doppler speed log an electromagnetic log? 59

WAAS GPS may be preferred to DGPS. 60

Tests should include one demonstrating that the vessel can be steered away from a stopped engine. The shaft spread of many catamarans means if an engine fails they do not have enough steering effort to do other than run in circles. 61

A "Lystergram" test of stability on course is simple and valuable, and stability on course should be required (though it is unlikely that it will be a problem). 62

On page 1-13, natural frequencies are required to be above 1.4 times the highest forcing frequencies. Natural frequencies below 70% of the lowest forcing frequency achieve the same response amplitude operator and should be allowed as well. 63

A whole vessel Finite Element model may be considered. MAESTRO, especially, is well established for hull scantling optimization and is useful throughout the vessel's life for structural maintenance planning. Since it uses super-elements specially formulated for ship and boat structures, it is economical to use in terms of computer resources and modeling effort. The program is also reasonably in prices. Both the US Coast Guard and the Canadian Defence Department have developed structural monitoring programs for vessels using MAESTRO or variants of it and ABS SAFEHULL is based on the core MAESTRO engine. 64

Lettering of minimum 0.20 high is not in accordance with ASTM Y14 and is quite large, producing cluttered drawings, and is unnecessary with CAD as the lettering is relatively clear. 5/32 is a common standard, even for hand drafting practice and smaller sizes are readable even when reduced to 11x17. MIL-T-3100 provides a useful comprehensive standard for drawings and similar documentation, as does COMDTINST M9085, which is available over the Internet and provides more extensive standards for AutoCAD drawings. Note also therein provisions that require contractors submitting CAD drawings ensure that SHX's and similar proxies, shapes and other components be either publicly available or submitted with full license rights with the drawings. Otherwise, such entities do not display or plot properly. Drawings should also be submitted at 11x17 reduction and as DWF files as well as DWG as the latter are more compact and can be viewed and printed by computers without AutoCAD installed. 65

The WTA should consider a electronic project management system such as those used in the construction industry, such as Redspark or Buzzsaw, from Autodesk. The US Coast Guard has such a system for the Deepwater program and the NSRP demonstrated such as system in about 1996 under NIIP SPAARS. However, note that the 66

most competitive shipbuilders use CAD product modeling techniques which generate drawings as a side product. A product model would be very valuable for long term vessel management and WTA should consider encouraging product models in lieu of conventional drawings. 66

Does a "short circuit analysis" include a fault current analysis or is it just an analysis demonstrating that the minimum level of protection devices clear? 67

Other

WTA personnel are strongly advised to obtain focused training specifically for source selection and shipbuilding contract management. A source for the former is George Washington University and the latter, Fisher Maritime (New Jersey). 68

An immediate next step would be to commission or produce in-house "point designs" to validate the specifications and to examine costs and possible alternatives. I am currently contemplating such an effort as a paper to be submitted to the Society of Naval Architects and Marine Engineers and I would appreciate any information that you may be able to give me in this regard. 69

Note that specimen high performance craft specifications are available from various federal sources and may be useful. One such specification is that for the Response Boat – Medium, available at www.hjfordweb.com/arb. 70

Please note that the comments offered herein are my own and do not necessarily represent the views or official policy of the Commandant of the Coast Guard. 71

I also enclose my resume for your information, and would be pleased to offer any help I can provide with any future efforts 72

Thank you for the opportunity to offer comments on these excellent studies. I can be reached at either (202) 267-0562 (note that the voice message on this number is probably wrong, and I cannot pick up voice message at this number, as this phone was recently moved, but I am generally there) or (410) 762-6731 days (EDT) and (410) 437-3233 evenings.

Very respectfully

Christopher D. Barry, P.E.

Christopher D. Barry, P.E.

Address:	8100 West End Drive, Baltimore MD 21226 USA
Phone/Email:	(410) 437-3233 cdbarry@hotmail.com (home) (410) 762-6731 cbarry@elcbalt.uscg.mil (work)
Education:	B.S. Mechanical Engineering/Naval Architecture, University of California at Berkeley, 1974
Licenses:	Naval Architecture/Marine Engineering, Mechanical Engineering, Washington State, No. 27127, 1990 Mechanical Engineering, California, No. M 18536, 1978
Memberships:	Society of Naval Architects and Marine Engineers (SNAME) SNAME T&R Panel SD-2, *Computer Aided Ship Design*, SP-4, *Production/Design Integration* AutoDesk User's Group International (AUGI)
Clearance:	CONFIDENTIAL (NACI)

DATA PROCESSING & CAD/CAE QUALIFICATIONS:

Languages:	FORTRAN 77/66, C, Pascal, BASIC
Systems:	PC/MS-DOS, VAX/VMS, UNIVAC/Exec, UNIX, CP/M, WinNT, Win98
Applications:	AutoCAD R14; Lotus 123; Excel; ANSYS; IDEAS/GEOMOD; SHCP; GHS; ShipCAM; Algor; MAESTRO

EMPLOYMENT HISTORY:

1992 - Present USCG Engineering Logistics Center, ELC-024, 2401 Hawkins Pt Rd., Baltimore MD 21226
Senior Naval Architect - Responsible for design, analysis, and contract and technical management tasks in support of United States Coast Guard boats and small cutters to 120'. Supervised cutter weight and stability maintenance, including salvage and damage control software databases and performed stability tests. Developed Computer Aided Lofting/Numeric Controlled Cutting system for Coast Guard YARD and trained YARD staff. Member of ELC ISO 9001 Certification Implementation Team. Developed Owners Requirements Documents, specifications, cost negotiations, Engineering Change Proposal negotiations and claim rebuttal positions for major boat and cutter acquisition programs. Provided engineering support to new construction Project Resident Offices, reviewed drawings, calculations and conducted tests and trials. Developed statements of work, evaluated proposals and provided engineering and design support for fleet support, ShipAlts and BoatAlts. Investigated accidents. Managed **hydrodynamic model tests** and research.

1991- 1992 Munson Manufacturing Co. 150 Dayton, Edmonds, WA 98020
Chief Naval Architect - In charge of all design tasks for builder of high speed aluminum commercial/paramilitary boats including fast ferries, oil spill recovery vessels and Navy and Coast Guard patrol boats. Responsible for all engineering tasks, supervised design and engineering staff. Developed and implemented Computer Aided Lofting/Numeric Controlled Cutting hull manufacturing system that increased profits by 300% and trained staff in its use. Developed more than 16 complete boat designs in one year, including CNC code.

1990 - 1991 Elliott Bay Design Group, 5301 Shilshole, NW, Seattle, WA 98107
Senior Naval Architect - In charge of various projects in support of tug, merchant ship, ferry, fishing vessel and yacht newbuilding and modification. Projects included proposal preparation, **supertanker structural modification**, supertanker, fishing vessel, tug, freighter, excursion passenger vessel and ferry stability studies, contract designs and proposals of research vessels and patrol craft, lines fairing and numeric lofting for steel, aluminum and FRP ships, motor yachts and working and recreational boats.

1987 - 1990 Ground Systems Division, FMC Corp., P.O. Box 1201, San Jose, Calif. 95108
Principal Engineer/Naval Architect – Responsible for all naval architecture and hydrodynamics for amphibian and swimming armored vehicles (Bradley M2/M3, AAV7A1, LAV-AD, M113A1, AFAS) including development of High Water Speed Test Bed/AAAV for U.S. Marine Corps. Tasks included concept and detailed design development, vendor interface, proposal preparation, **hydrodynamic model and full scale testing, fluid flow analysis**, and hydrostatic, **hydrodynamic,** and infrared signature **simulation software** development.

1986 - 1987 Arneson Marine Inc., 15 Koch Road, Corte Madera, Calif. 94925
Applications Engineer -- Responsible for marketing, analytic and design tasks in support of application of innovative surface piercing high speed marine drive systems to recreational, military and commercial high speed vessels. Tasks included certification liaison with ABS, DnV & Lloyds Register, development of computer programs and management of spares and propeller inventory.

1985 - 1986 Harborside Marine, 2101 Wilson Ave., National City, Calif. 92050 (Harborside purchased Lee Engineering)
Chief Engineer - Responsible for all engineering and design tasks in support of newbuilding in FRP and repair/renovations in FRP, steel, aluminum and wood to vessels up to LCM-8 class for U.S. Navy, U.S. Coast Guard, and various fishing/utility work vessels and fiberglass recreational boats including tooling design. Responsible for Coast Guard recreational boat safety test program. Responsible for design of floating marina and dock structures in Mexico and US.

1984 - 1985 Lee Engineering Corp., 100 Old County Road, Brisbane, Calif. 94005
Vice President of Engineering - Responsible for all engineering for marine projects in ship design firm. Projects included U.S. Coast Guard recreational boat safety certification (33 CFR 183) survey program, initial proposal and portion of drawing package for Navy 42PRMK4 aluminum aircraft rescue boat, 65' catamaran FRP passenger motor boat, renovations of debris boats and tug for Army Corps of Engineers, working drawings of various modifications to Matson containership *Lurline*, sail and motor recreational vessel design and Navy Ship Selected Records (SSR) maintenance support.

Christopher D. Barry, P.E.

1982 - 1984 John Brown/Earl & Wright Ltd., 20 Eastbourne Terrace, London W2 6LE, UK (Joint Venture with Earl & Wright)
Senior Naval Architect - Project responsibility for analysis of hydrostatics, stability, seakeeping and **various hydrodynamic analyses** in support of North Sea offshore oil projects. Tasks included survey of UK DoEn research for impact on regulations, owner liason support, weight control and float-out for *SEDCO 713*, design of *North Alwyn B* jacket and modules, mating sealoads for *Beryl B, Thomeliten* and *Noske Hydro Waterflood* jackets and subsea templates and development of various computer programs.

1979 - 1982 Earl & Wright, Consulting Engineers, Inc., 1 Market Plaza, San Francisco, Calif. 94105
Naval Architect - Project responsibility for **hydrodynamic**, hydrostatic, upending and stability, seakeeping, **offshore mooring,** ice force, structural and fatigue analyses and software development in support of domestic, international and Arctic offshore oil projects. Tasks included forensic analysis of *Alexander Kielland* accident, design tasks for *North Rankin* platform, *SEDCO 711* class rigs, ***Claymore* North Sea FPP**, seakeeping improvements to SEDCO *Staflo*, fleet support for J class rigs, computer simulation of offshore construction projects and project naval architect responsibility for **ice-breaking drill vessel *Kulluck***. Supervised up to three engineers.

1974 - 1979 Morris Guralnick Associates, 620 Folsom Street, San Francisco, Calif. 94107
Naval Architect/Marine Engineer - Responsible for various design and analysis tasks in naval and maritime ship newbuilding, modification and renovation included **hydrodynamics, deepwater mooring,** stability, inclining tests, heat balance, piping design, structure design and analysis and hydrodynamics. Projects included tasks on **floating energy production platform OTEC 1**, research vessels, commercial tankers, Navy combatants, Navy fleet combat support ships, cable layers, cryogenic liquid carriers, drydocks, tugs, motor yachts and sailing yachts.

OTHER EXPERIENCE

1976 - 1982 Bay Area Marine Institute, Pier 66, San Francisco, CA
Instructor in lofting, structure, and naval architecture at vocational marine trade school.

1992 Olympic Boat Co., Monroe WA
Design Consultant for FRP sportfishing boat manufacturer - CAD hull design, optimization and lofting for *Northwest 24*

1986 - 1990 Sunset Engineering Assoc. San Francisco, CA
Principal/Owner of firm providing forensic analysis of boating accidents, government proposal preparation assistance, software development, and small craft engineering studies.

1986 - 1990 KTI Inc., Oakland CA
Consultant for software algorithm development to hardware/software development firm.

PAPERS AND PRESENTATIONS (Partial list)
"Implementation, … Zarnick Strip Theory Analysis …", IIPYD 2002, New Zealand, Dec., 2002 (accepted, co-author)
"Ferries … New Paradigms From New Technologies", *IMT Pacific, SNAME, May 2002, Asilomar CA (co-author)*
"Hydrodynamic Efficiency Improvements … *Island* Class Patrol Boats", *2001 Annual Meeting*, SNAME, Orlando FL (co-author)
"Block Construction of Small Ships … Developable Panels" – *SPS 2001*, SNAME, June, 2001, Ypsilanti, MI (co-author)
"CAD/CAM In Shipbuilding" Harvard University Graduate School of Design, Oct 2000
"The Stepped Hull Hybrid Hydrofoil Ferry" – *FAST '99*, SNAME, August, 1999, Seattle, WA (co-author)
"Keys to CAD/CAM In Small Shipyards" *1998 Annual Meeting*, SNAME, San Diego, (co-author)
"Implementation of Integrated CAD/CAM In Small and Medium Sized Shipyards: A Case Study" (co-author)
1997 Ship Production Symposium, SNAME, 1997, New Orleans, *Journal of Ship Production*, SNAME, May 1998
"Fast Ferry Design", "Propeller Matching" - *International WorkBoat Show*, 1996, New Orleans
"CAD/CAM and Fiberglass Tooling", - *Professional BoatBuilder*, Oct/Dec 1999
"Propeller Matching", - *Professional BoatBuilder*, April/May 1997"
"Implementing and Integrating CAD/CAM - Joinery and Outfit", - *Professional BoatBuilder*, April/May 1996
"Implementing and Integrating CAD/CAM - Metal Boatbuilding", - *Professional BoatBuilder*, Dec/Jan 1996
"Implementing CAD/CAM", "Fast Ferry Design", "Weight Control and Management", "Propeller Matching", and
Keynote speech, - IBEX '95 West; IBEX '96; IBEX '96 West, IBEX 2002
"Implementing CAD/CAM in Shipyards" - *Newbuild 2000*, RINA, London, October 1995 (co-author)
"The Stepped Hull Hybrid Hydrofoil" - *Small Boats Symposium '93*, ASNE, May, 1993, Norfolk, VA (co-author)
"Application of Computer Lofting for Small Yards" - *Marine Computers '91*, M.I.T., SNAME, October 1991 (co-author)
"In Search of High Water Speed" - *Amphibious Warfare Review*, Spring, 1989 (co-author)
"Advanced High Water Speed Armored Amphibious Vehicle", Northern California Section, SNAME, Sept. 1988 (co-author)
"Advances and Applications in Surface Piercing Propulsion", Northern California Section, SNAME, Jan. 1987 (co-author)
"Sailing Yacht Structures" - *AIAA/SNAME Ancient Interface XIII*, Oct., 1981 (co-author)

AWARDS, PATENTS
Society of Naval Architects and Marine Engineers 1997 Elmer Hann Award for Best Paper at a Ship Production Symposium
US Patent No. 4,974,539 "Integrated Propulsion ... System"; 5,134,954 "Asymmetric Hydrofoil..."
FMC special award ($3,000) for technical innovation
U.S. Coast Guard Meritorious Team Commendations, Flag Commendation Letters, Spot Cash Awards



EIR 165

October 30, 2002 Via Mail and e-mail

Mr. Thomas G. Bertken
Chief Executive Officer
Water Transit Authority
120 Broadway Street
San Francisco, CA 94111

Dear Mr. Bertken,

I am writing to providing comments on the Draft Program Environmental Impact Report (DPIER) for the Expansion of Ferry Transit Service in the San Francisco Bay Area.

Unless otherwise stated, the page references in this letter pertain to the DPIER. The Water Transit Authority (WTA) concurrently issued a Draft Implementation and Operations Plan (DIOP). Since the two documents appear to be related, some of the comments will also relate to the DIOP. 1

In the summer of 2002 CALSTART released a report that indicated that in order for an expanded ferry system to be considered a "clean air solution" the new ferries would have to exceed the EPA's 2007 Tier II marine emission standards by more than 85%. This conclusion was also supported by a California Air Resources Board staff analysis. In various locations throughout the DPIER there is reference made to the need to achieve similar emission reductions. However, it's not clear if this is the stated policy of the WTA or not. For example, on page 2-6, the DPIER said it developed an evaluation that "resulted in five options that can provide a 50 to 80 percent reduction in air pollutant emissions in the comparison to the EPA Tier II 2007 requirements." However, the report doesn't state the estimated emission reductions associated with each of the five strategies. If the WTA's policy is that it will only implement a system whereby the ferries emit 85% fewer emissions than the EPA's Tier II standard, then that policy should be clearly articulated. 2

Both the DPIER and the DIOP make several references to the "Clean Marine Ad Hoc Work Group" (Work Group) initiated by the WTA. On p. 3.6-15 it's stated that the WTA's evaluation "was performed in coordination with the 'Clean Marine Ad Hoc' Work Group." On page 40 of the DIOP, there is reference to the "Clean Marine's study" as if this AD Hoc Work group actually conducted an analysis. It should be well understood by all parties that the WTA did not seek to achieve consensus among the members of the Work Group. The WTA and its consultants would provide reports to the Work Group. I, and other members of the group, would provide limited feedback. There was discussion but there was no consensus. The findings put forth by the WTA do not reflect any consensus or majority opinion of the Work Group nor was there any process established to try and reach a common opinion. The opinions reflected in these documents are solely those of the WTA. 3

Both the DPEIR and DIOP indicate that a ferry using Selective Catalytic Reduction (SCR) and a diesel particulate filter (DPF) would result in none of the three alternatives having greater emissions than the No-Build alternative. In effect, the WTA is already choosing the ferry emission reduction strategy prior to building a single ferry, securing a dollar for operation, or finalizing a new route. Is this a wise strategy? Vehicle and marine propulsion technologies are evolving at a more rapid pace than in the previous century. The WTA should consider setting emission targets, and then when closer to the actual design and build phase, selecting the best available technology. 4

By selecting SCR and DPF technology options, the WTA seems to be committing itself to a diesel path for a considerable period of time. This is certainly the easy path but it may not be the most beneficial path. In addition to the health concerns related to diesel, staying with diesel does little to move the system closer to the Zero Emission Ferry that it "...will aggressively pursue..." 5

In the Coachella Valley of California, approximately 10 years ago, Sun Line Transit District converted its entire fleet from diesel to natural gas. Over the past four years, Sun Line has begun testing fuel cell vehicles and buses. Sun Line has set-up an extensive test program whereby at least four different technologies are used to create hydrogen. Sun Line is now testing buses that run on a combination of compressed natural gas and hydrogen (the mixture is called hythane). Based on its experience with natural gas, Sun Line's mechanics were easily able to incorporate the use of compressed hydrogen in the hythane and fuel cell test programs. The same maintenance facilities that were retrofitted to accommodate compressed natural needed virtually no modifications to accommodate the hydrogen fuel.

On October 31, 2002, Sun Line received a true zero-emission 30' bus (ZEB) running on compressed hydrogen. In 2004, Sun Line will begin operation of a new 40' fuel cell bus. It is uncertain when, and if, it will become economical for Sun Line to convert its fleet to fuel cell power. However, what is clear is that for the past 10 years the emissions from the Sun Line buses have been a fraction of what they would have been had the transit district continued to pursue the diesel path. It is also true that Sun Line's progress with hydrogen and fuel cell technology has been enabled by its work with compressed natural gas. 6

The DIOP states that issues remain before "four of the WTA's five propulsion alternatives can be used." Neither the DIOP nor the DPIER discuss the issues remaining with SCR and DPF in high-speed marine vessels. It should be noted that combining these systems would add a significant cost element to the ferry system. Can they reduce emissions? Most certainly. Should the WTA be locking itself into this technology at this time? 7

If we assume that additional costs will be incurred, then we should consider other options. On page 40 of the DIOP, the WTA writes that "Natural gas fuel does not yet have regulatory approval for use on U.S. passenger ferries." In reality, natural gas is 8



used in at least one passenger ferry operating in Virginia. While the approval process for using natural gas in passenger ferries is far from streamlined, there are no show stoppers when it comes to utilizing this fuel in a marine environment. In addition to the compressed natural gas ferry operating in Virginia, a car ferry using liquefied natural gas has been operating for the past two years in Norway. There have not been any safety incidents related to either vessel. In short, regulatory approval for natural gas can be approved if there is an interest and a will. 8

Using natural gas could be an interim step toward using hydrogen-powered fuel cell ferries as the WTA has stated it seeks to do. Whether in a liquid or a compressed form, natural gas has properties similar to either liquid or compressed hydrogen. The equipment, facilities, and training for both fuels have much in common.

Significant challenges remain before fuel cells will be viable in the transportation market. Costs need to decrease by a factor of about 10. The reliability and durability also need to be vastly improved. Furthermore, it remains unclear where the hydrogen will come from. These issues should be addressed. The WTA should pursue zero emission ferries. But, in the interim, the WTA should also pursue the cleanest possible option within reasonable economic boundaries. Moving to natural gas would also be a bold goal, but imminently more achievable than pursuing fuel cell ferries.

Natural gas engine technology is far superior today than it was 10 years ago. The cost of spark-ignited natural gas engines has declined considerably, while their reliability has improved significantly. Meanwhile, firms such as Cummins-Westport have now developed viable heavy-duty diesel engines that run on a mixture of 95 percent natural gas and 5 percent diesel. These engines are being used in a fleet of NorCal Waste refuse trucks, and have demonstrated the same efficiency as standard diesel engines running on 100% diesel. These engines could be scaled up for the ferry system if there was a commitment to natural gas. 9

In addition to being far cleaner than diesel fuel, natural gas also has the advantage that it is available from domestic sources. If the expanded ferry system was to make use of natural gas as a primary fuel, its cost would not be dependent on the changing political situation in the Middle East.

Presently, our power plants produce energy from a wide variety of fuels. Hydro-power, natural gas, nuclear, coal, wind, and solar all produce electrical power for use by Californians. Diversity in this sector is viewed as a positive. Greater diversity of fuel sources in the transportation sector would also be positive. Energy diversity would create greater energy security.

The DPIER analyzes emissions from the ferry system and how it would impact the Bay Area's air quality. However, does it look at the issue from a broader regional perspective? Presently federal transportation funding for the San Francisco Bay Area is in question due to air quality concerns. Yet, the air quality concerns in the San Francisco Bay Area proper are minor when compared to those confronting the 10

Sacramento and San Joaquin Valleys. The DPIER indicates the Bay Area is in conformity in regards to NOx emissions, yet it does not mention that the Sacramento and San Joaquin Valleys are not. When it comes to air quality, it is time that we begin thinking in broader regional terms. 10

In terms of mitigating ferry emissions, neither report included any discussion of retro-fitting existing ferries. This is an area where investment could also yield significant emission reductions. 11

Lastly, confirmed in this study, and also noted in the CALSTART study, cold starts of single occupancy vehicles used to drive people to and from the ferry stations are significant. If the WTA wants to really reduce emissions from an expanded ferry system, it should be aggressively exploring opportunities to reduce cold starts from vehicles used to transport its passengers to and from the terminals. With the merger of telecommunication systems and vehicles, there are a number of new concepts being developed that the WTA should examine. In 1998, in coordination with BART, CALSTART operated the nation's largest electric car sharing program. Approximately 120 users shared 40 electric vehicles each day. The vehicles, that have no cold start emissions at all, were used to transport people from their homes to and from BART stations, from BART stations to work, and as "pool" cars during the day at the work place. CALSTART is now supporting a program with City CarShare in San Francisco to use electric vehicles in their shared fleet of vehicles. Recently we also helped launch the nation's first clean mobility center at a transit and rail hub in Long Beach, California. At that location, transit users can access four forms of zero emission transportation: electric cars, electric scooters, electric bikes, and conventional bikes. Along with clean fuel demand responsive shuttles, these are but a few of the innovative concepts now emerging that could help reduce over-all ferry system emissions. 12

CALSTART has appreciated the chance to participate in both the WTA Technical Advisory Committee and the Clean Marine Ad Hoc Work Group. Ferries can play an important role in providing greater mobility options in the San Francisco Bay. The challenge before us is to make it the cleanest and most secure system that we can afford. 13

I would be pleased to provide additional information or answer any questions. I can be reached at our new San Francisco Bay Area office: 1160 Brickyard Cove, Suite 101, Point Richmond, CA 94801. Phone: (510) 307-8700. Fax: (510) 307-8706.

Sincerely,

John Boesel
President

VOID

EIR 147

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Chuck Reed
COUNCILMEMBER

October 21, 2002

Board of Directors
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: South Bay Ferry Terminal Site Study

Dear Chair and Board of Directors:

This letter is a request that the Water Transit Authority please reconsider locating a water transit ferry system site in the Alviso area in light of new construction planned on the Guadalupe River adjacent to the Santa Clara County Alviso Marina.

On July 9, 2002, the Santa Clara Valley Water District Board of Directors committed to a significant investment in the Alviso and North San Jose region by approving a $60 million Guadalupe River flood protection project. The project will provide the following features:

1. Removal of vegetation and sediment build-up in the river.
2. Construction of flood walls and levee raising/rehabilitation.
3. Construction of depressed maintenance roads with ramps.
4. Reconstruction of State Route 237 eastbound bridge over the Guadalupe River.
5. Provide for healthy creek and bay ecosystems.
6. Revegetation to provide continuous riparian corridors.
7. Increase recreational opportunities by providing opportunity for construction of river trails.
8. Increase wildlife habitat.
9. Improve water quality.

1

In addition, the County of Santa Clara is planning to start construction on improvements to the Santa Clara County Alviso Marina in 2004.

From 1849 to approximately the 1890's, the Port of Alviso was the gateway to Santa Clara County via boat transportation. In 1852, the passenger steamer, Boston, plied the Bay regularly. The fare was $35.00 each way from San Francisco to the Port of Alviso. This boat transportation provided a much needed option of travel in addition to reducing sediment build-up in the River.

801 N First Street, Room 600 San Jose, CA 95110 *tel* (408) 277-5320 *fax* (408) 297-7069 District4@ci sj.ca.us

Once again, there is an opportunity to consider the Alviso site as a means of travel to the Golden Triangle of Silicon Valley. As a transit system site, it could reduce highway congestion, air pollution and fuel consumption, and provide economic opportunities for both North and South Bay cities. Along with the substantial amount of infrastructure being constructed by the District to provide flood protection, recreational opportunities and natural wildlife habitat, the construction of an Alviso bay transit port could further enhance this region of Silicon Valley. 1

I appreciate your consideration of this request.

Very truly yours,

Chuck Reed

Chuck Reed
Councilmember



Ms. Phyllis P. Ayer
1321 19th Ave
San Francisco, CA 94122
www.marinemammalcenter.org

10-24-02

EIR 148

WTA
San Francisco

attn.: Mr. Steve Castleberry

Dear Friends:

Re: Expansion of Ferry
Transit Service in
S.F. Bay Area.

Please do not build a Gilmas
St. ferry terminal or a Port Sonoma
ferry terminal. Both would
harm water birds greatly.

Dredging at Gilmas St., &
disturbance to the tidal marsh
at Port Sonoma are also to be
unfavorably considered.

Thank you for your attention.

Sincerly,

Phyllis Ayer

1

2

Rodney McInnis (EIR 149)
UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In Reply Refer to:
October 24, 2002 151422SWR01SR6227:BM

Thomas G. Berken
Water Transit Authority
120 Broadway
San Francisco, California 94111

RECEIVED
OCT 25 REC'D
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

Dear Mr. Berken:

Thank you for the opportunity to comment on the Draft Program Environmental Impact Report (DEIR) for the expansion of ferry transit service in the San Francisco Bay area being proposed by the Water Transit Authority (WTA). The National Marine Fisheries Service (NOAA Fisheries) is responsible for conserving marine and anadromous fish species and their habitat, as well as protecting marine mammal species. NOAA Fisheries has concerns about this program regarding the potential for adverse effects to aquatic species and habitats protected under the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and the Marine Mammal Protection Act (MMPA). 1

We have reviewed the DEIR and have the following comments for your consideration:

PAGE 3.5-17 :
Central Valley steelhead are also listed as threatened under the Endangered Species Act (ESA) and utilize the San Francisco Bay during migration both as smolts and as adults returning to spawn. 2

Also, Central Valley Fall Run chinook are a candidate species which means this Evolutionarily Significant Unit continues to be considered by the NOAA Fisheries for listing as an endangered or a threatened species, but it is not yet the subject of a proposed rule. 3

Effective November 15, 1999, Central Valley Spring Run are listed as a threatened species under the ESA. 4

PAGE 3.5-18:
Coho salmon may continue to utilize the San Francisco Bay. Designated critical habitat for coho salmon includes two tributaries to the Bay, Corte Madera Creek and Arroyo de Corte Madera. 5

IMPACT B-1 (Dredging):
The Goals project is a plan to recover lost wetlands and increase the amount of wetlands in San Francisco Bay. It is not a map for identifying mitigation sites with which to replace new losses of wetlands. Any new project should avoid impacts to existing wetland habitats. 6

IMPACTS B-2, B-5 and B-6 (Dredging):
Impacts to habitat function and value resulting from new dredging activities associated with Alternatives # 1 & # 2 will likely require mitigation. Dredging of relatively undisturbed areas results in the displacement of an established benthic community. The function of the disturbed habitat may not recover to the previous state due to the changes in physical characteristics such as depth, water temperature, hydrodynamics and substrate composition that results from the dredging activity. The addition of pollutants from the ferry boats and associated support facilities (i.e. parking lots) could further degrade the quality of the environment impacted by the project. San Francisco Bay is extensively invaded with non-native species, and disturbed or altered environments are thought by some to be more easily invaded.[1] By altering the physical characteristics of a habitat and removing the established community of organisms present, including any native species, an opportunity is created for highly prevalent non-native species to colonize the disturbed area in greater concentrations than were present before. The alteration of substrate alone from one type to another (e.g. sand to mud) can result in the settlement of a different array of benthic organisms. The net result of new dredging activities may be a loss of both forage habitat and prey for various native species that previously utilized the area. In any case, there is a temporary loss of prey organisms until the area becomes re-established, and depending on the frequency of dredging, the benthic community may never become fully re-established and/or fully functional. Mitigation should be provided to compensate for any losses of habitat function and value. 7

IMPACT B-9 (Pile driving):
Pile driving impacts are purported to be minimized to a level of less than significant with the implementation of unspecified successful mitigation measures. NOAA Fisheries cannot concur with this determination until more information is available about these activities and what constitutes successful mitigation measures. Adverse effects of pile driving include harm and mortality of a variety of fish species at various life stages, as well as harm to marine mammals. Recent pile driving activities in San Francisco Bay and Suisun Bay have demonstrated considerable adverse impacts to aquatic species even with the implementation of various measures to reduce the sound pressure levels. These measures have failed to reduce the impacts to less than significant. 8

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[1] Cohen, A.N., and J.T. Carlton, 1998. *Accelerating invasion rate in a highly invaded estuary.* Science 279:555-558.

If you have questions regarding these comments, please contact Mr. Brian Mulvey at (707) 575-6056.

Sincerely,

Rodney McInnis
Acting Regional Administrator

cc: Val Chambers, NMFS Long Beach
Lindy Lowe, Bay Conservation and Development Commission
Michael Monroe, U.S. Environmental Protection Agency Region IX
Eric Larson, California Department of Fish and Game

EIR 150

Tristan Bettencourt

From: Ellie Cohen [ecohen@prbo.org]
Sent: Friday, October 25, 2002 2:22 PM
To: email@watertransit.org
Cc: Nadav Nur; Nils Warnock; Hildie Spautz
Subject: PRBO Comments on Draft Ferry EIR for SF Bay

Ferry EIS comments letter 1025... Ferry EIS comments 102502 PRBO...

October 25, 2002

RE: Water Transit Authority EIS Comments

Dear friends,

Attached please find our comments on the draft Ferry EIR for SF Bay.

Please confirm that you have received and can read our comments. If you have any trouble reading this document, please contact me immediately.

Sincerely,

Ellie M. Cohen

Ellie M. Cohen
Executive Director
PRBO Conservation Science
4990 Shoreline Highway
Stinson Beach, CA 94970
Phone: 415-868-1221, ext. 318
Fax: 415-868-1946
ecohen@prbo.org
www.prbo.org

October 25, 2002

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

Dear colleagues,

Thank you for the opportunity to comment on the Draft Program Environmental Impact Report: Expansion of Ferry Transit Service in the San Francisco Bay Area. PRBO Conservation Science appreciates the effort that the Water Transit Authority, URS Corporation and others have put into this stage of consideration of expanded ferry transit service.

However, we believe significantly more information than presented in the EIR is required before decisions are made and alternatives selected that might expand ferry transit use throughout the greater San Francisco Bay Area. The impacts of expansion on wildlife, habitat and overall ecosystem function must be thoroughly evaluated and incorporated into any recommendations. 1

PRBO Conservation Science
Founded in 1965 as Point Reyes Bird Observatory, PRBO Conservation Science (PRBO) is dedicated to conserving birds, other wildlife and ecosystems through scientific research and outreach. Working with hundreds of governmental, nonprofit and private habitat managers in terrestrial, wetland and marine ecosystems throughout the West, our 65 staff scientists and 60 seasonal biologists study birds and ecosystems to conserve biodiversity.

PRBO is an active leader in the major national and international partnerships working to protect birds and ecosystems including Partners in Flight, the US Waterbird Conservation Plan, the US Shorebird Conservation Plan, the Riparian Habitat Joint Venture, the Pacific Seabird Group and the North American Waterfowl Management Plan regional Joint Ventures. PRBO is currently vice-chair of the San Francisco Bay Joint Venture and on the Steering Committee of the Wetlands Regional Monitoring Program.

In recognition of our work, PRBO was honored with the 2002 national "Conservation Partner Award" from the USDA Forest Service and the Bureau of Land Management.

Background
San Francisco Bay is the most important estuary on the continental Pacific Coast for birds and a critical link in the Pacific Flyway. Its wetlands provide crucial habitat for a wide range of species. PRBO's research over the past 2 decades has shown that hundreds of thousands of landbirds (songbirds and raptors), shorebirds (sandpipers and plovers) and waterfowl (ducks) use various Bay habitats including tidal marsh, tidal flats, and man-made salt evaporation ponds as wintering grounds, as stopover "refueling" areas during their annual migration and for breeding.

PRBO's research was also the basis for the Bay being declared a site of hemispheric importance by the Western Hemisphere Shorebird Reserve Network.

Of the many bird species that depend on San Francisco Bay wetlands year-round, several are listed as threatened or of special concern including the Western Snowy Plover, California Clapper Rail, California Black Rail, Alameda Song Sparrow, San Pablo (a.k.a. Samuel's) Song Sparrow, Suisun Song Sparrow, and Saltmarsh Common Yellowthroat.

Since the 19th century, over 85% of historic tidal marsh habitat has disappeared due to human activities, such as diking for agriculture, silting, urban development and other activities. Next to tidal marsh habitat, tidal flats have been the most negatively impacted habitat in the Baylands, losing 42% of their area in the past 200 years (Table 1, Goals Project 1999). At the same time, these mudflats are one reason that San Francisco is one of the most important areas in North America for birds, particularly shorebirds.

This habitat loss puts the long-term viability of these wetland-dependent wildlife populations at risk and undermines the vital role tidal marsh plays in maintaining water quality.

While human activities have drastically altered the ecosystem, the Bay's importance to wildlife has only grown as other estuaries and wetlands in the Flyway have been reduced or eliminated (for example, over 90% of historic wetlands have been lost in the Central Valley). The magnitude of this habitat loss and the unique value of the San Francisco Bay ecosystem have put a premium on programs that work to conserve remaining populations and to restore depleted species, including endangered and potentially-endangered birds.

Currently, there are significant efforts to protect what habitat remains and restore some of what was lost. Conservation and restoration programs constitute a high priority for numerous public and private organizations including the US Fish and Wildlife Service, US Environmental Protection Agency, US Geological Survey, California Coastal Conservancy, California Department of Fish and Game, CALFED Bay/Delta Program, Sierra Club, Ducks Unlimited, Audubon Society, Gordon and Betty Moore Foundation, the David and Lucile Packard Foundation, and private landowners.

Around the Bay, some 12,000 acres have already been acquired, restored or enhanced and there are plans for another 32,000 acres, representing investments amounting to hundreds of millions of dollars. Hundreds of thousands of dollars have already been spent and lit is likely that several billion dollars will be invested in these efforts over the next two decades.

We believe that expansion of ferry transit service should not come at the cost of undermining or degrading these large-scale, collaborative conservation activities.

Expanding San Francisco Bay Ferry Transit Service

We recognize that improvement to the ferry system may reduce traffic load on Bay Area roads, improve air quality, reduce water pollution from run-off and increase quality of life for Bay area residents. However, we are concerned that some potential ferry terminal sites and ferry routes will impact sensitive habitats and the wildlife that use them.] 2

In particular, the project alternatives 1 and 2 as proposed will undoubtedly have direct and indirect impacts on adjacent wetland habitat. URS has not attempted to quantify these impacts and cannot do so without detailing specific project plans. However, the programmatic EIR does indicate proposed new ferry terminals and new ferry routes throughout the bay, and has documented that they will be built within or pass through known distributions of sensitive habitats and special status species. 3

Impacts on these resources cannot be adequately assessed with the information provided in the EIR due to the lack of details and because relevant studies have not been conducted within the Bay. We recommend that the next phase of the EIR include research on how wave wash and direct disturbance from increased boat traffic, increased human activities around bay habitats will impact tidal habitats including tidal marsh, tidal flats, and other baylands, as well as direct impact on all associated wildlife. 4

Petaluma River

The San Pablo Bay wetlands provide critical habitat for tidal marsh-dependent birds and other wildlife. Alterations to the ecosystem are of concern because the San Pablo Bay wetlands contain the entire range of the San Pablo Song Sparrow (a California Species of Special Concern) and large concentrations of the Salt Marsh Yellowthroat and California Black Rail (CA Species of Special Concern and CA Threatened Species, respectively). In this regard, marshes on both banks of the Petaluma River (in Marin and Sonoma Counties -- mature and recently restored sites) are an important part of the network of San Pablo Bay wetlands. The ancient Petaluma Marsh is several thousand years old and is the largest tidal marsh dating from the pre-European era in the entire San Francisco Bay Estuary.

The main purpose of this section is to contribute to the documentation of wildlife use in the area surrounding the proposed Ferry Terminals in the Petaluma River Area, both at Port Sonoma Marina and Gnoss Field. We understand that the scope of the current EIR did not involve evaluation of specific new terminal projects, so we do not know exactly how much each project could directly and indirectly impact jurisdictional wetlands.

Nonetheless, we would like to make part of the public record the following comments:

1) The Port Sonoma Marina property currently includes tidal marsh vegetation and wildlife associated with tidal marsh habitat. 5

2) There is high quality tidal marsh habitat directly adjacent to Port Sonoma Marina along the shoreline of the Petaluma River to the north, along the bayshore to the southeast and across the Petaluma River to the west. These properties are for the most part under management by California Department of Fish and Game and the US Fish and Wildlife Service. 6

3) PRBO and Jules Evens of Avocet Research Associates have documented, in the marshes within and adjacent to Port Sonoma Marina, breeding populations of: 7
    a. California Clapper Rail (Federal and State of California endangered status);

b. California Black Rail (State of California threatened status);
c. San Pablo Song Sparrow (State of California Species of Special Concern); and
d. Salt marsh Yellowthroat (State of California Species of Special Concern).

These species have been documented on a regular basis over the last 10 years. Specifically, the mouth of the Petaluma River, including marsh habitat within and immediately adjacent to Port Sonoma Marina, is used by at least one pair of California clapper rails annually. Impact B-16 refers to the take of special status species. The recommendation to mitigate this impact is first to avoid sites with documented presence. 7

4) The EIR states that the impact of wake wash and potential flooding of clapper rail nests can be reduced if clapper rail nests are not built within 50 m of the river or bay front. Since the location of nests cannot be predicted, the implication is that ferry routes placed next to tidal marsh pose a high risk of impacting this species. 8

5) This area has been a focus of significant public and private projects for land acquisition and tidal marsh restoration, including Petaluma River Marsh and Sonoma Baylands projects. Ferry activity could directly impact these expensive and highly valued restoration projects by changing sediment deposition patterns and restoration processes. 9

6) The proposed ferry route approaching Gnoss field passes through a relatively narrow tidal channel referred to as Black John Slough. The EIR recommends that excluding this site and several others would decrease dredging costs significantly, implying that if this site were developed for the ferry system, the slough would probably need initial dredging. This Slough passes through the middle of prime tidal marsh habitat studied extensively by PRBO since 1996. This marsh habitat has some of the highest densities in the entire San Francisco Bay estuary of black rails, San Pablo song sparrows and common yellowthroats. Reproductive success of song sparrows is also generally relatively high, among all the sites we study, indicating that the site is important to maintaining the population. We have also documented several pairs of clapper rails breeding in this area. 10

7) PRBO research has shown that tidal marsh song sparrows nests near the water's edge are more successful (i.e., more likely to fledge young) than those near the upland edge, probably because the latter are more susceptible to native and non-native predators. This raises the concern that wave action and other disturbances related to ferry traffic around the perimeter of tidal marshes may negatively impact the reproductive success of this species of special concern. 11

Tidal Flats

The following comments relate to Section 3.5.2 Impacts and Mitigation.

In general, we do not believe that the document adequately addresses the potential loss of tidal flat habitat in San Francisco Bay due to dredging and disturbance from the creation of new ferry terminals. As mentioned above, next to tidal marsh habitat, tidal flats have been the most negatively impacted habitat in the Baylands, losing 42% of their area in the past 200 years (Table 12

1, Goals Project 1999). At the same time, these mudflats are one reason that San Francisco is one of the most important areas in North America for birds, particularly shorebirds (Accurso 1992; Warnock and Takekawa 1995, 1996; Page et al. 1999). This draft EIR/EIS addresses the importance of the tidal flats to wildlife, yet the mitigation described (Mitigation B-1.1, Mitigation B-2.1, and Mitigation B-3.3) does very little to address the potential loss of this important habitat. 12

Specific Comments:

Impact B-1.

We agree with the draft EIR/EIS that Alternatives 1 and 2 could potentially result in significant impacts to wetlands due to new construction. It looks like significant amounts of tidal flat habitat would be lost to dredging, especially at Gnoss Field, Moffett Field, SF International Airport and Oakland International Airport, and perhaps Martinez and Hercules/Rodeo. Shorebirds in the South Bay would likely be especially impacted by loss of tidal mudflat through dredging at these expansion sites (see Fig. 3.5-10 in draft EIR/EIS, Stenzel et al. 2002). 13

Mitigation B-1.1: The draft EIR/EIS states that "The Goals Project (1999) has described…115 potential restoration sites around the Bay…" and goes on to say "…there are large amounts of area that could potentially be used by WTA for compensatory mitigation." (p. 3.5-30).

Of the 115 potential restoration sites the Goals Project mentions, there is only one (78. Oakland Middle Harbor) that lists restoring intertidal mudflat as a desired effect. The majority of the restoration projects listed call for restoration to tidal marsh. While the creation of tidal marsh will favor some species like Clapper Rails, it likely will not mitigate for the loss of tidal flat habitat for birds that traditionally use tidal mudflats for foraging (see Stenzel et al. 2002, Warnock et al. 2002). This draft EIR/EIS should have a better plan for how this habitat loss would be mitigated, especially since there is current concern that the Bay may be facing a sediment deficit, resulting in further tidal flat loss (Williams 2001). 14

Impact B-2 - Alternatives 1 and 2 could likely result in the spread of non-native *Spartina* and the effect is considered significant. Mitigation B-2.1 does not adequately outline how *Spartina* would be prevented from spreading. It is our understanding that *Spartina alterniflora* is very difficult to get rid of, if not impossible. What would be done if removal were not successful? The spread of *S. alterniflora* would also further reduce tidal flat availability to birds. In Britain, the spread of the plant *Spartina anglica* (the hybrid progeny of an introduced species) has been implicated in the national decline of Dunlin. Dunlin declined primarily on estuaries where *Spartina* flourished (Goss-Custard and Moser 1988) and clearing the plant increased shorebird use locally (Evans 1986). 15

Impact B-3. Impact of dredging is determined to likely be significant under alternatives 1 and 2. Many of my comments above pertain to this section. Mitigation efforts address the need to replace eelgrass beds that are lost but nothing is mentioned on mitigation of lost tidal flats (even though their importance is acknowledged).

Impact B-11 The draft EIR/EIS mentions the possible disturbance effect of ferry traffic on waterfowl but not on shorebirds. This should be addressed in more detail as disturbance from 16

various factors has been shown to significantly affect shorebird populations (Burger 1986, Pfister et al. 1992, Davidson and Rothwell 1993, Lambeck et al. 1996), especially by temporarily preventing access to potential habitat and food (Burger 1981, Lord et al. 1997). Hovercrafts (mentioned as an alternative method to dredging some areas Table ES-1), are likely to be most disruptive to waterbirds due to the amount of noise they are capable of producing. This would need to be investigated before allowing hovercrafts to operate in the bay, especially areas where birds concentrate such as in the shallow waters of the South Bay. 17

Conclusion

Before determining a recommended course of action, we urge you to prepare a supplemental or subsequent system-wide EIR that includes a thorough evaluation of the effects of increased ferry traffic and related human activities on the birds and other wildlife that use San Francisco Bay's tidal marsh, tidal flats, and other baylands. 18

San Francisco Bay is the most important estuary on the continental Pacific Coast for birds and a critical link in the Pacific Flyway. We urge wise action that seeks to ameliorate traffic congestion and related pollution without further threatening the enormous wildlife values of this hemispheric treasure- an invaluable resource that is currently the subject of a multi-billion dollar, multi-agency restoration effort.

Sincerely,

Ellie M. Cohen	Nil Warnock, PhD	Nadav Nur, PhD	Hildie Spautz
Executive Director	Wetlands Co-Director	Population Ecology Director	Biologist

References:

Accurso, L. M. 1992. Distribution and abundance of wintering waterfowl on San Francisco Bay 1988-1990. Unpublished Msc. thesis, Humboldt State University, Arcata, California.

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Winston H. Hickox
Agency Secretary

Air Resources Board

EIR 151

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor



October 23, 2002

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

Dear Ms. Haught Johnson:

Thank you for providing us with the opportunity to review and comment on the draft Program Environmental Impact Report (EIR) and Implementation and Operations Plan (IOP) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of these documents was limited to the subject matter pertaining to air quality issues, and we have provided some technical comments in the enclosure to this letter, which we hope will be helpful.

As you know, air quality is intrinsically linked to transportation and land use decisions. Though California has successfully reduced mobile source smog-forming pollutants since the 1970's through new vehicle and fuel technologies, those gains have been eroded by dramatic growth in population and vehicle miles traveled (VMT). Reducing the growth in VMT is challenging, however research has helped demonstrate that one way to slow growth is to give people more transportation choices – choices that enrich their lifestyles and make their communities more livable and healthy. It has been our experience, however, that new transit services of any kind must be the cleanest possible in order to benefit clean air.

With that said, we want to commend WTA's effort to expand ferry transit in the San Francisco Bay Area and for the commitment to build the fleet at an emissions standard that is 85 percent lower than the United States Environmental Protection Agency's Tier II standards. We also want to acknowledge WTA's efforts to develop zero-emission ferries. For California to meet its long-term air quality goals, it is critical to move beyond traditional technologies to zero- and near-zero emissions technologies. Clearly putting a transit system in operation that demonstrates state-of-the-art emission control technology and the development of zero-emission ferries will help achieve our air quality goals and be a model for other regions to follow. 1

Thank you again for this opportunity to provide comments. If you have any questions about our comments, please contact Mr. Daniel E. Donohoue, Chief of the Emissions Assessment Branch, at (916) 322-6023, or by email at ddonohou@arb.ca.gov.

Sincerely,

Peter D. Venturini, Chief
Stationary Source Division

Enclosure

cc: Mr. Daniel E. Donohoue, Chief
Emissions Assessment Branch
Air Resources Board

EIR 152

City of Albany

EIR 152

1000 SAN PABLO AVENUE • ALBANY, CALIFORNIA 94706-2295

CITY ADMINISTRATOR
PH (510) 528-5710
FAX (510) 528-5797

CITY ATTORNEY
PH (510) 524-9205
FAX (510) 526-9190

CITY CLERK
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FAX (510) 528-5797

CITY COUNCIL
PH (510) 528-5720
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PERSONNEL
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POLICE
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RECREATION & COMMUNITY SERVICES
1249 Marin Avenue
PH (510) 524-9283
FAX (510) 528-8914
- Friendship Club/ Childcare Program
  PH (510) 524-0135
- Senior Center
  PH (510) 524-9122
  FAX (510) 524-8940
- Teen Center
  PH (510) 525-0576

October 25, 2002

RECEIVED
OCT 29 2002
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

Steve Castleberry, System Planning Manager
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Comments on Draft Programmatic Environmental Impact Report (PEIR) for Expansion of Ferry Service in the San Francisco Bay Area

Dear Mr. Castleberry,

Thank you for sending the city of Albany a copy of the above-mentioned document for review and comments. The city of Albany commends the WTA for its continuing efforts to reduce traffic congestion throughout the Bay by promoting the use of ferries.

The city of Albany has the following comments on the Draft PEIR:

- What affect would increasing the bridge tolls, as is being pursued to fund the possible ferry expansion, have on reducing vehicle traffic and increasing public transit ridership? The Draft PEIR should examine the possible affect of reducing vehicle traffic if the bridge toll was increased to $3, $4 or $5. The issue is whether an increase in bridge tolls, by itself, will result in a reduction in vehicle traffic comparable to that envisioned with an expanded ferry service. 1
- How will the WTA ensure that the independent operators of an expanded ferry system will purchase ferries that comply with the EPA Tier 2 standards? 2

In addition to our comments on the Draft PEIR the city of Albany has the following concerns that should be addressed as part of any site specific EIR:

- If a ferry terminal is proposed at the end of Gillman Street, what impacts will the facility have on wildlife in the area? 3
- How will the wave action generated by the ferries be handled and what impacts will erosion have on Albany Beach and the Eastshore State Park proposals? 4
- How are traffic, circulation and parking going to be addressed? Who will be responsible for making the necessary improvements and maintaining them? 5

- There needs to be adequate parking to handle current and possible future development of Golden Gate Fields, a ferry terminal and Eastshore State Park? If the terminal is in one city and the parking is in another city, how will the disparity in impacts be addressed? 6
- How will the ferry terminal be accessed and what impacts will the terminal have on the freeway system, Buchanan Street and Gilman Avenue? 7

We look forward to reviewing your responses to our comments on the Draft PEIR and being actively involved in the review of any future ferry terminal that would be located at the end of Gillman Street.

Please feel free to contact our Planning Manager, Dave Dowswell, if you have any questions. He can be reached at (510) 528-5769.

Respectfully,

Peggy Thomsen, Mayor
City of Albany

cc: City Council
Beth Pollard, City Administrator
Ann Chaney, Community Development Director

J:\Dave D\planchron\ProjComments\watertransdpeircmntltr.doc

EIR 153

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

October 30, 2002

Water Transit Authority
IOP/EIR Comments
120 Broadway
San Francisco, CA 94111

BY FAX: 415-291-3388
ATTN: WTA IOP COMMENTS

Subject: Comments on the Draft Implementation and Operations Plan and Environmental Impact Report for Expansion of Ferry Transit Service in the San Francisco Bay Area, August 2002.

To Whom It May Concern:

Thank you for the opportunity to comment on the Draft Implementation and Operations Plan (IOP) and the Draft Programmatic EIR for the Expansion of Ferry Transit Service in the San Francisco Bay Area.

The County of Sonoma supports the recommendation that "Port Sonoma on Highway 37 should undergo further study, including ridership, conceptual site design, a site-specific EIR (including studies of wetlands and endangered species) and cost effectiveness analysis." 1

The County supports the concept of a ferry connection at Port Sonoma, particularly if combined with a rail connection. Your studies have indicated that ridership patronage at a Port Sonoma Ferry Terminal make this a feasible opportunity. However, the County is concerned that the use of Port Sonoma as a ferry site may induce extension of public water and sewer to the site or result in non-transportation-related development at the facility. 2

Such a facility presents an opportunity unique to the Bay Area in an area in which the following transportation elements intersect:

- Four lane Highway 37 (and within close proximity to Highways 101 and 121)
- San Pablo Bay and the Petaluma River
- North West Pacific Railroad (proposed for passenger service)
- Bay Trail (proposed)

As your organization is aware, planning for a multi-modal transportation facility/connection at Port Sonoma is currently underway through the Sonoma Marin Area Rail Transit Committee (S.M.A.R.T.). This planning effort could result in passenger rail service on the 70 mile Northwest Pacific Railroad corridor from Cloverdale to San Rafael. Within the last several months, S.M.A.R.T. has committed approximately $150,000 to study the Port Sonoma alternative in its rail station/implementation plan EIR/EIS. Public EIR scoping sessions are scheduled for November.

Sonoma County is also in the process of updating its General Plan, including a major focus on circulation and transportation issues. A potential ferry site at Port Sonoma will be considered as part of this update. 3

Please continue to keep us informed regarding this project. If you have any questions, please don't hesitate to contact me at (707) 565-3790.

Sincerely,

Denise Peter

Denise Peter, AICP
Planner III

c. Board of Supervisors
Steve Sharpe, CAO
David Knight, TPW
Suzanne Wilford, SCTA
Lillian Hames, SMART
Greg Carr, PRMD
Angus Latta, PRMD

10 28-02

FIR 154

Mr. Tom Bertken, CEO
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken,

Surge the Water Transit Authority to build a clean and green ferry system. Please mandate that all new ferries are at least 85% cleaner than federal law requires. Exclude wetland sites. Avoid dredging. Minimize parking lots and increase public transit. Offer free rides to bicyclists who ride to the terminal (NOT drivers). And make sure routes are cost-effective.

Please update me on future developments.

Thank you,

Charlotte Rieger
1324 Grizzly Peak Blvd.
Berkeley, CA 94708

STATE OF CALIFORNIA GRAY DAVIS, *Governor*

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

FIFTY CALIFORNIA STREET, SUITE 2600
SAN FRANCISCO, CALIFORNIA 94111
PHONE: (415) 352-3600
http //www bcdc ca gov

EIR 155

October 29, 2002

Mr. Thomas Berken
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

SUBJECT: Draft Implementation and Operations Plan

Dear Mr. Berken:

The San Francisco Bay Conservation and Development Commission ("BCDC") appreciates the opportunity to review and comment on the Water Transit Authority's ("WTA") Draft Implementation and Operations Plan ("IOP"). Although the Commission has not had the opportunity to review the IOP and therefore these are staff comments, they are based on the Commission's law, the McAteer–Petris Act, and its *San Francisco Bay Plan*. The draft IOP includes many admirable commitments to providing the region with viable ferry service while protecting the Bay and its resources. Specifically commendable are the WTA's commitments to: new emissions monitoring protocols, planning and implementing good connections with other transit, acquiring new transit riders, enhancing shoreline access and continuing study of propulsion technologies that could lead to zero-emissions ferries. BCDC also supports the WTA's proposed mitigation measures for Bay impacts, which include: ensuring that ferry routes are more than 900 feet from marine mammal haul out, feeding and pupping sites; reducing impacts on the California Clapper Rail by ensuring that the waves generated by ferries do not affect their nests; and using route bending to avoid wake impacts on the shoreline and shorelinehabitats and plant and wildlife species. 1 2

In addition to these points, BCDC has several questions regardingthe IOP which follow.

The Routes. Environmental Impacts (pages 12 and 17). It is unclear what is meant by the term "environmental fatal flaws." Does this term refer to growth inducing impacts, the presence of threatened or endangered species? or sensitive habitats? or a combination of factors? It would be helpful if this term were defined and any proposed terminals or routes that were eliminated due to the existence of environmental fatal flaws were identified in the document. 3

The Routes. Bay Bridge Corridor (page 20). The IOP states that the development of a terminal in Berkeley may offer some environmental challenges, including addressing impacts to the adjacent Eastshore State Park from both vessels and vehicles accessing a potential terminal. However, the DEIR for the IOP does not include a discussion of the potential for ferry sites to have impacts on recreation uses and lands, even on a programmatic level. Since the IOP includes several sites that may be located adjacent to significant recreational lands, the DEIR should include a discussion of the potential for impacts and the possible mitigation measures that could be employed to address these impacts. 4

The Routes. Golden Gate Bridge Corridor (page 22). The discussion for the Port Sonoma site includes the statement that the proposed site should undergo further study, including ridership, conceptual site design, a site-specific EIR (including studies of wetlands and endangered species) and cost-effectiveness analysis. Although BCDC agrees with this analysis, it is not clear why the WTA describes these studies specifically for the Port Sonoma site. From BCDC's analysis of the project and the DEIR, it seems that every proposed site would be required to undergo similar, if not identical, studies. From the material provided in the DEIR, it appears to us that the Port Sonoma site developemnt has the potential to have significant impacts from a growth inducement and habitat perspective and may have what could be identified as "environmental fatal flaws." If the WTA is indicating that the Port Sonoma site needs more rigorous analysis before it is included in the proposed system, then this should be made clear in the IOP.. Additionally, in some sections of the IOP the Port Sonoma site is identified as requiring further study, similar to the potential terminal sites at the airports, recreational areas and Moffett Field. However, the document includes Port Sonoma with the other ferry terminals under the heading "What is the proposed new system" while the other similar sites are not included in the proposed system Consequently the stsus of the Port Sonoma Site in the IOP, and why it is included, apparntly, in the proposed system is unclear. It would be helpful to clarify the status of the Port Sonoma site. 5

The Connections (page 31). The IOP describes several potential measures to reduce the demand for parking, including charging a fee for parking, participation in a car-share program and preferential parking for car and van pool participants. BCDC supports these measures, along with transit and shuttle connections to the terminals, which should assist the WTA in reducing parking demand. However, these measures were not included in the DEIR for the IOP and a discussion of these measures would allow reviewers of the DEIR to evaluate the possible mitigation measures with respect to parking demand and traffic impacts on local communities. 6

The Terminals. Figure 22 (page 35). The figure that depicts the Standard Modular Ferry Terminal-Conceptual Design, does not delineate the public access from the access for ferry riders. Although this is understandable since every site will have its own unique set of requirements, neither the IOP nor the DEIR discusses how the WTA plans on enhancing shoreline access for both passengers and non-passengers at proposed ferry terminal sites. A discussion of the potential partnerships and tools that could be helpful in enhancing shoreline access, particularly in areas where access already exists and the placement of a ferry terminal could have adverse impacts on this access, should be described in the DEIR to support he statements in the IOP. 7

The Boats (page 38). The IOP describes the year-long study that the WTA undertook examining 39 combinations of fuels and propulsion systems. As stated earlier, BCDC commends the WTA for its thorough and progressive approach to this issue. However, there was little or no discussion of this impressive work in either the air quality or the water resources sections of the DEIR. Such a discussion would better inform reviewers of the DEIR of both the process and the future plans that the WTA has concerning fuels and propulsion systems. 8

The Bay (page 47). The IOP includes a brief discussion of the California Clapper Rail and the potential impacts that waves generated by ferries may have on the nests of this species. The IOP states, "[t]herefore, more research is needed to accurately identify Clapper Rail nesting sites and 9

determine if effective mitigation measures exist." California Clapper Rail nesting sites are generally known around the Bay and the DEIR should include this information so that a programmatic analysis may be done on the proposed system. This analysis could help better inform the discussion that occurs in the IOP. 9

The Future (page 61). BCDC strongly supports the concept of the water transit oriented development along the urbanized areas of the Bay shoreline and looks forward to working with the WTA and the Metropolitan Transportation Commissionto identify the places where this type of development could enhance the Bay shoreline, increase the viability of the ferry service and make a positive difference for the region by providing housing, jobs and activities in already urbanized areas that would be accessible by transit. 10

Thank you again for the opportunity to comment on the IOP and the associated DEIR. If you have any questions please feel free to contact me at (415) 352-3645.

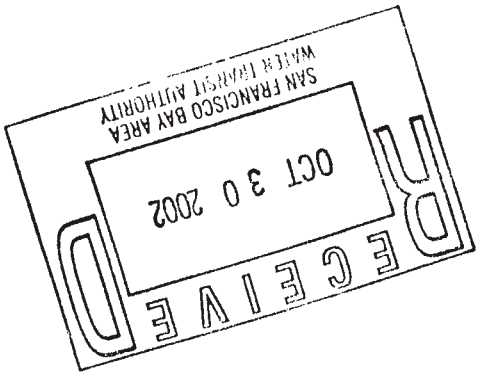
Sincerely,

LINDY L. LOWE
Coastal Planner

LLL/gg

EIR 156

Totton P. Heffelfinger
37 Fifth Avenue
San Francisco, CA 94118



October 24, 2002

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

As indicated below in more detail, the Draft EIR fails to provide information which should be included in a programmatic EIR on Alternatives one and two for an extensive increase in a region-wide ferry system. My comments are mainly limited to subsection 3.1 Dredging and subsection 3.5 Biology.

To be useful and provide guidance for the future activities contemplated by the EIR, it is not sufficient to defer meaningful analysis of impacts caused by new routes and terminals to future studies. The result of such procedure would be to piecemeal the analysis without considering the cumulative impacts of the whole system. Thus, for example, the loss of eel grass habitat in dredging for a new terminal at Oakland International Airport might be approved with some mitigation but no account would be taken of the regional loss of eelgrass habitat and need for compensation if the whole system is ultimately developed.

A major justification of a programmatic approach is to do the studies necessary to predict cumulative impacts and enable decisions on specific actions to be taken with assurance that adverse impacts by all components will not be excessive and to devise mitigation that will keep such impacts under control. Notwithstanding the region-wide effects of an extensive new ferry system with multiple new and expanded routes and terminals, this EIR appears to be based solely on a review of existing literature. Draft technical studies listed on page 62 of the IOP do not deal with any region-wide dredging or biological impacts. Only a reference in the IOP to the need for further study of rafting birds [IOP p.47] is conceded to be a continuing region-wide need before any new routes are implemented.

1

More specifically, my areas of concern are as follows:

DREDGING

Impact D-1: Indicates that a very large increase of construction and maintenance dredging would be required under Alternatives 1 and 2, but

2

would be substantially reduced if four of the potential new ferry terminals were eliminated. If these new routes were not eliminated, the suggested mitigation is to place dredge materials in upland and wetland reuse areas. This mitigation proposal is speculative to the point of being fanciful. Experience to date has shown that locating and preparing such disposal sites even for pristine materials has been difficult, that much dredged material is far from pristine, that upland disposal may damage other habitat such as seasonal wetlands, and that creation/restoration of habitat by such disposal, if successful, will be very costly and require many years of planning and work. 2

Impact D-2: Before concluding that mitigation measures would successfully render the impact of dredging in contaminated areas less than significant, some testing must be done. The "less than significant" conclusion is meaningless in the absence of any such testing. If the DEIR is to be useful, it must analyze the cumulative impact of dredging on water quality if all routes are developed. 3

Impact D-5: Loss of wetlands is discussed below under Impact B-1

BIOLOGY

Impact B-1: This analysis should include all wetlands and not only "jurisdictional" wetlands. While tidal marsh is undoubtedly jurisdictional, onshore facilities such as parking lots may impact seasonal and other wetlands which may no longer be considered "jurisdictional" under federal law. It is not sufficient to say that impacts to wetlands will be considered on a terminal by terminal basis sometime in the future. The loss of any more tidal wetlands in the Bay Area is likely to have cumulative adverse impacts that have more than local significance, especially on birds and fish. It should be the function of this EIR to conduct sufficient studies to guide future development and determine what kinds of mitigation can be planned to avoid loss of area and function. From this point of view, the DEIR is virtually useless. This is not an exercise that can be deferred and done on a case by case basis. 4

Mitigation B-1.1: Except for Polonius-like advice that "disturbance of wetlands should be avoided" the only suggestion for mitigation is to design and implement "suitable compensatory mitigation" using the habitat restoration goals of the Goals Project. The costs, risks and temporal loss of acquiring a suitable site and restoring tidal marsh, although well known, are ignored as are the impacts such restoration may have on other habitat. Again, why are not studies being conducted now so that future piecemealing will not cause region-wide harm? 5

Impact B-3: Impacts on special aquatic sites, including eel grass and mudflats, could have Bay-wide adverse effect on some bird and fish 6

species. Migratory shore birds, for example, are largely dependent on mudflats throughout the Bay for food. Any significant loss of mudflats or vegetated shallows could cause a catastrophic loss of birds including some listed species that depend on these areas for all or part of the year. The DEIR is unable to suggest anything other than "suitable compensatory mitigation" for loss of such habitat, hinting that there will be no in kind mitigation and that we must be content to accept something else that provides "enhanced functions and values relative to the impacted special aquatic sites". Is this useful guidance to those who will wish to sacrifice scarce habitat resources to build a ferry terminal? Why should we not require that studies be done now that will estimate the likely cumulative damage and give us a choice as to whether the proposed system should be reduced before further expensive planning for a massive system increase? 6

Impact B 11: Roosting and foraging water fowl in shallow areas would be impacted by ferry traffic, but the extent of impact is not assessed and no effective mitigation is proposed except reduction of ferry traffic. As noted above, ongoing study on the effect on rafting ducks is proposed and this should be expanded to include specific impacts on all waterfowl so that ferry traffic can be directed and limited. This cannot be adequately done on a piecemeal basis. 7

A related issue is the treatment of California Clapper Rail habitat in the Draft Programmatic EIR, Section 3.3.2.4 (page 3.3-14) and Mitigation WW-3.

In this section the DEIR admits that vessel wake action can impact Clapper Rail nests within 50 meters of a marsh edge. To mitigate for this they would identify potential Clapper Rail nesting sites within 50 meters of the edge of a marshland for Clapper Rail nests and then perform site inspection to see if nests are located on ferry routes. If so, the mitigation is to use low wake vessel technology, adjust new ferry routes to redirect wave energy away from sensitive habitats , and make operational adjustments such as slowing down ferries near sensitive areas. 8

With respect to WW. 3.4, there is apparently evidence that ferries often exceed listed speed limits. This would mean risk of death to nesting rails if WW 3.4 speed limits were ignored. The DEIR fails to address this threat to the small remaining population of this endangered species.

The proposed mitigation is not only inadequate but also may greatly restrict recovery of the Rail since it addresses only existing Clapper Rail nesting sites. It does not allow for Rails to create new nesting sites. If a new ferry route goes near a marsh not presently utilized by Rails but that may in the future be used by nesting Rails that capability is removed by this plan, since once wake impacts are taking place no new Rail nesting 9

9

can occur. Since one cannot predict where Rails will want to nest (beyond certain potential nesting sites), this greatly reduces the Rail's chances of recovery. A more appropriate mitigation would be to require that all new ferry routes be located at a sufficient distance from all tidal marshes capable of supporting Clapper Rail nests so as to ensure that ferry wake wash will not impact Clapper Rail nests found within 50 meters of the marsh edge.

Thank you for your consideration of the above comments.

Very Truly Yours

Totton P. Heffelfinger

San Francisco International Airport

P.O. Box 8097
San Francisco, CA 94128
Tel 650 821.5000
Fax 650.821.5005
www.flysfo.com

EIR 157

October 30, 2002

Mr. Thomas Bertken
Chief Executive Officer
Water Transit Authority, DEIR Comments
120 Broadway
San Francisco, CA 94111

AIRPORT COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

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LARRY MAZZOLA
VICE PRESIDENT

MICHAEL S. STRUNSKY

LINDA S. CRAYTON

CARYL ITO

JOHN L. MARTIN
AIRPORT DIRECTOR

Subject: ***Comments on the Expansion of Ferry Transit Service In the San Francisco Bay Area - Draft Program Environmental Impact Report, August 2002***

Dear Mr. Bertken:

Thank for the opportunity to review and comment on the Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service In the San Francisco Bay Area. San Francisco International Airport (SFO) is interested in opportunities to expand and improve alternative transportation access for the traveling public and those that work at the Airport. 1

SFO would concur that further study is required to consider ridership demand and operational feasibility. The Airport looks forward to working with the Water Transit Authority to consider the surrounding environmental conditions and the practicality of hovercraft operations. Until such time as more project specific information is available with respect to a water transit connection at or adjacent to SFO, we will respectfully withhold comment. 2

Should you have any questions or require additional information, please do not hesitate to call me at (650) 821-5347. Thank you.

Yours truly,

Nixon Lam
Environmental Planner
Bureau of Planning and Environmental Review

c: John Costas
Richard S. Walsh
Cathy Widener

See:
Public Comment Summaries

CITY OF PETALUMA

POST OFFICE BOX 61
PETALUMA, CA 94953-0061

EIR 159

E. Clark Thompson
Mayor

Janice Cader-Thompson
Michael Healy
Matt Maguire
Bryant Moynihan
Mike O'Brien
Pamela Torliatt
Councilmembers

October 30, 2002

Water Transit Authority
Attn: WTA IOP Comments
120 Broadway
San Francisco, CA 94111
By Facsimile: 415-291-3388

Dear Charlene Haught Johnson and the Water Transit Authority Board of Directors:

The City of Petaluma is pleased to learn that Port Sonoma in Sonoma County has been maintained as a potential high-speed ferry service and dock location for the North Bay in the recent Water Transit Authority's Implementation and Operations Plan. 1

The City appreciates the public awareness and interest that your comprehensive study has afforded residents and businesses and encourages the WTA to maintain Port Sonoma in the Implementation and Operations Plan as the best possible location for high-speed ferry service in the North Bay. The possibility of affordable public transportation and excursion trips to the North Bay by ferry would serve many people in an environmentally sound way. 2

Sincerely,

Clark Thompson

E. Clark Thompson
Mayor of Petaluma

cc: Petaluma City Council
Supervisor Mike Kerns
Jessica Vann Gardner, Petaluma Visitors Program

City Manager's Office
11 English Street
Petaluma, CA 94952

Phone (707) 778-4345
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General Plan Administration
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GIS
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MCBC
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BICYCLE COALITION
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Organizational Affiliates
American Red Cross Cycle Corps
Bicycle Trails Council of Marin
Bike the Bridge! Coalition
Marin Cyclists
Regional Bicycle Advocacy Coalition (REBAC)
Single Cyclists
Tam Valley Bike Club
Transportation Alternatives for Marin (TAM)
Trips for Kids
Velo Club Fairfax

October 31, 2002

via fax 415/291-3388

EIR 160

Thomas Bertken
Water Transit Authority
IOP and EIR Comments
120 Broadway
San Francisco, CA 94111

RE: IOP and EIR Comments

Dear Mr. Bertken:

The Marin County Bicycle Coalition (MCBC) has reviewed the Implementation and Operations Plan (IOP) and the Environmental Impact Report (EIR) for the Water Transit Authority's planned expansion of Ferry Transit Service in the Bay Area.

We appreciate your efforts to bring ferry service back to the Bay Area. However, there is only brief mention of bicycle access and usage in the IOP and none in the EIR. We hope that you will change this, and have provided the following comments to support our position that **better bicycle and pedestrian access will increase ferry ridership with less environmental impacts**. 1 2

The WTA goal as stated in Section 2, first paragraph "...is to increase regional mobility and transportation option by providing new and expanded water transit services and ground transportation terminal access in the San Francisco Bay Area." The Bay Area bicycle coalitions can be one of your organizations' biggest allies in meeting this goal since the improvement of mobility is also the stated goal of the bicycle coalitions.

When the Metropolitan Transportation Commission adopted its Regional Transportation Plan last year, it also adopted a Regional Bicycle Plan that focuses on "Safe Routes to Transit." We urge the WTA to also explicitly call-out the need for a "Safe Routes to Transit" program as part of implementation of the WTA.

SAFE ROUTES TO TRANSIT is a program that encourages transit providers and local jurisdictions to provide safe bicycle and pedestrian access to ferry and transit locations. There are three main components:

1) ACCESS: Infrastructure such as bike lanes, sidewalks and multi-use pathways to provide safe bicycle and pedestrian routes to WTA terminals
2) REMOVAL OF BARRIERS. In order to have access to shoreline ferry sites, it requires crossing rail and freeway barriers to bicycle and pedestrian travel. This should be addressed in the WTA plan.
3) PARKING: Secure bicycle parking at WTA terminals and boats will be needed. Safe bicycle storage on ferry boats (including ramps to access parking on boats, and protective bubbles to ensure that salt water does not damage bikes) is also needed so that patrons can use their bicycles on both ends of the trip.

3

The premise of Safe Routes to Transit is simple: people need to travel to ferry terminals in order to use the ferry boats. The more that ferry terminals can be carefully planned to incorporate safe bicycle and pedestrian access, the more people will walk and bike to take the ferries, thus increasing capacity of the ferry service without the increasing air pollution that comes from unnecessary car trips to ferry terminals. Another component

of Safe Routes to Transit is safe bicycle parking at ferry terminals, such as Bicycle Stations or Bicycle Garages, which provide attended bicycle parking and other amenities such as concession stands. A ferry terminal in Marin County that is in need of a Bicycle Garage (or Bike Station) right now is the Larkspur Ferry Terminal (LFT). There are plans to build Class 1 bicycle and pedestrian paths along the railroad right-of-way to directly access LFT, there will need to be better bicycle parking to accommodate the increase in bicycle use as a mode to access this form of transit. 3

What follows are more specifics about the EIR:

IOP, page 3: "Expanded water transit will significantly increase the capacity for bicycles to traverse the Bay and connect to the Bay Area bike trail network."
COMMENT: This statement should be amended to read "... water transit combined with bicycle access will allow for a seamless multi-modal transit system. The ferry transit hubs will be coordinated and linked to new and existing main bicycle route arteries that will encourage ferry users to ride to the ferry terminals." 4

IOP, page 29: "Ferry routes also extend the bike network across the Bay. Ferries are able to carry as many as 25 or more bicycles, significantly expanding capacity for bikes to traverse the Bay. It is therefore essential that the ferry terminals connect to the Bay Area bike network."
COMMENT: The current capacity on the ferries of 25 bicycles is occasionally exceeded. Given this condition, it would be prudent for the WTA to plan for expanded bicycle use given that the IOP is looking 5 to 10 years into the future before implementation. Also, mention should be made of the use of the "bike station" concept to minimize the number of bikes being taken onto the ferry. Currently there are bike stations in Palo Alto, San Francisco (Embarcadero BART) and Berkeley BART, and all are very popular and well utilized. 5

IOP, page 37: "Bicycle commuters will be able to comfortably load through a separate boarding and disembarking area in the rear (aft) and side of the vessel. This will avoid conflicts between bicycles and other passengers, and provide additional time for cyclists to board. The bikes will be stored in racks at the rear of the vessel."
COMMENT: Storage racks on the vessels need to be protected from salt spray because is very damaging to bicycles and their components, such as the brakes. Currently this is a significant impediment to ferry patrons wanting to travel with their bikes. 6

EIR, Section 2.4.1, page 2-5, *Terminal and Passenger Access and Connections with other Transit Services*: This section should be expanded to include how bicycles would access the ferry terminals. Such access would have a positive environmental impact that should be stated. 7

Overall, the MCBC would like to see the EIR developed to identify the positive effects of increasing bicycle and pedestrian usage to ferry terminals. This will serve WTA and the Bay Area in a healthy way. We look forward to working with you on your visionary project. Please add us to all future mailings, and consider our organization as a resource. We can be reached at (415) 456-3469. 8

Thank you for your consideration.

Yours truly,

Deb Hubsmith, Executive Director

Cc: Metropolitan Transportation Commission
Regional Bicycle Advocacy Coalition and member groups

EIR 145

BLUEWATER NETWORK

Ferry Expansion DPEIR and IOP Comments

San Francisco Bay Area Water Transit Authority
Draft Program Environmental Impact Report

By Teri Shore, Bluewater Network

October 22, 2002

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Ferry Expansion DPEIR and IOP

Bluewater Network offers these comments with a vision for the most environmentally sound ferry system in the world.

Summary

A Vision for San Francisco Bay

The expansion of the ferry fleet will forever change the profile of San Francisco Bay. This dynamic and scenic estuary serves the Bay Area on many levels. It offers an important avenue for transportation, commerce and recreation; nourishes a complex ecosystem that supports waterfowl, wildlife, fish, and wetlands; and gives the Bay Area an environmental character unlike any in the world.

Growing the existing small commuter and recreational ferry fleet comprising less than two dozen boats into a regionwide water transit system with 30 or more new vessels, seven new routes and eight new terminals in 10 years will dramatically transform the Bay's waters and shoreline. Combined with projected increases in commercial vessel traffic, the waters of the Bay are destined to become busied with marine activity—probably the most since the days of steam ferries or sailing ships. In this age of environmental awareness, many questions remain about the problems and benefits that could manifest during such a dramatic change in so short a time.

Many visions are competing for future of the Bay, ranging from plans for major port expansions and a new cruise terminal to filling the Bay for airport expansion, to ongoing and renewed efforts to restore wetlands, tidal marshes and protecting and enhancing the integrity of the Pacific Flyway. Ultimately, Bluewater Network sees the need for a long-term plan for San Francisco Bay that combines conservation and restoration with clean water transit, sustainable ports, recreation, and protection of its natural beauty.

To create a sustainable vision, we need to start asking lots of questions. We need to find out just how many ferries and ships the Bay can accommodate without injury to the environment, function and beauty of the Bay. How many ferries do we really need and how fast do we really need to go? How many cruise ships do we really need? Will migrating birds begin to avoid a crowded Bay? How many consumer goods do we need shipped here from distant ports? Can we really build new wetlands to replace the ones that are lost to development? Will whales be run down during their ancient migration along the California coast?

So while we urge caution in going forward with maritime activity on the Bay, we also see that the expansion of the ferry fleet provides an opportunity to improve mobility in the Bay Area and put the cleanest possible passenger ferries into service, setting a standard for all future ferry fleets.

Bluewater Network applauds the groundbreaking work of the San Francisco Water Transit Authority in setting a new standard for low-emissions vessels that will be 10 times cleaner than today's dirty diesels and for investigating seriously the potential environmental impacts of the proposed new system. The new ferries must meet the WTA standard of 85 percent below EPA Tier 2 – 2007 in the first phase or the Bay Area will suffer significant air quality impacts. (See attached CALStart and CARB studies on ferry emissions.) We will refer to this standard in the text as the "low-emissions standard." 1

The draft programmatic Environmental Impact Report (DPEIR) is a broad and informative document that gives ferry planners and policy makers most of what they need for moving forward. It identifies many potential environmental impacts and suggests measures for preventing air and water pollution, loss of wetlands and habitat, disturbance of marine mammals and wildlife and other impacts such as noise, growth inducement and energy use.

At the same time, questions and information gaps remain. We have extensive comments and questions on air quality and other sections. Most of the comments ask for clarification, more information and further study at the program level. We believe that the unusually short timetable given to the WTA by the Legislature to complete the ferry plan and the DPEIR should not allow any potential shortcutting of the EIR process. More time should be expended on the DPEIR to conduct further analysis and study in several areas including air quality, dredging, wetlands, biological resources, and ferry noise. A supplemental EIR may be needed to address program level impacts. 2

Bluewater Network appreciates the Water Transit Authority's responsiveness to our concerns and questions in the past and have confidence that our analysis of the DPEIR will be fully reviewed and responded to in a timely and satisfactory manner.

Our comments will be divided into sections by topic, with more general comments first followed by specific references to text. The topics are ordered generally as laid out in the DPEIR, except for the Air Quality Section, which we have moved to the front of the order.

General

One of the first points we'd like to make is that the DPEIR should be fully integrated into the draft Implementation and Operations Plan (IOP). The DPEIR contains recommendations for environmental measures, studies and standards that are not reflected in the IOP. Conversely, the IOP contains information that is not included in the DPEIR, such as the mandate for the low-emissions standard. The low-emissions standard and environmental mitigations must also be dictated in the authorizing legislation and any funding mechanisms, such as separate Bridge Toll Funding legislation that includes ferry funding. 3

While we understand that both the EIR and IOP will be presented to the Legislature as a complete package, they should be consistent in order to ensure that environmental measures are not overlooked as the planning process moves forward. It is possible that the staff and board that prepared the IOP and EIR may not necessarily carry them out five or 10 years from now. The EIR, the IOP and the authorizing legislation will ultimately become the only documentation of the intentions and mandates of the WTA planning efforts.

We are concerned that the WTA is promoting the expansion of the ferry system in the IOP as a transportation project that will improve air quality and significantly reduce congestion. 4

Contrary to the language in the IOP, based on the findings of the DPEIR, an expanded ferry system is not going to improve Bay Area air quality or significantly reduce traffic congestion. The DPEIR finds that air quality impacts will remain significant even with mitigations. It also finds that the 200,000 reduction in VMT per day by 2025 will be minimal at .001 percent of Bay Area VMT in 2025. These facts need to be reconciled in the IOP.

With that said, we do believe that the ferry expansion can be promoted on its true merits. What an expanded ferry system will do is provide commuters a new transit choice and ferries that are far cleaner than today's vessels. We believe that this how the ferry plan should be presented to the public.

4

Executive Summary

We have questions and comments about the summary of impacts and mitigations in the Draft DPEIR. These issues are addressed in each section.

Program Description

2.1 System Alternatives Evaluated in the DPEIR

IOP Alternative 5 Needed

The routes proposed in the IOP do not match the routes studied in the DPEIR. The DPEIR should be revised and air emissions and other impacts calculated to reflect the IOP proposal to provide a complete picture of the environmental impacts. It should be easy to do since the ridership, route, emissions and other calculations on the proposed routes are available. The IOP proposal would essentially comprise a fifth alternative that was not fully studied.

5

We are also concerned about inconsistencies between alternatives studied in different sections. The DPEIR examines four broad alternatives. However, in the air quality and energy sections only, it discusses a Reduced Alternative 2. This is a separate alternative that should be reviewed for all impacts.

6

We also want to make note of the fact that the routes mentioned in Reduced Alternative 2 do not exactly reflect the IOP proposal because Redwood City, South San Francisco and Treasure Island are not included. So air emissions should be calculated for an IOP Alternative 5 including these routes as mentioned above.

7

It does not make sense, and could violate CEQA, to study a different alternative for only one or two impacts. As this is a programmatic DPEIR, each proposed alternative must be evaluated for a full range of impacts, particularly those with Significant, Potentially Significant or Unknown impacts. The DPEIR should be revised to reflect the actual IOP routes.

5

Baseline Alternative Not Comparable for Air

Alternative 4 is used as the baseline for comparing the impacts of the other alternatives. The comparison is problematic, however, when it comes to marine air emissions in particular. That's because the existing fleet represented in this Alternative is expected to continue and will essentially be integrated into a new ferry fleet expansion. That means that those air emissions will

8

remain. It is not clear as to whether those air emissions are included in all the alternatives or not. If not, they need to be added to each Alternative. More on this in the Air Section. 8

No True No-Build Alternative

A true No-Build Alternative is missing in the program DPEIR that compares investment in a ferry system to a non-ferry system as required in the authorizing legislation and requested numerous times in the environmental scoping comments. 9

The WTA legislation requires that the Bay Area Air Quality Management District compare the air quality impacts of the ferry system to alternative transportation modes, including cars (see SB428). This is still missing from the program DPEIR. Without it, the DPEIR is incomplete and the public review cannot be adequately conducted until it is completed and distributed to the public for review. 10

Alternatives 3 & 4 - ALCATRAZ

We are concerned that the Alcatraz route is considered part of Alternative 4 for comparison. While it is part of the existing system, it does not serve commuters. This service inflates patronage on the commuter ferry system by a million passengers or more and overstates emissions for the existing commuter ferry system, making decreases look greater than they may actually be for the expanded commuter system. If you include Alcatraz, then all harbor cruises and other leisure ferry patronage and emissions should rightly be included.

Also, the WTA's legislation specifically states that it shall not operate ferry service to a national park. Taking out Alcatraz will provide a better picture of current and future ferry patronage and emissions 11

Vessel Technology 2.5

The DPEIR incorrectly suggests that Hovercraft was one of the vessel types studied or recommended by the WTA in the Clean Marine process, when it never was. In fact, the IOP recommends traditional diesel catamaran vessels with pollution controls in the first phase, and a surface-effect ferry for the second phase. The DPEIR gives no explanation for suggesting the use of Hovercraft, its characteristics or drawbacks. If it is to be considered as mitigation in the DPEIR, a study of the pros and cons of the vessel type must be conducted for the DPEIR by the WTA Clean Marine Working Group. Otherwise, it should be removed from all references in the DPEIR. 12

Air Quality 3.6

Key Comments

- The emissions standard mandated in the IOP at 85 percent below EPA Tier 2 – 2007 is not mandated as mitigation in the DPEIR but discussed only as an option. The program DPEIR should be revised to reflect the mandate as a required mitigation to reduce air emissions as much as feasibly possible, as required by the SB428. 13

- Even with the low-emissions mandate an expanded ferry system is still likely to have a significant impact, according to the DPEIR, a fact which needs to be reflected in the IOP. 14

- Reduction of traffic congestion will be minimal due to a small reduction in total daily Vehicle Miles Traveled, according to the DPEIR, a fact that needs to be reflected in the IOP. 15

- The air emissions should be calculated based on the proposed ferry routes in the IOP, as the four alternatives in the DPEIR do not accurately reflect the actual proposal. 16

- The air emissions should be expressed and compared in terms of per passenger mile totals, not just in bulk totals, as this is a standard measurement for estimating air quality impacts. 17

- The Air Quality section is missing an analysis by the Bay Area Air Quality Management District as required in the WTA's authorizing legislation, SB428. 18/10

- The ferry emissions from the no-build alternative should be added to the other alternatives, since the existing fleet is likely to remain on the Bay even as the new system expands. Please note that in the IOP the full system of 44 boats (14 existing plus 30 new) is touted in the plan, indicating that the existing fleet is essentially considered part of the entire WTA ferry system. 19

- Hovercraft should be omitted entirely from the DPEIR as the WTA Clean Marine Committee never studied it, nor is there any explanation in the DPEIR about Hovercraft. Alternatively, a Clean Marine analysis environmental pros and cons of Hovercraft should be included in the DPEIR. 20/12

- An analysis of air quality impacts on public health needs to be completed for the program DPEIR, as increases in emissions will have a regional public health impact. This was not addressed anywhere in the DPEIR or the IOP. 21

- The air quality section does not address the potential for air emissions to disproportionately affect low-income shoreline communities or people of color. This is a regional issue since ferries will be traveling between and past several communities. The subject of environmental justice is discussed only in the Land Use section concerning terminal construction in shoreline communities. 22

- It is not clear whether the potential air emissions from dredging operations have been analyzed in the DPEIR, which should be estimated and mitigations proposed (such as electric dredges). 23

- The proposed mitigation for reducing bus emissions by using natural gas or alternative fuels needs to be incorporated in the IOP. 24

- The air emissions tables and appendices are nearly impossible to decipher. More user-friendly explanations should be given for the tables and appendices so that the average reader can understand them and not need to ask the WTA for clarification. For example, no total emissions calculations are made for the alternatives, nor are percentage changes calculated. Instead, I made my own 25

calculations and have a number of questions that have been posed to WTA staff and not answered as of the date of this comment letter. The many technical questions we have follow the air quality discussion and text changes below. 25

- Bluewater Network reserves the right to offer further public comment, particularly on air emissions once the Bay Area Air Quality Management District independent analysis is complete, and once we receive specific answers to our questions about air emissions calculations.

Air Discussion

The mandate for vessels that meet the low-emissions standard must be spelled out in the DPEIR. And a more detailed plan for achieving the mandate in the IOP is needed. Currently, the entire plan consists of issuing an RFP for the vessels, but no back-up plan for the possibility that no one will bid since the proposed technology is untested on ferries. 26

In order ensure that the emissions mandate is achieved, we recommend that the IOP and the DPEIR recommend the early construction of a pilot fleet boat or boats by the WTA that meets the low-emissions standard. The pilot fleet vessel should be built in advance of the other vessels and before immediate service is required. This pilot vessel would allow the WTA to ensure that such a vessel will be reliable and meet the standards. If it does not, it gives the WTA the opportunity to change the technology if needed before ordering additional boats without jeopardizing service. 27

Ferry-only emissions of PM and NOX are predicted to decrease compared to the existing system, but it is difficult to understand how an increase of 30 or more vessels over 20 years can reduce emissions over a fleet of 14 vessels even with air pollution controls. It is also unlikely that the existing fleet will be required to meet the low-emissions standard. Many of these vessels will probably never even meet the EPA Tier 2 - 2007 standard in 2025 as ferries typically operate for 20 or 30 years. 28

Therefore, the emissions for the existing fleet need to be included in all Alternatives. It is not clear whether they been included in the calculations beyond the so-called no-build Alternative 4. If they are not, then the small decreases in PM and NOx are almost certain to disappear.

Ferry emissions of SOx, CO and ROG will increase. While PM and NOx are the most important air pollutants to address due to the Bay Area's non-attainment of federal and state air quality standards, the others cannot be dismissed. The DPEIR does not dismiss them even though the increases are small, finding that the air quality impact will be significant. But this increase seems to be overlooked in the IOP, which makes a general statement that the plan will improve air quality. 29

Air Quality Detail

Page 3.6-14 Impact A-1 Total emissions increases for Alternative 1 and 2 for NOx and SOx were shown to be the same, 4 and 1 percent, respectively. This does not make sense, as Alternative 1 is significantly larger in number of vessels than Alternative 2. Explain or correct. 30

Mitigation A-1.1 The air emissions were recalculated after eliminating low ridership routes, reducing the air pollution increase by half for Alternatives 1, 2, 3. However, neither South San Francisco, Treasure Island or Redwood City routes proposed in the IOP were included in 31

Reduced Alternative 2. Because a long route like Redwood City could significantly impact the total emissions, the air emissions should be recalculated using the entire IOP proposal. 31

Page 3.6-16 Impact A-2 This section of the DPEIR states that total vehicle miles traveled are reduced compared to the no-project alternative, therefor reducing overall car emissions. However, the reduction is not quantified. The DPEIR needs to clarify the size of car emissions reductions in the text instead of requiring the reader to calculate the numbers from the charts. Otherwise the DPEIR reader could be led to believe that the emissions reductions are significant, when they are not. 32

Note that the DPEIR states in the Transportation section, page 3.12-5 that the percentage change in total *vehicle trips compared to the no-project alternative is minimal* for all project alternatives at one-one hundredth of a percent (.001 %). Correspondingly, the overall car emissions are small as well and are likely to be offset by latent demand from drivers replacing any that may switch to ferries. See CARB ferry emissions comparison report, attached.

Page 3.6-17 Cold start emissions remain a potential significant impact, as daily CO standards are likely to be exceeded at ferry parking lots.

It is worth noting the proposed mitigation of restricting parking at the terminals to reduce cold starts appears to conflict with the parking section in Transportation that states that parking availability will exceed demand at most locations. Ridership numbers are based on ample parking. The ridership numbers need to be recalculated based on restricted parking at levels that would prevent violation of the daily CO standards. 33

Page 3.6-18, 19 Impact A-5, Impact after Mitigation

While it is estimated by the DPEIR that PM emissions from the reduced Alternative 2 would be less than the no-project alternative, the potential impacts to people's health need to be addressed, particularly since the Bay Area is out of attainment for state and federal air quality standards. 34

As recommended by CARB in its draft staff ferry emissions report, the WTA should conduct a public health analysis to determine how many people could be adversely effected by the ferry system's share of PM emissions in the Bay Area. The number of potential premature deaths, cancer and respiratory disease should be quantified in the DPEIR. 35

Page 3.6-19 Bus emissions will increase unless alternative fuels and technologies are employed. The mitigation calls for use of CNG, propane, fuel cell or other low-emission technology. This mitigation needs to be specifically included in the IOP. 36

The mitigation of not providing bus service to the terminals should be rejected as it defeats the purpose of an intermodal system. 37

Page 3.6-19 Impact A –7 The DPEIR acknowledges that air pollutants would be deposited on the bay, increasing levels of nitrates and sulfates. However, it does not address the deposition of dioxins produced by the combustion of diesel fuel. The dioxins could be released into the air, and also directly into the water in vessels where the exhaust outlet is placed close to or below the waterline, particularly in catamaran hulls. 38

The issue of dioxins and direct deposit of diesel exhaust into the water needs to be quantified and addressed.

Table 3.6-6 Emissions of PM and NOx for Reduced Alternative 2 appear to be reduced compared to the existing ferry system. However, it is not clear how these estimates were calculated. We believe that there may be an error in methodology or calculations.

It is not known what reduction in emissions was assumed when calculating the marine emissions for Reduced Alternative 2 with SCR and PM.

It also seems that the emissions from the existing fleet are not included in the total air emissions calculations. Or if they are, it is unlikely that any emissions reductions would be achieved.

It is also wrong to assume that the existing fleet will ever meet the low-emissions standard. It appears that the calculations assume that by 2025 the existing fleet would meet the standard. The best the current fleet will probably achieve is EPA Tier 2- 2007, if that.

It is also unknown as to whether emissions from auxiliary engines on ferries were calculated in the emissions tables.

The Table fails to calculate total emissions from non-ferry sources for Reduced Alternative 2.

The Table fails to calculate total emissions from all sources for any alternative.

In addition, the DPEIR should explain why SOx, CO and ROG emissions are significantly increased.

The WTA needs to provide a detailed explanation for the emissions calculations in Table 3.6-6. Please note that the Technical Appendices to the DPEIR do not provide any of the information needed to decipher the calculations in Table 3.6-6. The Appendices only raise more questions as they contain no explanations for emissions calculations or for the abbreviations used to identify routes.

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Detailed Questions

The following questions were sent to WTA staff on September 27. Bluewater Network hoped to have responses before drafting our comments, but since we have not, I am including them here.

Dear Steve and EIR team,

In order for Bluewater Network to make the best possible comments on the DPEIR air quality segment, Russell and I could use your assistance in clarifying some of the calculations and conclusions contained in the DPEIR document. Your prompt response to the following questions would be very much appreciated:

1. Marine emissions comparisons
Questions refer to Air Table in the DPEIR Appendices titled "Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming Diesel Engines with SCR"
a. As labeled, this would indicate that the calculations on this chart are for marine emissions only, is that correct?
b. Why is the decrease in NOx emissions in pounds per day only 21 percent when SCR technology provides 80 to 90 percent or more in NOx reductions?

40 (see EIR 20)

c. Why is the decrease in PM emissions only 60 percent when PM traps typically provide a reduction of 80 percent or more?
d. Why is the increase of SO2 so high, about 9X higher? (For example, is this a byproduct of using the SCR or PM traps? Or increased consumption of fuel due to increased number of vessels or as a result of the added weight of the SCR?)
e. Why is the increase of CO emissions so high, about 6 times higher?
f. Why are VOCs three times higher?

2. These questions pertain to Table 3.6-6 Emission Estimates for Year 2025 No-Build vs Alternative 2 (lbs/day)
a. Under ferries, the column titled "Reduced Alternative 2 with SCR and PM traps" reflects the same emissions reductions and increases for the fleet as the above. So we have the same questions for this column as questions A through F above.
b. What are the total emissions from ferries, buses and cars for Reduced Alternative 2? (It seems that only ferry emissions are calculated for Reduced Alternative 2.)
c. What are the total emissions increases or decreases for cars for Reduced Alternative 2 compared to no-build alternative 4?
d. What are the total emissions increases or decreases for buses for Reduced Alternative 2 compared to no-build alternative 4?
e. What are the total VMTs, increases and decreases, for Reduced Alternative 2 compared to the no-build alternative 4.?

3. Additional Emissions Questions and Requests
a. Please provide Per Passenger Mile calculations for emissions for at least Reduced Alternative 2 for ferries, cars, buses separately and IN TOTAL compared to no-build Alternative 4.
(This should really be done for all the alternatives, as requested in the environmental scoping sessions as this is a standard way to compare emissions for public transport. However, realizing the tight timeframe and the fact that the IOP calls for a system similar to Reduced Alternative 2, the calculations for this one alternative would be the most important.)
4. Please provide ferry, bus, car and TOTAL emissions calculations for the Proposed IOP plan, since it is not represented in any of the DPEIR Alternatives.
Please note that the Reduced Alternative 2 does not include Redwood City or South San Francisco, which are proposed routes. The addition of these routes to the calculations could have a significant impact on the total emissions and air quality impacts of the ferry system as proposed. We need as true an emissions picture as possible to provide meaningful comments.
5. What type of diesel fuel were the emissions calculations in the DPEIR for ferries based on? (CARB diesel, which will be required as of January 2003? Or was it based on ultra-low sulfur diesel, which will be required by CARB in the near future? Or standard non-road diesel?)
6. What ridership models were used to calculate the emissions and VMT? Were they the same ridership models used in the IOP? (ie, were these the ridership projections based on the new market data or some other assumptions, such as full boats, half-full boats or ????)
Please let Bluewater Network know when you might be able to respond or if you cannot.
Thank you very much for your assistance and patience.
Sincerely,
Teri Shore

40 (see EIR 20)

Dredging 3.1

Impacts 3.1.2.2

3.1-16, Impact D-1 The DPEIR states that dredging for a new ferry system was not factored into the Bay Area Long Term Management Strategy for dredged materials. Before the programmatic DPEIR is completed, the WTA should consult with agencies that regulate dredging to make sure that the volume predicted can be accommodated in the LTMS. This should happen before the DPEIR is certified, not after the project moves forward. The need for such a consultation is mentioned in Mitigation D-1.2 and should be incorporated into the DPEIR and the IOP. 41

The DPEIR also states that the "tourism navigation channel ring" around the Bay will not happen, decreasing the estimated dredged spoils anticipated in the LTMS. However, the GGNRA is currently considering a tourism circle around the Bay, so additional dredging may be necessary. This should be considered in the DPEIR if the tourism operations are considered at all. 42

Page 3.1-17 Mitigation D-1.1: Hovercraft should be eliminated from mitigation since this craft was not studied by WTA for environmental impacts. Surface-effect vessels were studied and can correctly remain in the text. 43

Mitigation D-1.2

Creation of new upland and wetland reuse areas for disposal of dredged materials from ferry routes should not be assumed. In fact, creation of new wetland habitat is not a science and often fails. There is also a limit as to the availability of such sites. The availability should be determined as part of the programmatic DPEIR and not deferred to site-specific DPEIRs, since dredging is a regionwide programmatic issue, not a site-specific one, as demonstrated in the LTMS. 44

Impact after Mitigation

It is wrong to state that the in-bay dredge disposal needs for each individual project is "unlikely to be very much." This is too general and probably inaccurate. No site-specific analysis for dredging needs for ferry routes or terminals have been completed, so this statement is speculative and possibly inaccurate. 45

We disagree that impact after mitigation is likely to be less than significant. The increase in dredged volume is likely to be potentially significant, considering that many questions remain about dredging needs and disposal. 46

Mitigation D-2.1

This section says that if any terminals with dredging requirements are selected for development (several are proposed) that the WTA IOP include "specifications and allocation of responsibility to the entities implementing new channel dredging to adopt adequate dredging techniques and BMPS." The IOP does not contain any such language, but only mentions that dredging will be less than .4 of long-term average annual volumes. The IOP should call for, at a minimum, BMPS, for dredging. Avoidance of dredging would be a more suitable standard. 47

Mitigation D-2.2: Remove reference to Hovercraft. 48

Mitigation D-2.3 We believe that dredging impacts from stirring up toxic sediment will be potentially significant after proposed mitigations due to the fact the many questions remain about dredging locations, needs and disposal. 49

Mitigation D-4.2 Remove reference to Hovercraft. 50

Impact D-4 Impact after Mitigation

We believe that the dredging impacts to threatened, endangered or protected species will be potentially significant after mitigations due to lack of information about dredging needs and locations. BMPs, consultations with agencies, and use of technologies cannot fully mitigate the impacts to rare animals whose habitat continues to disappear. 51

The preferred mitigation for all dredging is no dredging or the use of shallow-draft vessels (besides Hovercraft) that don't require deep water. 52

Navigation 3.2

Table 3.2-8 For non-ferry transits in 2025, did the DPEIR take into account the expected doubling or tripling of cargo and container traffic by 2020? Did the DPEIR take into account the projected growth of cruise traffic in the Bay and the proposed new cruise ship terminal? If not, please revise figures as the growth in commercial marine traffic will increase both the number of transits and the potential for vessel interaction. 53

Wake Analysis

In general, we disagree that the potential impacts from ferry wakes on the environment after mitigations will be less than significant. The potential impact to wildlife, shorelines, recreational boaters and property due to wakes will remain significant even after mitigation due to unknowns about wake action in the Bay. Additional study and monitoring at the program level should be required as mitigation for these impacts in the DPEIR and IOP. 54

One issue that does not appear to be addressed is the affect of the combined energy and height of a natural wave with a wake wave. Just because a wake wave is less in size than a natural wave does not mean impact will be less than significant. We believe that these forces join together to create waves with more energy and greater impacts. As SF BayKeeper notes in its comments, the height of wake waves would be increased due to wave train interference and reinforcement. Please explain these potential impacts. 55

Mitigation WW 1.4 Remove the reference to Hovercraft. 56

Mitigation WW-1.6 The word "could" should be strengthened to "should", so that is reads "If it is not possible to reduce impacts to less than significant levels using the previous mitigation measures, the proposed routes with potentially significant erosional wake wash impacts should be removed from consideration or terminal locations should be changed." 57

The revised mitigation measure should be reflected in the IOP so that ferry planners and policymakers and communities know that if wake impacts cannot be mitigated, then the proposed routes and terminals will not move forward.

Based on the DPEIR wake findings, routes to Pittsburg and Antioch should be removed from the list of proposed ferry routes for the first phase or included for study only, like Port Sonoma. 58

3.3.2.4 Potential Impacts on Indicator Species

As mentioned in the Biological Resource section below, the *potential* Clapper Rail nesting habitat needs to be considered along with existing Clapper Rail nesting habitat. Otherwise, the potential impacts may prevent the recovery of the species into suitable habitat and the eventual extinction of the species. 59

Table 3.3.7 Proposed Route Expansion

Hovercraft should be removed from this table as this craft was never studied by WTA in its technical studies or in the DPEIR. If need be, those routes should also be eliminated if they will be infeasible without Hovercraft, unless a study of this craft is conducted. 60

Port Sonoma-SF route calls for a 350-passenger, 35-knot vessel. I believe that such a vessel has been eliminated from consideration on this route due to shallow water and ridership needs. 61

Water Resources 3.4

The potential for dioxin from diesel exhaust to impact bay waters has not been addressed in the DPEIR. In particular the potential for exhaust to be transmitted directly into the water from between catamaran hulls is not quantified. 62

Increased ferry trips (up to 1,500%) could result in greatly increased surface turbulence, affecting all small boats, both when underway and tied up in marinas. The height of wake waves would be increased due to wave train interference and reinforcement, often incorrectly called rogue waves. These impacts are not fully addressed in the program DPEIR. 63

Toxic Hot Spots are not shown on Figure 3.1-1 as stated. 64

Wastewater: The impacts from increased blackwater (human waste) and graywater (from gallies, sinks) generated on-board ferries and at terminals should be considered from a water quality perspective. A discussion of how the ferry fleet will handle blackwater and graywater should be included in the DPEIR. A discussion of how shoreside wastewater would be handled and the potential impacts and mitigations discussed.

Will new water treatment facilities be required for discharge of ferry wastewater? Will new water treatment facilities be required to handle terminal wastewater? Will municipalities be able to handle the increased wastewater? What is the increased risk of dumping or spills of blackwater and graywater into the Bay? 65

This subject was entirely overlooked in the DPEIR and will have a regional impact. Such a discussion should not be postponed to site-specific studies as ferries will criss-cross the entire Bay every day.

Impact W-1

Mitigation W-1.1 The IOP does not contain specific measures as directed in the DPEIR that will prevent, minimize and clean up spills and leaks from construction equipment. The IOP needs to be revised to reflect this directive

66

Mitigation W-1.2 Best Management Practices for dealing with stormwater runoff as directed in the DPEIR for preventing water quality impacts are not found in the IOP. The IOP needs to be revised to reflect this directive.

67

Impact W-2 Floodplains

In addition to considering the 100-year floodplains, the DPEIR should consider the potential impacts of global warming on climate change and rise of sea levels that could greatly impact terminal locations. The DPEIR should calculate a best and worst case scenarios regarding sea level rises and factor that into the mitigations for minimizing flooding.

The DPEIR does not address the issue of global warming and the potential for proposed terminals. The 100-year flood zone needs to be revised. It would be a waste of tax dollars to design and build without providing for this.

68

Impact W-3 Operation

Mitigation W-3.4 This calls for the WTA to include in its IOP a requirement for review of new vessels and equipment to be introduced to new routes and/or for existing route service expansion for technological designs to avoid fuel spills. I do not see this in the IOP, so it should be amended.

69

Biology 3.5

In general, we believe that the significance levels for the potential impacts from an expanded ferry system to biological resources are understated. In almost every instance, the impacts after various mitigations are determined to be less than significant. In many cases, the mitigations that are proposed are experimental, theoretical or too general to provide certainty that the impacts will be less than significant to the biological resources of San Francisco Bay on a regional level.

Increasing the number of ferry transits on the Bay by 1,000 percent or more is certain to forever change the face of the estuary and produce significant environmental impacts. Building terminals in sensitive shoreline habitat, whether wetlands, tidal marsh or other types will forever remove a dwindling supply of shoreline habitat. It is almost impossible to mitigate for loss of wetlands, eelgrass beds, spawning habitat and foraging areas for birds and wildlife. Engineering and technology can only go so far in mitigating damage to the environment.

70

While we realize that some impacts will be revisited on a site-specific level, it is crucial that the program DPEIR fully address regional issues such as eelgrass beds, wetlands, endangered species habitat, and diving duck habitat. Due to a lack of information in some of these regional impacts, additional regional studies as specified in the detail below must be completed as part of the program DPEIR. These should be mandated in the DPEIR and IOP before the program DPEIR is certified to make sure that the ferry plan does not move forward to site-specific EIRs prematurely.

71

Additional studies on potential impacts to eelgrass beds and waterfowl must be conducted as part of the programmatic DPEIR. These studies must be funded on a regional basis to include monitoring of ferry impacts over the long term. The programmatic DPEIR should mandate such studies for the 10-years of the first phase of ferry expansion and fund them before the ferry plan is approved by the Legislature. Detailed recommendations follow.

A revised or supplemental DPEIR may be warranted once new information is gathered on regional impacts that currently are not available. The first new ferry boats won't go into service for a number of years, so there is time to conduct further regional environmental analysis as the ferry expansion moves forward. 71

Specific comments and recommendations follow:

3.5.2.2 Potential Impacts on Habitat

Impact B-1 Loss of wetlands due to dredging and terminal construction.

While we agree that the loss of wetlands are likely to be significant, we disagree that loss or disturbance of wetlands would be solely a site-specific impact. Wetlands are regional resources that contribute to the Bay estuary ecosystem has a whole. Loss of wetlands in one location impacts the entire ecosystem, particularly since few wetlands remain. 72

Mitigation B-1.1 The impacts of loss of wetlands should not be relegated to site-specific studies but analyzed more fully on a regional basis. The DPEIR states that "total area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation." This statement reflects the DPEIR's inadequacy in fully addressing wetland impacts on a regional basis. The program DPEIR should therefore calculate the potential total area of wetland impacts for the four alternatives on a regional basis, as has been done with dredging. 73

In addition, the conclusion that the loss of wetlands would be "minimal" compared to the areas potentially available for mitigation is not well documented. The mitigation of loss of wetlands is not an exact science, and failure rates are high. As it is impossible to gauge the availability of other sites for mitigation of wetlands, primary mitigation should simply be NO LOSS of wetlands, meaning, no building of terminals in wetlands areas. 74

B-3 Eelgrass Beds, Mudflats, Wetlands

The program DPEIR determined that the significance levels for impacts to special aquatic species during project construction are unknown. Like wetlands, this is a regional impact that must not be relegated to site-specific studies for further analysis.

Mitigation B-3.1: This should be strengthened to read "Disturbance of eelgrass beds and mudflats should not be allowed in the designing of projects features and routing of ferries." 75

Mitigation B-3.2 The DPEIR states that an updated mapping of eelgrass beds needs to be conducted before the project moves forward. This measure needs to be completed as part of the program DPEIR and before site-specific studies of terminals are conducted. 76

The DPEIR also notes that very little eelgrass mitigation has been done in San Francisco Bay and that mitigation of impacts to eelgrass beds may not be feasible or successful. As a result of this 77

finding, the DPEIR should require that no terminal or route should destroy or disturb eelgrass beds or potential eelgrass habitat. 77

3.5.2.5 Potential Effects on Fish

Impact B-8 Pacific red herring

Mitigation B-8.1 The DPEIR determined that dredging should be avoided in known herring spawning grounds or monitored during herring season. We believe that the mitigation should be strengthened to mandate no dredging in known herring spawning grounds during herring season, without the option of monitoring and stopping if necessary. By the time the spawning herring are noticed and the work stopped, destruction of herring and habitat will have already occurred and there is no mitigation for this. 78

We also believe significance level to be changed from L to PS based on the importance of this fishery to Bay wildlife and commercial fishers and the fact that numerous proposed terminals are located in primary red herring spawning habitat: Richmond, Berkeley/Albany, Mission Bay, Harbor Bay. 79

3.5.2.6 Potential Effects on Birds

Impact B-10 Loss of habitat for shorebirds and wetland species

We strongly disagree that this impact will be site specific. This is a regional impact that needs to be fully evaluated in the program DPEIR and not relegated to the site-specific studies. Additional study should be funded to more fully assess the potential impacts to loss of habitat. The designation for this impact should be Significant. 80

Mitigation B-10.1

We strongly disagree that the potential impact of loss of habitat would not be significant after mitigation, unless the mitigation is for no building of terminals in habitat for shorebirds and wetlands species.

The mitigations for this impact refer back to the mitigations for wetlands and eelgrass loss, which we also take issue with. It is difficult if not impossible to mitigate for loss of habitat. 81

Therefore, the significance level should be change to "significant" and the mitigation changed to "no loss of habitat for shorebird and wetlands species."

B-ll Roosting and foraging waterfowl

The DPEIR found that the potential impacts to waterfowl, particularly declining species of diving ducks such as Canvasbacks, are unknown. It also states that impacts would be limited to site-specific areas. These findings are not adequate for a program DPEIR.

Roosting and foraging waterfowl are found in many locations around the Bay including the Central Bay, not just the North and South Bay. In addition, waterfowl may move around. So it is not adequate to designate this impact as site-specific. It is truly regional and should be considered as such in the DPEIR. 82

As more information is needed to determine the regional impacts, the DPEIR should not go forward without further analysis and a commitment to funding for a 10 year study that includes monitoring of the impacts of ferry transits on waterfowl. 83

The program DPEIR must call for independent biologists from PRBO, Audubon, a university or a similar independent non-profit to begin study immediately on approval of the ferry expansion plan by the state legislature. The study should be incorporated into the program DPEIR or into a revised or supplemental DPEIR before site-specific studies begin, new terminals are built, or new ferry routes deployed in waterfowl roosting and foraging habitat. 83

Impact B-15 Gray Whales

In the discussion on gray whale impacts on Page 3.5-20, the number of gray whale sightings in the Bay has been underreported. The DPEIR cites the Sea Training Institute as documenting two gray whale sightings in the Bay in 1999 and six in 2000. However the DPEIR does not cite in the text that the Oceanic Society has documented far more sightings, as many as 69 in 2001. The Oceanic Society's sighting numbers should be included to make the discussion more accurate and objective. The OC's sightings are shown on a map, but not included in the discussion. 84

In the discussion of impacts, the DPEIR says that gray whales are "likely actively avoiding ferry vessel routes." What is this based on? We believe that there is no factual evidence that this is true, only speculation by the EIR preparer. On the contrary, fast ferries have struck whales on many occasions in locations around the world, indicating that they do not always avoid ferries or ferry routes. Please remove or revise this language based on specific citations. 85

Mitigation B-15.1, B-15.2 The mitigations need to be strengthened to require whale observers on ferries when sighted in the Bay and to require use of forward-facing sonar on the ferries to detect and avoid whales and other marine mammals that cannot be seen. These mitigations should be included in the IOP.

As written, the mitigations say that sonar "could" be used and does not require specific whale observers. Without stronger language, such measures could be ignored. 86

Forward-facing sonar that uses frequencies that do not harm marine mammals is commercially available and has been used by researchers. Copies of WebPages from one manufacturer are attached as an example of one product now available.

3.5.2.8 Potential Effects on Special-Status Species

As with wetlands and waterfowl, impacts to special status species need to be considered more fully on a regional basis. It is not adequate to postpone any further study of impacts to site-specific analysis. 87

The analysis is based on "known distributions" of salt marsh harvest mouse, black rail and clapper rail. This is inadequate as *potential* habitat for endangered or special status species should also be included. Limiting the study to existing habitat, which has been greatly diminished for these species, ignores the potential impacts to recovery and expansion sites. As a result, the program DPEIR must be revised consider potential habitat for these species, not just existing, or the ferry expansion could threaten the future of these rare animals. 88

Mitigation should require no take of state or federally listed species or loss or degradation of habitat. 89

Land Use 3.7

In the Land Use section, the DPEIR attempts to quantify whether or not the building of terminals will unfairly disrupt low-income communities or communities of color. The methodology may be flawed since it depends on census tracts, not actual population, to come up with figures showing that these communities will not be unfairly affected. Because census tracts range in population size from 1,500 to 8,000, they are not necessarily comparable. The impact should be calculated based on actual population within the census tracts. 90

Environmental Justice: On the subject of environmental justice, nowhere does the DPEIR address the question of increased air emissions and the impact on public health in shoreline communities or for the Bay Area as a whole. This should be analyzed in the program DPEIR. 91

Neither the DPEIR nor the IOP examines or explains how the ferry system will fairly serve a diverse community of riders. For example, will WTA provide subsidized fares for low-income riders, students, retired or people of color? 92

Land Use is the only section that addresses environmental justice. This issue needs to be addressed in more detail and warrants a separate section in the DPEIR.

Aesthetics 3.8

Impact V, Visible Exhaust

The statement that visible exhaust from current or modern ferries is minimal or nonexistent is inaccurate. Ferry plumes are visible on a daily basis at the San Francisco Ferry Terminal. SF BayKeeper recently made observations of visible ferry exhaust at the terminal and found that such emissions were frequent. Please revise this language to reflect this fact. 93

Impact V Light and glare impacts

The DPEIR does not address the potential impacts from light and glare to wildlife and the natural world. It only focuses on impacts to human communities. The DPEIR must evaluate the potential environmental impacts of terminal lighting on the Bay ecosystem and ways to minimize it.

Glare and light can impact the behavior of birds and fish that use shoreline habitats, particularly in undeveloped areas where little light and glare now and exists. Bright lights along the shoreline can be extremely disruptive to nocturnal wildlife, particularly hunting and migrating birds, but also to marine life, fish, amphibians, reptiles, plants, and mud-dwelling organisms. Many studies have been conducted on the problems with artificial lighting and the natural world. 94

This should be addressed on a program level and site-specific studies recommended on this impact.

Other Aesthetics

Possible advertising signs on ferries and terminals are not addressed. Does this indicate that there will be no visible advertising on board ferries or at terminals? If so, this should be stated in the DPEIR and the IOP. If not, this impact should be addressed since advertising creates significant visual aesthetic impacts. 95

Commercial Development: Water transit-oriented development could also create an aesthetic impact regionally on shorelines if chain stores and other commercial development is permitted to install signage. This needs to be addressed and guidelines given as mitigation for commercial shoreline development. 96

Geology 3.10

Table 3.10-2 Geohazard Exposure

The WTA IOP touts the ferry system as an emergency response system, particularly for earthquakes. However, the Geohazard table indicates that every proposed terminal site studied in the DPEIR shows high or very high potential for earthquake shaking and liquefaction. This seems to indicate that ferries may have difficulty in docking at terminals after an earthquake as they may be damaged by shaking and liquefaction. 97

This situation should be addressed in the DPEIR or in the IOP Safety and Emergency Response section. Will the ferry system have back-up locations for loading and unloading passengers that are less likely to be damaged by an earthquake?

Impact G-3 Liquefaction

This impact should be significant after mitigation because it is not clear how viable it is to simply remove or re-engineer "liquefiable deposits." 98

Noise 3.11

Ferry Noise Sources 3.11.1.2

The research and findings on the potential impacts of ferry noise on the environment, wildlife, passengers, crew and shoreline communities are inadequate due to a lack of ferry noise information and study by the EIR preparers. The estimates of potential noise impacts are based on an extremely limited database. As this is a regional impact with ferries crossing miles of water every day, it is critical that additional noise data from existing ferries be gathered and used in predicting noise impacts on a regional basis in the program DPEIR. 99

The discussion states that "noise data of existing ferries throughout the world is virtually nonexistent, especially for types of fast ferries proposed for this project. Most of the existing fast ferry data is anecdotal and is focused on shipboard noise." The discussion then cites one study on an experimental vessel and a single noise sampling done on a SF Bay ferry. There are no specific standards for noise levels on ferries. As a result, the DPEIR's conclusion is that "the expected range of noise levels is unknown."

If this is the case, the potential impact should be listed as UNKNOWN, not less than significant or potentially significant. 100

For the purposes of the program DPEIR, additional study is required to make a more exact finding on the regional level. Impacts or mitigations cannot be adequately evaluated in the program DPEIR without more study.

On page 3.11-12 the DPEIR says "a calculation of the noise output from existing and proposed ferry vessels are well under the significance criteria." What is the calculation based on if there is no information? And if that is the case, how can the DPEIR predict the sound levels on proposed vessels without any baseline? It is not adequate to base the findings entirely on the proposed noise limits for the new ferries without explanation of how those noise levels were determined. As no new vessels have been built, it is inadequate to address the noise issue based solely on the projected noise levels of non-existent vessels. There is no certainty that new vessels will meet the standards. 101

To remedy this inadequacy, further study of noise levels on a range of existing ferries on the Bay must be conducted as part of the program DPEIR. Otherwise this section will remain inadequate. 102

Transportation 3.12

3.12.2.2 Impacts and Mitigation

The DPEIR finds that total reductions in Vehicle Miles Traveled are small, 200,000 miles a day by 2025 or less than .001 percent for the Bay Area. WTA staff has pointed out that the reduction may appear more significant if calculated for trips across the Bay only, as only a relatively small percentage of people travel across the Bay for work. I suggest that such a calculation is made and the DPEIR revised, otherwise the VMT reduction does not seem large enough to warrant singling out in the IOP as one of the major benefits of the ferry expansion. 103

Due to the DPEIR findings, Bluewater believes that the WTA is not entirely accurate when it describes the plan in the IOP as a way to reduce traffic congestion and improve air quality. Realistically, it is a plan whose merits lay in providing a cleaner ferry system than exists today and giving new choices to commuters and other Bay Area travelers. 104

Energy 3.13

We disagree with the DPEIR's conclusion that energy use will be less than significant with any sized ferry expansion. The DPEIR should compare energy use per passenger mile for ferries to other modes, In doing so, a significant or potentially significant impact would become evident. The DPEIR should be revised to reflect a potentially significant impact for energy use with proposed mitigations.

By way of explanation, we will quote from an analysis prepared by the Sierra Club, and include in our comments the comparison prepared by Howard Strassner of the Sierra Club: 105

"Section 3.13.2.3 attempts to show the increase in total transportation energy consumed due to increased ferry use is negligible by aggregating all transportation energy and comparing the impacts of alternative levels of ferry service. This tends to conceal the actual approximate energy consumed by each transportation mode. Fortunately Table ENRG-A-1, in the appendix, partially clarifies this issue. This table shows the energy consumed per passenger mile, (btu/PMT). This is a useful number for those entrusted to make transportation decisions. Unfortunately this table, which is part of a ferry DPEIR, does not include this information for ferries. However there is sufficient information to calculate Btu/PMT by combining data from the appendix with date from Section 3.13.2.3."

The analysis found that for Alternative 2, ferries use 25 times more energy per passenger mile than buses and 244 times more energy per passenger mile than BART. See attached.

It is difficult to understand why the DPEIR did not make these calculations and why the DPEIR determined that energy use increase would be insignificant. 105

We suggest that the DPEIR propose mitigations to reduce energy consumption such as: slower vessel speeds, energy-efficient vessel designs and, probably most importantly, use of non-fossil fuels. For example, use of biodiesel (B100) could significantly reduce use of fossil fuels.

The biodiesel could be required on the longer ferry runs or, conversely, required on the shorter runs due to cost concerns as a way to offset the use of huge amounts of diesel fuel by the faster vessels on the longer runs. NOx emissions could be offset with emissions controls. 106

Also, the DPEIR and WTA IOP should consider the fact that fossil fuel availability and costs are likely to change significantly during the course of the project due to pending political conflicts, possible interrupted and dwindling supplies, and greater demand. In fact the DPEIR and the WTA IOP should consider the fact that fossil fuels cost far more than the pump price in terms of subsidies and military costs. The DPEIR should calculate the best and worst case scenarios for diesel fuel costs and availability over the course of the ferry project. The WTA itself estimated that diesel would cost $5 per gallon or more if all this was taken into account. 107

Energy Omissions

The Energy Section is missing a discussion of global warming gases that would be released as a result of the significant increase in burning of fossil fuels by ferries and the intermodal system including cars. This should be added to the program DPEIR. 108

Energy use by the ferry terminals should also be analyzed on a program level such as how much electric and other energy will be required to run the terminals. The most energy-efficient lighting should be used, such as compact fluorescent lighting. Solar panels should be considered to generate electricity for lighting terminals and other electrical needs. 109

Energy Detail:

3.13.2.3 Impacts and Mitigation

Impact E-1 We disagree that the increase in energy use by a ferry system is not substantial. If the energy were calculated per passenger mile instead of for regional impacts, a significant impact would be determined. 110

Mitigation E-1.1 The proposed routes to Redwood City, South San Francisco and Treasure Island need to be added to the reduced list of routes and the energy calculations revised in order to reflect the proposed routes in the IOP. 111

Impact E-2 We disagree that the alternatives studied in the DPEIR would result in "slightly less" energy efficient mode of transit. Indeed, the ferry system is a significant user of energy and a much less energy efficient mode of transit. The DPEIR needs to be revised to reflect this fact. It takes much more power to push a boat through the water, than a vehicle over land, particularly fast-ferries. 112

Mitigation E-2.1 and E-2.2 The mitigation should not rely on future feasibility of alternative fuels. Biodiesel is available now, so there is no reason not to consider this fuel as mitigation for the high-energy use of ferries. 113

Impact after Mitigation: This should be revised to "potentially significant" or "significant" with mitigations.

Section 4 Growth Inducement

Water Transit Oriented Development This section does not mention the potential growth-inducing impacts of Water Transit Development (WaTOD). that is highly touted by the WTA. 114

It also does not discuss the potential environmental benefits of such development to Smart Growth.

At the DPEIR or IOP level, specific criteria should be established for commercial aspects of terminal design across the system. Terminals should be designed for the sole purpose of transporting and sheltering passengers, not creating visitor destinations. 115

The criteria should ban large restaurants or fast food outlets, chain coffee shops or gift shops, or other national chain outlets inside the terminal. In fact, the criteria should disallow the piggybacking of commercial operations onto the ferry terminal itself. Simple amenities at larger terminals run by independent, local businesses should be considered.

In the table on page 4-2, the DPEIR indicates that planning agency information for Port Sonoma and Gnoss Field is not available. This is not accurate. During the North Bay Ferry meetings, the WTA staff provided extensive information on the planning agencies, designations and general plans on these two proposed terminals. It is difficult to understand why the DPEIR states that such information is not available. 116

It is also difficult to understand why Port Sonoma and Gnoss Field are lumped together in the DPEIR analysis when these are two entirely separate locations under different political boundaries. Blurring the impacts for these two locations into one impact is not adequate or accurate. 117

Environmental Impacts not addressed

Environmental Justice: The DPEIR does not contain a section on Environmental Justice and how the air emissions might impact low-income communities or communities of color. The subject is addressed only in Land Use in relationship to building terminals. 118

Solid Waste: The total solid waste generated by a new fleet of ferries and 10 or more new terminals and the potential impact on the Bay and landfills must be quantified as a system.

The DPEIR should estimate the solid waste impacts for each alternative and propose mitigations such as shoreside and on-board recycling, waste reduction, limits on packaged products sold on ferries and at terminals. 119

This comment was made by Bluewater Network during the Environmental Scoping process.

Wastewater: The impact of increased human waste (blackwater) and other wastewater (graywater) being transferred by ferries across the Bay and generated at terminal sites on water quality and waste facilities should be addressed. The potential for accidental or intentional discharge of blackwater or graywater into the Bay must be evaluated. This comment was made in the environmental scoping process. 120

Greenhouse Gas Emissions:

These emissions needs to be calculated for the entire project and mitigations proposed to reduce them. This comment was made in the environmental scoping process. 121

End of Comments

List of Attachments

"An Emissions Evaluation of Proposed High-Speed Ferry Service Compared to Other Transportation Modes," California Air Resources Board, staff draft report, February 2002.

"Passenger Ferries, Air Quality, and Greenhouse Gases: Can System Expansion Result in Fewer Emissions in the San Francisco Bay Area?," a CALSTART Study, Executive Summary, July 2002.

Sierra Club comments on DPEIR Energy Section, Howard Strassner, San Francisco Group

FarSounder, Inc., forward-looking sonar, Technology Overview, webpages www.farsounder.com, October 2002

An Emissions Evaluation of Proposed High-Speed Ferry Service Compared to Other Transportation Modes.

I. Summary

This evaluation compares emissions for high-speed ferry service to auto or transit bus travel. Uncontrolled diesel ferries as well as diesel ferry engines with add-on emission controls were evaluated. Interest in this evaluation stems from high-speed ferry concepts proposed in the San Francisco and San Diego areas.

The principal conclusion from this evaluation is that add-on emission control technologies will be essential for new ferry services to be less polluting than average fleet light-duty vehicles and transit services.

Results of any analysis vary depending on assumptions. Air Resources Board (ARB) staff varied travel assumptions for each travel mode to produce three scenarios and a range of results. One scenario is more favorable to ferries, one is less favorable to ferries, and one is a best estimate scenario. It is important to remember that even the best estimate scenario is hypothetical and based on many assumptions. Examples of these assumptions include the number of auto access trips to the ferry or transit services, the average length of access trips, ferry occupancy, and the distance of the ferry service compared to bus or auto routes. Also, the evaluation is limited to high-speed ferries. Slower ferry speeds could have significantly different emissions.

Per passenger trip emissions were compared from mode to mode for each scenario. The best estimate scenario indicates that uncontrolled diesel ferries would increase oxides of nitrogen (NOx) plus hydrocarbon (HC) emissions per passenger trip by more than 400 percent when compared to the light-duty motor vehicle mode of travel. NOx alone would increase almost 1000 percent and particulate matter exhaust under 10 microns (PM10) would increase more than 300 percent when compared to the light-duty mode.

Cleaner technologies like selective catalytic reduction (SCR) and catalyst-based diesel particulate filters (DPF) have the potential to substantially reduce NOx and PM10. For this analysis, we assumed such controls would achieve reductions of 85 percent for NOx and HC below the United States Environmental Protection Agency's (U.S. EPA) year 2007 Tier 2 engine standards. For PM10, we assumed the ARB performance standard of 0.02 g/bhp-hr would be met. This standard is identified in ARB's *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* approved in October 2000.

The analysis shows that diesel ferries with add-on emission control technologies would emit 40 percent less NOx plus HC emissions per passenger trip than light-duty vehicles, although the controlled ferries would still emit about 5 percent more NOx than light-duty

vehicles. For PM10, diesel ferry engines with add-on controls would decrease emissions roughly 50 percent compared to the light-duty option.

A typical 2007 calendar year transit bus fleet would increase emissions per passenger trip by nearly 160 percent for NOx when compared to the light-duty mode. HC and PM10 would decrease by roughly 50 percent and 10 percent, respectively, when compared to the light-duty mode. Transit buses that achieve model year 2007 emission standards would be cleaner than the light-duty mode, decreasing NOx, HC, and PM10 each by roughly 75 percent compared to light-duty travel.

Some general conclusions can be drawn when considering all scenarios: less favorable, more favorable, and best estimate.

- Uncontrolled ferries had more per passenger trip NOx and PM10 emissions than the other modes of travel.
- Ferries had lower per passenger trip HC emissions than light-duty vehicles.
- Of the ferry scenarios, only the more favorable, cleanest ferry with add-on controls had lower per passenger trip NOx emissions when compared to light-duty vehicles.
- Ferries with add-on controls had lower per passenger trip emissions of NOx plus HC compared to light-duty vehicles.
- Ferries with add-on controls had lower per passenger trip PM10 emissions than light-duty vehicles.
- Transit buses meeting year 2007 emission standards represented the cleanest mode of travel. These buses had the lowest per passenger trip NOx and PM10 emissions compared to the other modes and were equal to ferry mode per passenger trip HC emissions on average.

Details are provided on each travel mode and scenario in other sections of this report.

The estimated cost-effectiveness of applying SCR to a 1400 horsepower (hp) ferry engine is roughly $1,300 to $1,600 per ton of NOx reduced. The cost-effectiveness for DPFs is roughly $22,000 to $49,000 per ton of PM10 reduced.

Increased exposure to diesel toxic air contaminants from ferry engines and from diesel bus engines may be a concern for workers and residents who would spend most of their day on or near ferry docks and routes or bus stations and routes.

II. Background

New Ferry System Proposals

In recent years, proposals have emerged for new high-speed ferry services in the San Francisco and San Diego areas. An initiative in the San Francisco Bay Area envisions up to 125 vessels traveling over 30 routes, carrying 25 to 30 million passengers annually among 35 to 40 terminals. Ferry vessels would be capable of

carrying 150 to 350 passengers at speeds of 25 to 40 knots. The higher speeds (40 knots = 46 mph) are considered important for achieving ridership and mobility goals. The San Diego Unified Port District plans to operate a much more limited high-speed service, ferrying 150 people twice daily between Oceanside and San Diego.

One of the first studies on the air quality impacts of the proposed Bay Area Water Transit System was prepared in 1999 by the Bluewater Network, an environmental organization under the direction of Dr. Russell Long. The study, called the *Bay Area Transit Options Emission Report*, indicated that diesel ferry service would be nearly 10 times more polluting than automobile travel. This report stirred interest in air pollution related to ferry travel.

Legislation

Senate Bill 428 (SB 428, Perata) became law in October 1999, creating the San Francisco Bay Area Water Transit Authority (Authority). The Authority has responsibility to prepare and adopt a Bay Area regional water transit plan and capital improvement plan for implementing the proposed water system. The Legislature, by statute, must approve the plan. The Authority will need to conduct environmental impact analyses before capital expenditures are authorized.

The law states that the implementation and operations plan must include "a *feasibility analysis and proposal for the use of new technologies and alternative fuels in marine engines and ground transportation intermodal services, to the extent feasible, to minimize air emission and water pollution impacts from the system operations. The analysis shall be conducted in cooperation with the Bay Area Air Quality Management District, the Regional Water Quality Control Board, and the Bay Conservation and Development Commission* (Government Code, Section 66540.22(f))."

The Authority has an eleven-member governing board. There is also a community advisory committee and a technical advisory committee. ARB has staff on the technical advisory committee.

SB 428 did not include financing; however, in 2000, the California Legislature appropriated 12 million dollars to fund environmental impact reports and design functions specified in the enabling legislation. For the more limited new San Diego service, capital funds have been identified and a mitigated negative declaration has been filed under the California Environmental Quality Act.

Another bill, Assembly Bill 2135, became law in 2000. Commencing January 1, 2003, diesel-powered vessels engaged in the commercial transport of 75 passengers or more will be required to use only diesel fuel formulated as specified in title 13 of the California Code of Regulations. Thus, when low sulfur diesel fuel is specified by ARB, diesel-powered ferries will be required to use the cleaner fuel.

MARPOL 73/78 Annex VI

MARPOL 73/78 is the International Convention for the Prevention of Pollution from Ships. This international treaty was originally adopted by the International Maritime Organization (IMO) in 1973 and revised in 1978. Its goal is to reduce pollution from all aspects of marine vessel operations. Annex VI, adopted by the Parties to MARPOL in 1997, sets NOx limits that range from 9.8 to 17 g/kW-hr (7.3 to 12.7 g/bhp-hr) depending on engine speed.

Annex VI will become effective one year after ratification by at least 15 countries representing 50 percent of the gross tonnage of the world's merchant shipping. As of the writing of this report, Annex VI has not been ratified, but full ratification is anticipated.

U.S. EPA Emission Standards for Marine Vessels

The U.S. EPA adopted Tier 2 emission standards in December 1999 that are more stringent than Tier 1 MARPOL Annex VI limits. U.S. EPA standards vary by engine category and displacement (liters/cylinder) ranging from 7.2 to 11.0 g/kW-hr (5.4 to 8.2 g/bhp-hr) of combined NOx and HC. PM standards range from 0.2 to 0.5 g/kW-hr (0.15 to 0.37 g/bhp-hr). The standards pertaining to ferry engines will apply in the year 2007. Since a variety of different sized engines are used on ferries, the emission limits that will apply to ferry engines will depend on the engine category and size being used. For our analysis, we selected an engine that would fall under the most stringent standard.

III. Emissions Comparison

Travel Modes

For this report, we compared emissions from transporting people by ferry, bus, and private vehicle in the San Francisco Bay Area in the year 2007. This is the year that U.S. EPA's Tier 2 standards will apply to engines of the size used for ferries. Emission estimates are for NOx, HC, and PM10. The six basic modes included in the analysis are as described below:

(1) Average calendar year 2007 light-duty vehicles in the Bay Area
(2) Average calendar year 2007 transit buses in the Bay Area
(3) Transit buses that meet California's 2007 transit bus standards
(0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM)
(4) Ferry with four 1600 hp uncontrolled new diesel engines that emit
9.9 g/bhp-hr NOx + HC and 0.2 g/bhp-hr PM10
(13.27 g/kW-hr NOx + HC and 0.3 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
4.9 g/bhp-hr NOx + HC and 0.22 g/bhp-hr PM10
(Off-Road Compression-Ignition (CI) Engine Standard for Year 2003)

(5) Ferry meeting U.S. EPA Tier 2 standards that emits
5.4 g/bhp-hr NOx + HC and 0.15 g/bhp-hr PM10
(7.2 g/kW-hr NOx + HC and 0.20 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
3.0 g/bhp-hr NOx + HC and 0.22 g/bhp-hr PM10
(Off-Road CI Standard for Year 2007)

(6) Ferry with SCR achieving 85 percent below Tier 2 levels of NOx + HC using DPFs and very low sulfur diesel fuel on propulsion and auxiliary engines to achieve ARB's PM Performance Standard. Ferry emits
0.806 g/bhp-hr NOx + HC and 0.020 g/bhp-hr PM10
(1.080 g/kW-hr NOx + HC and 0.027 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
0.45 g/bhp-hr NOx + HC and 0.02 g/bhp-hr PM10

Ferry Assumptions

The ferry is assumed to be one of the larger types of ferries proposed for the Bay Area Water Transit System. Larger ferries can accommodate 325 passengers or more. We assumed that the ferry would have four propulsion engines at 1600 hp each, plus two auxiliary engines at 100 hp each. Only one auxiliary engine would operate at a time, but all four propulsion engines would operate simultaneously. These assumptions are patterned after the catamaran fast ferry, M.V. Del Norte, that is currently part of the Golden Gate Ferry fleet.

The power cycle assumptions are an important part of estimating ferry emissions and can vary depending on the ferry route, time of day, and many other factors. The power cycle is the distribution of operation conducted at full power and at varying percentages of full power over the course of the route. The power cycle and corresponding speed cycle used in this analysis are based on the Marine Propulsion Law heavy-duty operating cycle. This is the same cycle used to generate the federal marine emission standards.

The cleanest ferry scenario assumes the use of add-on emission control technologies, such as SCR being utilized on ferries in Stockholm and elsewhere. This technology reduces NOx by 75 percent to 90 percent.

Ninety-eight percent of particulate emissions from diesel ferry engines are less than 10 microns (PM10 or smaller); for this analysis, all PM emissions for ferries are assumed to be PM10. The PM10 emissions level assumed for the cleanest ferry scenario is 0.02 g/bhp-hr (0.027 g/kW-hr). This is the performance standard for diesel-fueled engines greater than 50 hp identified in ARB's *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines* approved in October 2000. The analysis assumes that DPFs will be installed and very low sulfur fuel will be used. The performance standard is 85 percent below Tier 2 and 86.5 percent below uncontrolled PM emissions.

Literature on this topic indicates that slower ferries may reduce emissions, noise, and safety concerns. Although this evaluation focuses on high-speed ferries, future work should also include evaluations of slower ferries.

Travel Assumptions

The analysis of emissions for the various modes of travel included emissions added from auto and bus access trips to the bus and ferry services, as well as emissions associated with travel from the ferry to final destinations. In the absence of data to define emissions for the last link of the trip, we assumed that ferry-to-final-destination trips contribute one-half of the emissions of home-to-ferry access trips. The assumption that ferry-to-destination trips are less polluting than the home-to-ferry trips is based on the availability of shuttles and electric transit in the urban core.

Travel assumptions were varied to produce scenarios more and less favorable to ferries and a "best estimate" scenario. For example, the more favorable scenario assumes that auto trip length is longer than ferry trip length, thereby giving advantage to the ferry with respect to emissions. In the less favorable scenario, auto trip length is assumed to be shorter than ferry trip length.

No emission reduction benefits were assumed in the analysis for the congestion relief that might occur due to increased use of ferries or buses. Studies in the Bay Area and elsewhere indicate that congestion relief benefits from transportation projects are generally short-term, since congestion relief triggers new trips from latent demand and congestion returns to prior levels within a few years. Also, depending on the speed increases associated with congestion relief, NOx emissions may increase.

Table 1 shows a range of emissions for each mode of travel in the three scenarios—less favorable, more favorable, and best estimate. The table also shows the percentage change in per passenger trip emission when compared to the light-duty vehicle mode. For example, for NOx alone, light-duty emissions range from 30 grams per round trip per passenger in the less favorable scenario to 44 grams per round trip per passenger in the more favorable scenario. Similarly, the cleanest ferry mode emits from 48 to 33 grams per round trip per passenger of NOx. The best estimate assumptions indicate that light-duty vehicles would emit 37 grams per round trip per passenger of NOx compared to 39 grams per round trip per passenger for the cleanest ferry mode. The model year 2007 buses mode has significantly less NOx emissions ranging from 8 to 10 grams and the uncontrolled ferry mode has the most, ranging from 512 to 343 grams for the less to more favorable scenarios.

The four charts that follow Table 1 show graphically the change in emissions from mode to mode and from scenario to scenario. The charts are for NOx plus HC, PM10 alone, NOx alone, and HC alone. They also include a baseline that equals light-duty vehicle emissions for the best estimate scenario.

Appendix A contains more information on the travel assumptions and emission factors.

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Travel Assumptions

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Travel assumptions were varied to produce scenarios more and less favorable to ferries and a "best estimate" scenario. For example, the more favorable scenario assumes that auto trip length is longer than ferry trip length, thereby giving advantage to the ferry with respect to emissions. In the less favorable scenario, auto trip length is assumed to be shorter than ferry trip length.

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The four charts that follow Table 1 show graphically the change in emissions from mode to mode and from scenario to scenario. The charts are for NOx plus HC, PM10 alone, NOx alone, and HC alone. They also include a baseline that equals light-duty vehicle emissions for the best estimate scenario.

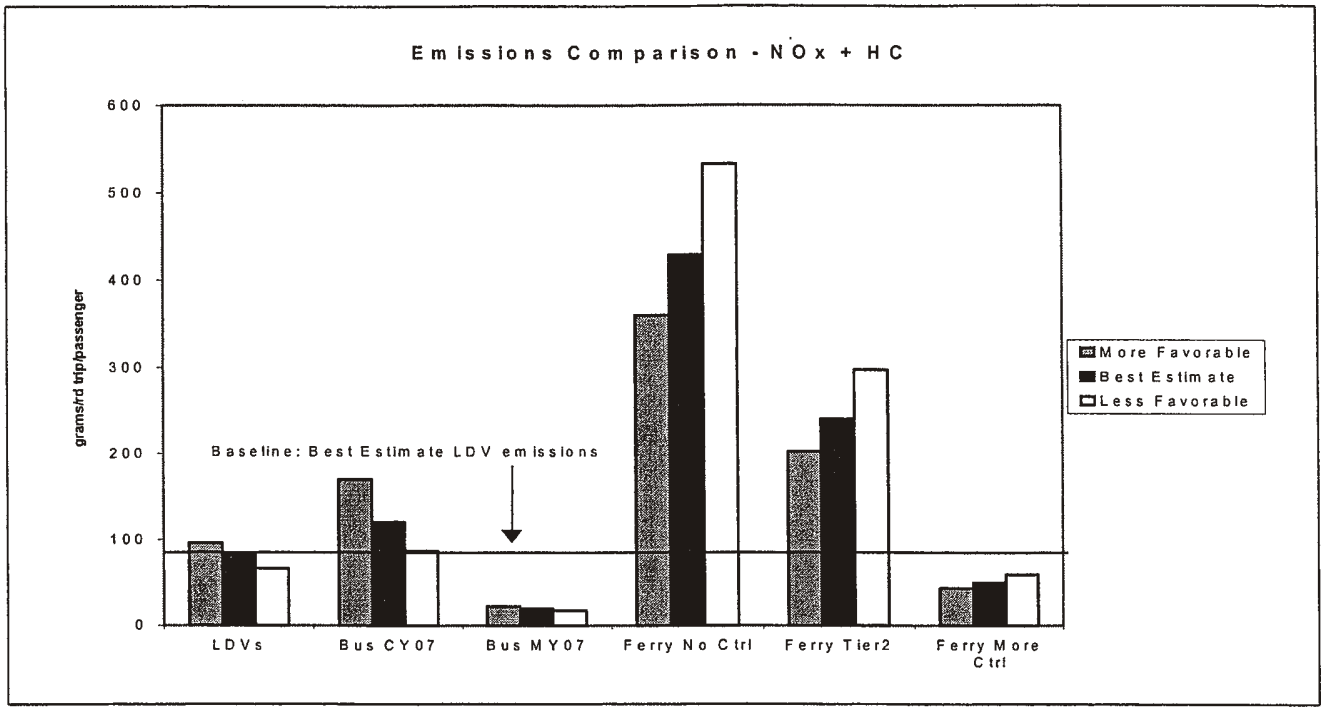
Appendix A contains more information on the travel assumptions and emission factors.

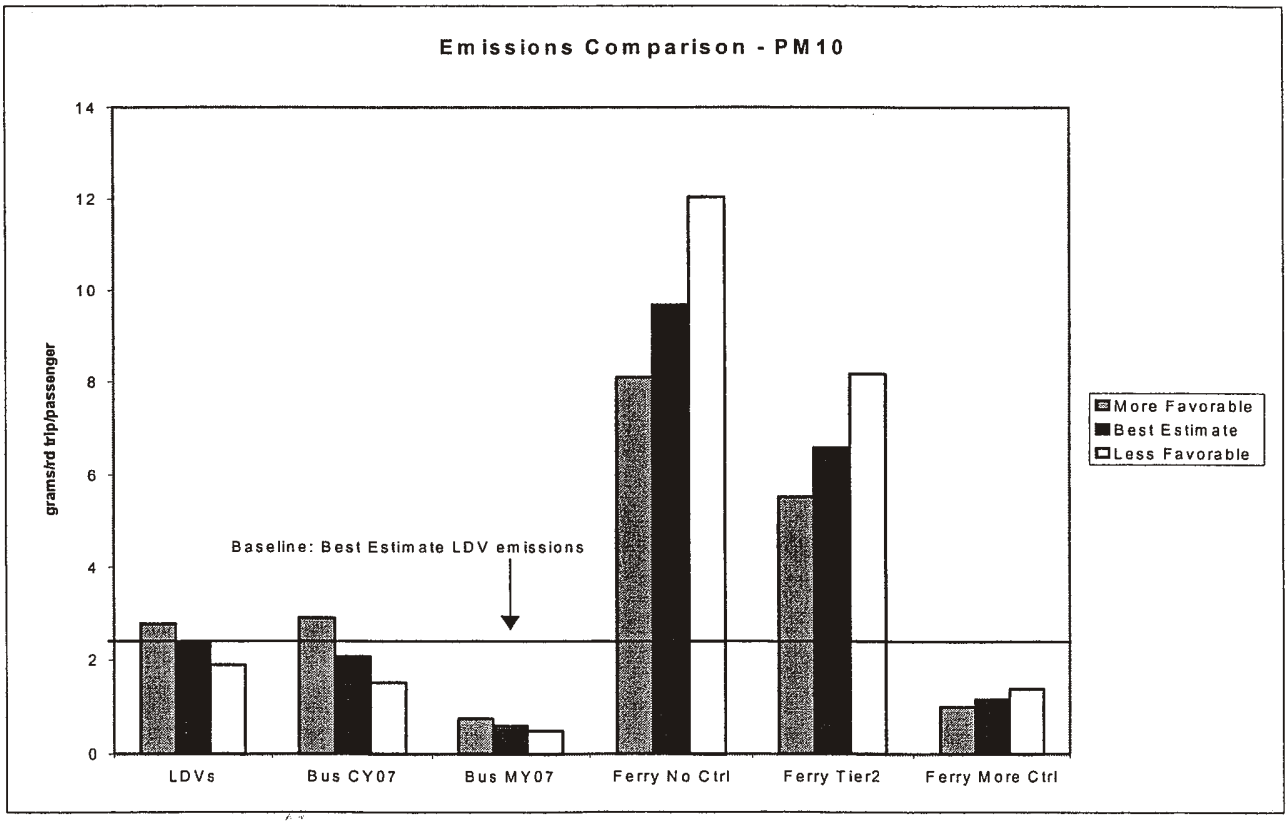
Table 1 Comparison of Ferry Emissions to Emissions for Other Modes of Travel

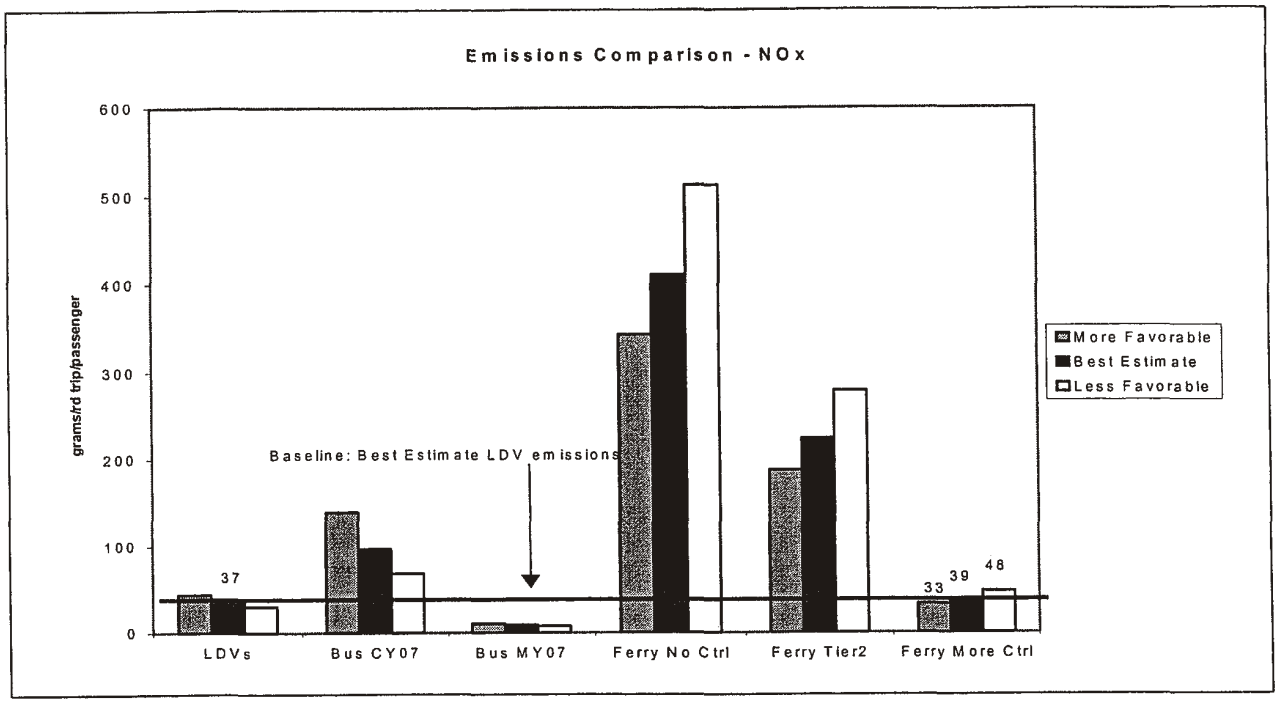
	Grams per Round Trip per Passenger		
	Less Favorable to More Favorable*	Best Estimate*	Best Estimate Percent Change** from LDVs
NOx			
LDVs CY2007 Bay Area	30 - 44	37	---
Buses CY2007 Bay Area	68 -139	97	+158%
Buses MY2007	8 - 10	9	- 76%
Ferry Uncontrolled	512 - 343	411	+ 999%
Ferry Tier 2	279 - 188	224	+500%
Ferry 85% below Tier 2	48 - 33	39	+5%
HC			
LDVs CY2007 Bay Area	36 - 53	45	---
Buses CY2007 Bay Area	19 - 31	24	- 48%
Buses MY2007	10 - 12	11	- 76%
Ferry Uncontrolled	21 - 16	18	- 60%
Ferry Tier 2	18 - 15	16	- 64%
Ferry 85% below Tier 2	12 - 10	11	- 76%
PM10			
LDVs CY2007 Bay Area	1.9 – 2.8	2.4	---
Buses CY2007 Bay Area	1.5 - 2.9	2.1	-13%
Buses MY2007	0.5 - 0.8	0.6	-75%
Ferry Uncontrolled	12.1 - 8.1	9.7	+ 306%
Ferry Tier 2	8.2 - 5.5	6.6	+ 176%
Ferry 85% below Tier 2	1.4 – 1.0	1.2	- 51%
NOx + HC			
LDVs CY2007 Bay Area	66 - 96	83	---
Buses CY2007 Bay Area	87 - 170	120	+ 46%
Buses MY2007	18 - 22	20	- 76%
Ferry Uncontrolled	533 -359	429	+ 419%
Ferry Tier 2	297 - 202	240	+ 191%
Ferry 85% below Tier 2	59 - 43	50	- 40%

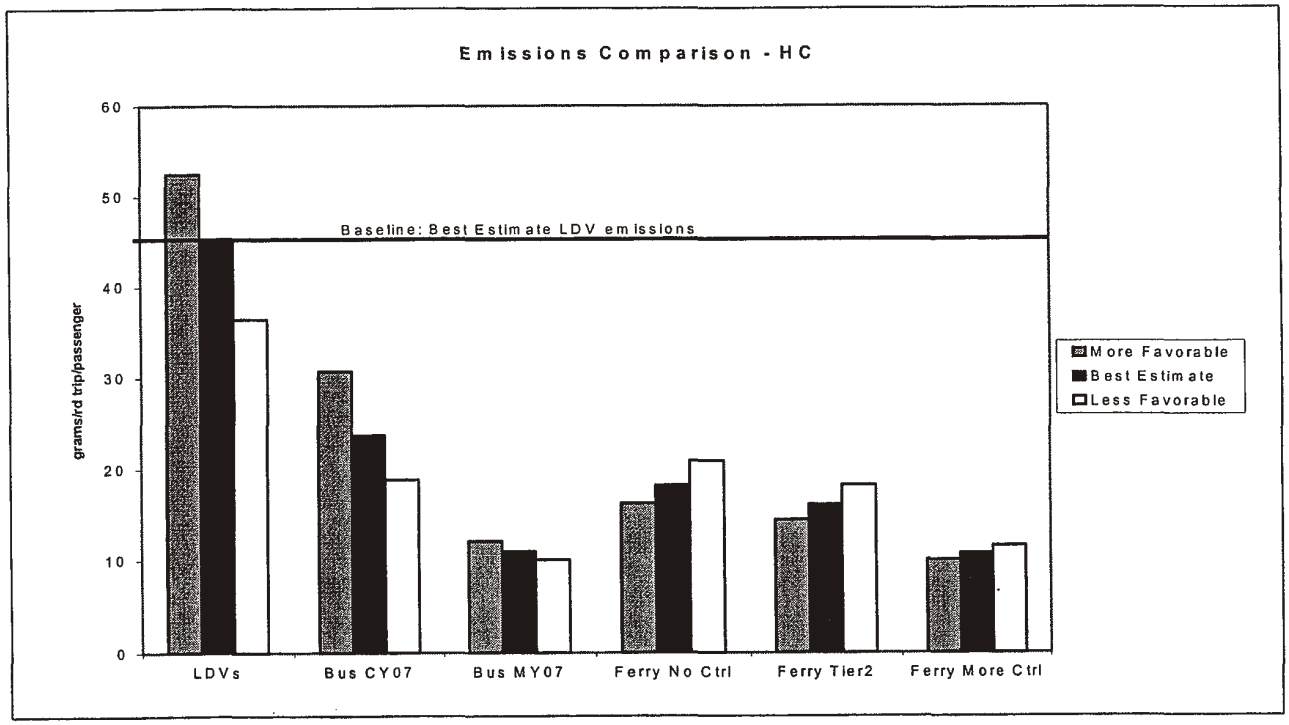
*The less favorable, more favorable, and best estimate scenarios are the result of varying travel assumptions for each of the travel modes in order to represent conditions that are more or less favorable to ferry travel when compared to the other modes.

**The percent change column shows the increase or decrease in best estimate emissions when compared to baseline light-duty vehicle emissions for each pollutant separately and for NOx+HC. For example, the Buses CY2007 mode of travel emits 158% more per passenger trip emissions of NOx than light-duty vehicles. Similarly, a Ferry 85% below Tier 2 emits 51% less per passenger trip emissions of PM10 than the light-duty vehicle mode of travel.


Emissions Comparison - NOx + HC
grams/rd trip/passenger
600
500
400
300
200
100
0
Baseline: Best Estimate LDV emissions
LDVs
Bus CY07
Bus MY07
Ferry No Ctrl
Ferry Tier2
Ferry More Ctrl
More Favorable
Best Estimate
Less Favorable


Emissions Comparison - PM10
grams/rd trip/passenger
14
12
10
8
6
4
2
0
Baseline: Best Estimate LDV emissions
LDVs
Bus CY07
Bus MY07
Ferry No Ctrl
Ferry Tier2
Ferry More Ctrl
More Favorable
Best Estimate
Less Favorable


Emissions Comparison - NOx
grams/rd trip/passenger
600
500
400
300
200
100
0
Baseline: Best Estimate LDV emissions
37
33
39
48
LDVs
Bus CY07
Bus MY07
Ferry No Ctrl
Ferry Tier2
Ferry More Ctrl
More Favorable
Best Estimate
Less Favorable


Emissions Comparison - HC
grams/rd trip/passenger
60
50
40
30
20
10
0
Baseline: Best Estimate LDV emissions
LDVs
Bus CY07
Bus MY07
Ferry No Ctrl
Ferry Tier2
Ferry More Ctrl
More Favorable
Best Estimate
Less Favorable

Toxic Air Contaminants

Because particulate emissions from diesel-fueled engines have been identified as a toxic air contaminant by ARB, evaluation of the proposed Bay Area ferry system should estimate the potential health effects resulting from ferry operations that use diesel as a fuel source. We recommend that the Authority perform a risk assessment to determine the potential cancer risk resulting from these operations.

The greatest exposure to diesel particulate emissions will be to on-site and near-site workers and residents who spend a large portion of each day on or near ferry docks or near the ferry routes. The same kind of exposure is also associated with the operation of diesel buses.

The use of compressed natural gas (CNG), or gasoline fuel, in place of diesel would offer relief from toxic exposure. Some ferry operators in the Bay Area are exploring the possibility of dual-fueled engines -- diesel at idle and CNG as power is applied; however, the use of diesel at idle will remain a concern. Gas turbines are being used in Hong Kong, Australia, New York, and Connecticut.

In February 2001, San Francisco city supervisors passed a resolution that asks the Bay Area Water Transit Authority to put a natural gas demonstration ferry on San Francisco Bay before submitting its ferry plan to the State Legislature.

Cost-Effectiveness of Marine Engine Add-On Control Technologies

Preliminary cost-effectiveness estimates for adding SCR and DPFs to Tier 2 ferry engines are provided in Appendix B. These estimates are based on information contained in the technical appendices to ARB's *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles, October 2000* (Risk Reduction Plan), and also on discussions with Siemens employees.

There may be additional costs specific to the control of ferry engines that go beyond the scope of this analysis. One concern is that while SCR and DPF control technologies are technically feasible, some ship designs may not have the physical space to accommodate them. New ferries may need to include design features that will allow room to accommodate additional control technologies. The costs associated with design changes are unknown.

The size of marine engines used on ferries can vary considerably. More information is available for 1400 hp off-road engines than for 1600 hp engines. The cost-effectiveness estimates in this report are based on a 1400 hp off-road engine operating 2,500 hours per year. The emissions are assumed to be roughly 85 percent below Tier 2 engine emissions. The evaluation indicates that SCR may cost from roughly $1,300 to $1,600 per ton of NOx reduced. There is less information available on the cost-effectiveness of using DPFs and low sulfur diesel fuel in marine applications. Estimates indicate that the cost-effectiveness may range from $22,000 to $49,000 per ton of PM10.

IV. Conclusions

1. A comparison of scenarios shows that:

   - Uncontrolled ferries had more per passenger trip NOx and PM10 emissions than the other modes of travel.
   - Ferries had lower per passenger trip HC emissions than light-duty vehicles.
   - Of the ferry scenarios, only the more favorable, cleanest ferry with add-on controls had lower per passenger trip NOx emissions when compared to light-duty vehicles.
   - Ferries with add-on emission controls had lower NOx plus HC per passenger trip emissions than light-duty vehicles.
   - Ferries with add-on controls had lower per passenger trip PM10 emissions than light-duty vehicles.
   - Transit buses meeting year 2007 emission standards represented the cleanest mode choice. These buses had the lowest per passenger trip NOx and PM10 emissions compared to the other modes and were equal to ferry mode per passenger trip HC emissions on average.

2. Emissions from ferries can be significantly reduced from current uncontrolled levels if low-emission technologies are combined with operating efficiencies. For example:

   - Technologies, such as SCR and catalyst-based DPFs, have potential for 90 percent reduction in NOx and PM10.
   - High-occupancy rates would increase emissions efficiency when compared to other travel modes.

3. Exposure to diesel particulate emissions may be a concern. We recommend that the Authority do an initial risk assessment to determine potential cancer risk resulting from the operation of diesel ferry engines. If diesel engines are used on the ferries, low-sulfur diesel fuel will be needed to obtain full benefits from DPFs.

4. The estimated cost-effectiveness of applying SCR on ferry engines is from $1,300 to $1,600 per ton of NOx reduced. The cost-effectiveness for DPFs is from $22,000 to $49,000 per ton of PM10 reduced.

Appendices

Appendix A

Emissions Comparison of Ferries to Other Transportation Modes—Assumptions and Emission Factors

Appendix B

Cost-Effectiveness of Adding Emission Controls to Tier 2 Engines

Appendix A

Emissions Comparison of Ferries to Other Transportation Modes – Assumptions and Emission Factors

This analysis compares year 2007 emissions per passenger round trip from transporting people by ferry, bus, or private light-duty vehicle. Emissions are estimated for NOx, HC, and PM10. The following are the scenarios analyzed:

(1) Average calendar year 2007 light-duty vehicles in the Bay Area
(2) Average calendar year 2007 transit buses in the Bay Area
(3) Transit buses that meet California's 2007 transit bus standards
(0.2 g/bhp-hr NOx and 0.01 g/bhp-hr PM)
(4) Ferry with four 1600 hp uncontrolled new diesel engines that emit
9.9 g/bhp-hr NOx + HC and 0.2 g/bhp-hr PM10
(13.27 g/kW-hr NOx + HC and 0.3 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
4.9 g/bhp-hr NOx + HC and 0.22 g/bhp-hr PM10
(Off-Road Compression-Ignition (CI) Engine Standard for Year 2003)
(5) Ferry meeting U.S. EPA Tier 2 standards that emits
5.4 g/bhp-hr NOx + HC and 0.15 g/bhp-hr PM10
(7.2 g/kW-hr NOx + HC and 0.20 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
3.0 g/bhp-hr NOx + HC and 0.22 g/bhp-hr PM10
(Off-Road CI Standard for Year 2007)
(6) Ferry with SCR achieving 85 percent below Tier 2 levels of NOx + HC using DPFs and very low sulfur diesel fuel on propulsion and auxiliary engines to achieve ARB's PM Performance Standard. Ferry emits
0.806 g/bhp-hr NOx + HC and 0.020 g/bhp-hr PM10
(1.080 g/kW-hr NOx + HC and 0.027 g/kW-hr PM10)
including one 100 hp auxiliary engine that emits
0.45 g/bhp-hr NOx + HC and 0.02 g/bhp-hr PM10

Total emissions for each mode of travel equal the emissions from the vehicles of that mode, plus emissions added from auto and bus access trips to the bus and ferry services, plus emissions from vehicle travel from the ferry service to the passenger's final destination.

SCENARIO TRAVEL ASSUMPTIONS

	BEST ESTIMATE (BE)	LESS FAVORABLE (LF)	MORE FAVORABLE (MF)	COMMENTS OR SOURCE
Light-Duty Vehicles (Baseline)				
Average trip length	35 miles	29 miles	41 miles	BE: MTC travel demand model run for Vallejo to San Francisco. Ratio of LDV to ferry trip length is 1.27 LF: Assumed ratio is 1.05 (down 0.22) MF: Assumed ratio is 1.49 (up 0.22)
Occupancy rate	1.15 persons per vehicle	1.20	1.15	BE: Home-work average occupancy rate – peak period – MTC region 1991 Statewide Travel Survey
Transit Buses				
Average trip Length	35 miles	29 miles	41 miles	Same as LDV trip length
Vehicle capacity (seats)	40	40	40	Typical bus -- Regional Transit
Occupancy rate	50%	60%	40%	BE: Assume same as ferry LF and MF: Plus 10%, Less 10%, respectively (reverse of ferry assumptions)
Percent of all riders that drive to the vehicle	85%	80%	90%	BE: Assume same as ferry LF and MF: Less 5%, Plus 5%, respectively (reverse of ferry assumptions)
Length of access trip	3 miles	3 miles	3 miles	Same as for ferry
Ferry				
Average trip length	27.6 miles	27.6 miles	27.6 miles	Ferry service Vallejo to San Francisco
Vehicle capacity (seats)	325	325	325	M.V. Del Norte fast ferry
Occupancy rate	50%	40%	60%	BE: Average round trip occupancy rate is 48.5% for the Del Norte fast ferry service from Larkspur to San Francisco. Source: *Bay Area Transit Options Emission Report*, 1999, by Russell Long and Pacific Transit Management, Berkeley, CA. LF: Less 10% MF: Plus 10%
Percent of all riders that drive to the vehicle	85%	90%	80%	BE: Based on Vallejo Ferry Passenger Survey and the Bay Area Council Water Transit Initiative Action Plan, Appendix D, *Existing Bay Area Ferry Services*. Percent varies by route and ferry port. Several examples are at 80%. Vallejo survey indicates 94% at Vallejo and 1%* at San Francisco. LF: Plus 5% MF: Less 5%
Length of access trip	3 miles	3 miles	3 miles	Assume approximately 10% of ferry trip length
Percent of all riders that bus to ferry	10%	5%	15%	BE: Based on Vallejo Ferry Passenger Survey and the Bay Area Council Water Transit Initiative Action Report, Appendix D, *Existing Bay Area Ferry Services*. Bus service varies depending on ferry route. Vallejo survey indicates 4% at Vallejo and 29%* at San Francisco. LF: Less 5% MF: Plus 5% (Access bus assumed to be MY2007 with 50% occupancy.)
Length of bus to ferry trip	3 miles	3 miles	3 miles	Approximately 10% of ferry trip length
Percent of all riders who walk or bike to ferry	5%	5%	5%	Pedestrian and bicycle access varies from port to port. Action Plan indicates transit/walk/bicycle is 20% or less at several locations. Walk/bicycle is 5% to 10% at Larkspur. Vallejo Ferry Passenger Survey indicates 2% walk/bicycle at Vallejo and 70%* at San Francisco.

* Percentages were adjusted to equal 100%; survey information equals 107% due to travelers who answered more than one mode for the same trip.

Emission Factors – Light-Duty Vehicles and Buses

	Light-duty vehicles (LDVs) Average Fleet CY 2007 Bay Area	Buses CY 2007 Bay Area	Buses MY 2007
Reactive Organic Gases (ROG) trip ends (g/trip)	1.77	1.95	--
ROG VMT (g/mi)	0.69	3.92	0.34
NOx trip ends (g/trip)	0.79	1.95	--
NOx VMT (g/mi)	0.59	25.70	0.67
PM10 trip ends (g/trip)	0.01	--	--
PM10 VMT (g/mi)	0.04	0.50	0.08

EMFAC2000, version 2.02.
Because the difference between ROG and HC in vehicle emissions is relatively small, ROG is used interchangeably with HC in this report. The PM10 VMT factor includes exhaust plus tire wear (0.008 g/mi), and brake wear (0.013 g/mi).

Emission Factors – Ferry Propulsion Engines – 1600 hp

	Uncontrolled*		U.S. EPA Tier 2 Std**		85% Below Tier 2 NOx + HC PM10 Controlled to 0.02 g/bhp-hr	
	g/mi	g/kW-hr	g/mi	g/kW-hr	g/mi	g/kW-hr
HC	24.63	0.27	18.24	0.20	2.74	0.030
NOx	1185.80	13.00	638.51	7.00	95.78	1.050
PM10	27.36	0.30	18.24	0.20	2.45	0.027

*13.27 g/kW-hr for HC+NOx, 0.3 g/kW-hr for PM10.
** 7.2 g/kW-hr for HC+NOx, 0.2 g/kW-hr for PM10.

Emission Factors – Ferry Auxiliary Engines – 100 hp

	MY 2003	MY 2007	85% Below MY 2007 PM10 Controlled to 0.02 g/bhp-hr
	g/bhp-hr	g/bhp-hr	g/bhp-hr
HC	0.30	0.30	0.05
NOx	4.60	2.70	0.41
PM10	0.22	0.22	0.02

Documentation for Emission Factors

Ferries:

Per Alan Stout, U.S. EPA and Jackie Lourenco, ARB: uncontrolled engines emit 13.27 g/kWh for HC+NOx and 0.3 g/kWh for PM10. U.S. EPA Tier 2 standards for marine engines vary by engine category and size. Scenarios use year 2007 standards--7.2 g/kWh for HC+NOx, 0.2 g/kWh for PM10 (based on displacement greater than or equal to 2.5 liters/cylinder and less than 5.0 liters per cylinder). Nearly all PM emissions (98 percent) from diesel ferry engines are less than 10 microns.

The cleanest scenario assumes SCR will reduce NOx and HC by 85 percent below Tier 2 ferry engines. There is a control technology evaluation that shows this in ARB's *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (October 2000)* on page IX-76. The manufacturer claims an SCR control system with catalytic oxidation will reduce NOx and HC, each, by 90 percent or more.

The cleanest scenario assumes that PM10 will be reduced to 0.02 g/bhp-hr, the performance standard identified in ARB's *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines (October 2000)*. The performance standard is based on on-road engine certification levels, use of catalyst-based DPFs, and very low sulfur diesel fuel.

Ferry Engine assumptions:

Vessel Rated Hull Speed = 36 knots
Ferry engine full power output = 4776 kW
(Based on four engines @ 1600 hp each; displacement 2.5 to 5.0 liters/cylinder)

Cycle Average power = 3283.50 kW
Percent of Full Power = 68.75 percent
Average Vessel Speed = 36 miles per hour (31.3 knotts)
(Based on Marine Propeller Law Heavy-Duty Operating Cycle)

Auxiliary Engine assumptions:

Two engines; emissions are for one engine operating during the trip
Each engine has four cylinders, 4.5 liter, 100 hp, load 50 percent

Buses:

The calendar year 2007 bus emission factors are based on EMFAC2000, version 2.02, calendar year 2007, San Francisco Air Basin, annual average. The model year 2007 bus emission factors are based on EMFAC2000, version 2.02, model year 2008, statewide, annual average. Year 2008 was chosen to ensure full implementation of the 2007 transit bus standards. Statewide emissions were used because the EMFAC2000 output for model year bus emissions for the air basin lacked sufficient decimal places to calculate emission rates.

Light-duty vehicles:

The emission factors for average fleet light-duty vehicles were developed from EMFAC2000, version 2.02, for the San Francisco Air Basin, calendar year 2007, annual average. The factors include average emissions for light-duty cars and trucks plus motorcycles. Emission factors for reactive organic gases (ROG) were assumed equivalent to hydrocarbon (HC) emissions for purposes of this analysis.

The vehicle miles traveled (VMT) factors equal running exhaust plus running losses divided by daily VMT. The trip end factors equal start emissions divided by daily trips plus hot soak emissions divided by daily trips. The start portion of the factors was adjusted using proportional analysis to reflect a commute-type pre-start soak distribution. The commute-type pre-start soak distribution is based on an analysis of the 1991 Statewide Travel Survey all day home-work and work-home trips (diurnal and resting losses were not included because the scenarios do not eliminate vehicles, only vehicle trips).

The PM10 grams per mile factor includes exhaust emissions plus tire and brake wear.

Appendix B

Cost-Effectiveness of Adding Emission Controls to Tier 2 Engines

Exhaust Emission Rates (g/bhp-hr)

	MY 2007 Diesel Engine (Meets U.S. EPA Tier 2 Stds)	with SCR (85% below Tier 2 levels of NOx+HC) plus Catalyst-Based DPFs
NOx	5.22	0.784
PM	0.15	0.020*

*Based on on-road engine certification/add-on control/very low sulfur diesel fuel. This is the performance standard in ARB's *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines (October 2000).*

SCR

Horsepower	NOx Reduced (tons/year)	Costs of SCR		Cost-Effectiveness of SCR based on NOx (annualized costs/tons)
		Initial + install	operating + maintenance	
1400 HP	11.77	$80,000 to $90,000	$4,353 to $5,530	$1,300 to $1,600 / ton

Source: Siemens provided information on costs and service life of SCR on ferries. More cost data was available for 1400 hp engines in general than for 1600 hp engines. We evaluated a 1400 hp engine but believe it to be representative of a 1600 hp engine.

DPFs

Horsepower	PM10 Reduced (tons/year)	Costs of DPF		Cost-Effectiveness of DPFs based on PM10 (annualized costs/tons)
		Initial + install	operating + maintenance	
1400 HP	0.34	$32,167 to $44,518	$156 to $312	$22,000 to $49,000 / ton

Source: Costs estimates and service life of DPFs are taken from *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (October 2000)*, pages IX-28.

Assumptions:

Annual Operating Hours for Ferry	= 2,500 hours per year
Percent Full Power (Load)	= 68.75 percent
Service Life for SCR	= 8 to 10 years
Capital Recovery Factors (CRFs) for SCR	= 0.13 to 0.15
Service Life for DPF	= 3 to 5 years
CRFs for DPFs	= 0.23 to 0.37

Calculation:

Annual Emission Reductions
= (Tier 2 Exhaust – Controlled Exhaust) * Horsepower * Load * Operating Hrs

Cost-effectiveness
= [CRF * (Initial + Install Costs) + (Annual Operating and Maintenance Costs)] /Annual Emission Reductions

Passenger Ferries, Air Quality, and Greenhouse Gases: Can System Expansion Result in Fewer Emissions in the San Francisco Bay Area?

A CALSTART Study
July 23, 2002

Project Sponsors:
Gas Technology Institute
Brookhaven National Laboratory -- Department of Energy
Department of Transportation Center for Climate Change and Environmental Forecasting

Acknowledgements

CALSTART is grateful to three key entities which provided the financial support necessary for this analysis. Those organizations are Brookhaven National Laboratory, the DOT Global Climate Change Task Force, and the Gas Technology Institute. At those organizations, there were three key individuals who supported this study and were responsible for making the funds available. WestStart would like to personally thank Danny Gore of the Maritime Administration, Dr. Jim Wegrzyn of Brookhaven National Laboratory, and Rajaena Gable of the Gas Technology Institute.

CALSTART was fortunate to work with a talented group of consultants who helped produce this report. Deborah Redman was responsible for writing the landside analysis and producing the final report. The waterside analysis was performed by a nationally prominent team of marine emissions experts including Dr. Alex Farrell, Research Faculty, Department of Engineering and Public Policy, Carnegie Mellon University, Pittsburgh; Dr. James Corbett, P.E., Assistant Professor, Marine Policy Program, Graduate College of Marine Studies, University of Delaware, Newark; and Dr. James J. Winebrake, Associate Professor in the Integrated Science and Technology Program at James Madison University.

Lastly, there were a number of people in the passenger ferry industry and regulatory agencies who were very helpful and worked with us to provide valuable information and advise. Among those people I'd like to thank are: Jeff Weir, Associate Transportation Planner, Transportation Strategies Group, CARB; David Clark, Deputy General Manager, Golden Gate Bridge, Highway and Transportation District; David Courtois, Maintenance Superintendent, Golden Gate Bridge, Highway and Transportation District; Ernest Sanchez, Manager of Ferry Service, Alameda/Oakland Ferry Service; Martin J. Robins, General Manager, Vallejo/Baylink Ferry System; and Carl Friedrich, Port Captain, Blue and Gold Fleet.

CALSTART would also like to thank the Gaia Foundation for its support that allowed for the distribution and dissemination of this report.

The views expressed herein are the authors' alone and do not necessarily represent the positions of the DOT, Brookhaven National Laboratory, the Gas Technology Institute, or any other organizations with which the authors are affiliated, or their sponsors.

Best Regards,

John Boesel
President
CALSTART

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Executive Summary

Continued interest in improving air quality in the United States along with renewed interest in the expansion of urban passenger ferry service has created concern about air pollution from these vessels. This study shows, as others have before, that emissions from ferries are significant. However, it also shows that there are no serious technical impediments to the development of passenger ferries with much lower emissions than those currently in service, so that ferry commuting can become an environmentally sound choice. Achieving this outcome will require research and development of new technologies, followed by their widespread use.

This study first analyzes air pollution (NO_X, HC, PM, CO, SO_2, and CO_2) emissions from three passenger ferries in the San Francisco Bay Area with existing engines (providing the most accurate emissions estimate currently available). It then applies a number of new engine and emissions control technologies to the same level of service in order to evaluate the potential of these new technologies. Eight ferry engines and emission-control technologies were studied:

(1) Existing engines
(2) EPA Tier 2 "Clean Diesel" Engines
(3) EPA Tier 2 + HAM (Humid Air Motor)
(4) EPA Tier 2 + ITD (Injection Timing Delay)
(5) EPA Tier 2 + CF (Catalyst Filter)
(6) EPA Tier 2 + SCR (Selective Catalytic Reduction)
(7) EPA Tier 2 + SCR + CF (Selective Catalytic Reduction and Catalyst Filter)
(8) CNG (Compressed Natural Gas engine)

Data for this study was obtained from Bay Area ferry operators; Bay Area ferry passenger surveys, peer-reviewed research publications, engine and emission control device manufacturers; local, state, and federal regulators; and other experts. Sources are identified in References. Emissions factors and technology cost data are sparse and uncertain, so the results reported here contain considerable uncertainty. However, the analysis was conducted with a consistent set of data and state-of-the-art techniques, so that while the absolute values reported are uncertain, comparisons across technologies or across different scenarios within the study are valid. Further, the results reported here are broadly consistent with all the other major studies of marine air pollution emissions conducted to date, providing added confidence in the analysis.

A key conclusion that emerges directly from the data collection effort is that all of the low-emission technologies examined for this study are currently in use in other transportation modes or onboard passenger ferries in Europe. Therefore, no serious impediments to commercialization for passenger ferry applications in this country currently appear to exist. The U.S. Coast Guard will have an important role in ensuring the safety of all these technologies, but for similar reasons this process is likely to proceed quickly, particularly if an expedited review process were adopted by the Coast Guard for demonstration projects.

The basic results of the analysis of ferry emissions are contained in Table ES-1. The adoption of Tier 2 engines (required for new vessels built after 2007) will reduce emissions of NO_X and PM relative to existing engines, but increase emissions of HC and CO. The increase in HC and CO emissions is due the fact that engines tuned for improved emissions performance generally are not as energy efficient as those tuned solely for economic performance, which

results in unburned and partially burned fuel in the exhaust gas. The use of SCR and CF technologies can result in emission reductions of all four of these pollutants, relative to existing engines. The use of CNG engines will reduce emissions of NO_X and PM significantly, but will increase emissions of HC and CO. Liquefied natural gas (LNG) engines would have essentially the same effect. Emissions of SO_2 are likely to fall significantly as low-sulfur diesel fuel becomes the only type available in California, and they fall further if CNG is used as the fuel. Emissions of CO_2 do not change very much across the various technologies, unless CNG is used as the fuel, in which case they go down by about a quarter. There are no significant differences in these results across the three vessels, and these results should hold for ferry operations located elsewhere.

Table ES-1: Annual Emissions per Ferry (tons)

Pollutant	Existing Engines	Tier 2 Engines	Tier 2 + HAM	Tier 2 + ITD	Tier 2 + SCR	Tier 2 + CF	Tier 2 + SCR + CF	CNG
Larkspur								
NO_X	58	29	21	23	5.7	28	5.6	5.8
HC	1.2				0.80	0.26	0.06	
PM	1.3	0.89	0.88	0.98	0.62	0.089	0.062	0.083
CO	11				5.5	3.3	0.8	
SO_2	2.3	0.041	0.041	0.041	0.041	0.041	0.041	0.019
CO_2	4,400	4,400			4,400	4,400	4,400	3,300
Alameda/Oakland								
NO_X	69	34	25	28	6.9	33	6.6	6.9
HC	1.4				0.95	0.30	0.08	
PM	1.59	1.06	1.05	1.17	0.74	0.106	0.074	0.099
CO	13.2				6.6	4.0	1.0	
SO_2	2.4	0.044	0.044	0.044	0.044	0.044	0.044	0.021
CO_2	4,700	4,700			4,700	4,700	4,700	3,600
Vallejo								
NO_X	87	44	31	35	8.7	42	8.5	8.8
HC	1.8				1.21	0.39	0.10	
PM	2.0	1.3	1.33	1.5	0.94	0.13	0.094	0.13
CO	17				8.4	5.0	1.3	
SO_2	5.1	0.09	0.09	0.1	0.092	0.092	0.092	0.043
CO_2	9,800	9,800			9,800			7,500

Note: Shaded values indicate an increase in emissions. LNG-fueled vessels would have emissions very similar to those shown for CNG.

The basic results of the cost analysis of controlling ferry emissions are contained in Table ES-2, which accounts for both capital costs and increased annual costs. These costs range from zero to several hundreds of thousands of dollars. The least expensive option is Tier 2 + ITD, most expensive is CNG (which includes the cost of one refueling station).

Cost-effectiveness is show in Table ES-3, in which the NPV values in Table ES-2 are divided by the total emission reductions based on Table ES-1 over an assumed 15-year life. This

approach means the values for each pollutant are independent – so that a cost effectiveness of $1,400-$1,800 per ton NO_X for Tier 2 + SCR implies the other reductions come at no cost. All of the technologies evaluated here are cost-effective methods of reducing NO_X, based on several comparisons: (1) California's Carl Moyer incentive program has an average cost effectiveness of about $5,000/ton NO_X, (2) numerous regulatory programs have had cost effectiveness values of over $5,000/ton NO_X (including the Low Emission Vehicle program, and regulations for motorcycles and small off-road engines), and (3) emission trading programs for large stationary sources in highly polluted areas generally have costs of over $4,500/ton NO_X. The cost effectiveness of these technologies is sensitive to the discount rate, fuel costs, and capital costs. The price of fuel is particularly important for the natural gas engines, especially since a relatively expensive infrastructure is included in the costs used here. The use of LNG could significantly change these costs. These results should hold for ferry operations located elsewhere.

Table ES-2: Costs of Emission Control Technologies

	Tier 2 Engines	Tier 2 + HAM	Tier 2 + ITD	Tier 2 + SCR
Capital	None	$71,000-$128,000	$0	$160,000-$280,000
O&M*	None	$1,400-$2,500	$1,600-$2,900	$45,000-$80,000
Fuel*	None	$13,000-$28,000	$17,000-$38,000	$8,400-$19,000
NPV	None	$210,000-$430,000	$180,000-$390,000	$680,000-$1,300,000
	Tier 2 + CF	**Tier 2 + SCR + CF**	**CNG**	
Capital	$45,000-$79,000	$200,000-$360,000	$450,000-$660,000	
O&M*	$40,000-$72,000	$85,00-$150,000	$0	
Fuel*	$4,200-$9,400	$13,000-$28,000	$120,000-$280,000	
NPV	$480,000-$870,000	$1,200,000-$2,100,000	$1,700,000-$3,400,000	

* Annual. Values shown for all three vessels. NPV assumes 15-year lifetime and a 7% discount rate.

Table ES-3: Cost-Effectiveness of Emission Control Technologies ($/ton)

	Tier 2 Engines	Tier 2 + HAM	Tier 2 + ITD	Tier 2 + SCR
NO_X	$185	$700-$1,000	$670-$1,000	$1,400-$1,800
HC	N/A			$156,000-$210,000
PM	$8,600	$42,000-$64,000	$48,000-$77,000	$88,000-$120,000
CO	N/A			$11,000-$15,000
SO_2	N/A	$8,800-$9,600	$8,100-$8,300	$26,000-$31,000
CO_2	N/A			
	Tier 2 + CF	**Tier 2 + SCR + CF**	**CNG**	
NO_X	$1,700-$2,200	$2,200-$2,900	$2,800-$4,400	
HC	$47,000-$63,000	$94,000-$130,000		
PM	$34,000-$48,000	$84,000-$110,000	$120,000-$180,000	
CO	$5,700-$7,600	$10,000-$14,000		
SO_2	$18,000-$22,000	$44,000-$54,000	$69,000-$76,000	
CO_2			$150-$160	

Note: Values for Tier 2 taken from [43]. Blanks indicate an increase or no significant change in emissions relative to existing engine technologies. Values are *not* additive.

The invention and use of environmental control technologies generally follows "technology-forcing" regulation, sometimes accompanied by market incentives for innovation. Many industries have responded successfully (if reluctantly) to such an approach. Thus, three trends in

the cost and performance of marine emission control technologies can be expected: 1) the costs and performance of the technologies described here will improve, 2) new emissions control technologies will become available, and, 3) ferry engineers, builders, and operators will learn how to incorporate low-emission technologies into standard practices.

Calculating net emissions of ferry commuting requires estimating the changes on both the waterside and landside parts of the trip. The former is described above. The latter requires understanding several landside factors: vehicle emissions, travel patterns, and travel demand.

Landside vehicle emissions were estimated for the comparison year (2007) with the state-of-the-art emissions model used in California, EMFAC 2000. This analysis shows the importance of reducing the landside emissions of a commute trip that includes a ferry component. Passenger ferries are just one part of the regional transportation system. If strategies are implemented to reduce the use of single occupancy vehicles as the primary means of reaching the ferry terminal, the over-all emissions from the transportation system could decrease dramatically. If this approach was used in conjunction with advanced low-emission ferry propulsion technologies and cleaner fuels, emissions from ferry commuting can be dramatically reduced.

Landside travel patterns were taken from ferry rider surveys provided by ferry operators in the Bay Area, indicating that average daily occupancy (percent of total possible passengers carried onboard) ranges from 15% to 33%. During rush hour departures, ferries are full (or nearly so) in one direction and virtually empty in the other, while mid-day departures tend to be relatively empty. In these surveys, ferry riders report that a large majority of them drive alone to the ferry terminal, while a smaller fraction (less than one-quarter in one case) would drive alone all the way to work if ferry service was not available. Further details on travel patterns are presented in the text.

Landside travel demand was estimated based on the overwhelming evidence from across the United States (and in the United Kingdom) shows that increases in transportation system capacity that makes travel more convenient, less expensive, or otherwise better tends to create more trips, called induced travel demand. Because ferry system expansion is designed to improve travel conditions, it will induce travel demand. A review of the best available data and discussions with California officials indicated that a realistic short-term value for induced demand in the Bay Area is 30%, with higher values in the long term.

Results for many different combinations of occupancy and induced travel demand were calculated and are presented in the body of the report. For convenience, Table ES-4 shows the results for a scenario with 50% occupancy (higher than currently observed in any Bay Area ferry system), half of the existing landside trips replaced by zero-emission shuttle trips (which are not currently offered), and induced travel demand of zero and 30%. The values shown are the percentage changes in net emissions due to ferry commutes in each of the three services.

PM emissions always decrease due to ferry commuting (coarse material, or PM-10, only). Commutes on the two shorter, slower routes, Larkspur and Vallejo/Oakland show reductions in most emissions for all ferry technologies, many of them very significant cuts. However, emissions of NO_X increase due to ferry commuting on these routes for all but the SCR and CNG technologies. This would be true even if average ferry occupancy were 75%. These two technologies (in conjunction with the zero-emission shuttles, no induced demand, and increased occupancy) make ferry commuting the preferable option from an air quality standpoint on these two routes. In the absence of zero-emission shuttles, however, all ferry technologies here result in NO_X emission increases for the Larkspur and Alameda/Oakland services.

Table ES-4: Percent Change in Emissions Due to Changing From On-Land Commute to Ferry Commute, Half of Home-To-Terminal Trips Provided By Zero Emission Shuttle

Route	Pollutant	Existing Engines	Tier 2 Engines	Tier 2 + HAM	Tier 2 + ITD	Tier 2 + SCR	Tier 2 + CF	Tier 2 + SCR + CF	CNG
Larkspur									
Zero	NO_X					-39%		-42%	-34%
Induced	HC	-87%	-66%	-67%	-63%	-92%	-97%	-99%	-84%
Demand	CO	-89%	--78%	-78%	-76%	-95%	-97%	-99%	-50%
	PM	-84%	-89%	-90%	-88%	-93%	-99%	-99%	-99%
	CO_2	-82%	-82%	-82%	-82%	-82%	-82%	-82%	-86%
30%	NO_X					-33%		-36%	-27%
Induced	HC	-86%				-91%	-97%	-99%	-83%
Demand	CO	-80%				-94%	-96%	-99%	-44%
	PM	-82%	-88%	-88%	-87%	-92%	-99%	-99%	-99%
	CO_2	-80%	-80%	-80%	-80%	-80%	-80%	-80%	-85%
Alameda/ Oakland									
Zero	NO_X					-38%		-39%	-36%
Induced	HC	-86%	-65%	-65%	-62%	-91%	-97%	-99%	-83%
Demand	CO	-89%	-77%	--77%	-75%	-94%	-97%	-99%	-47%
	PM	-83%	-89%	-89%	-88%	-92%	-99%	-99%	-99%
	CO_2	-79%	-79%	-79%	-79%	-79%	-79%	-79%	-84%
30%	NO_X					-32%		-39%	-30%
Induced	HC	-85%	-61%	-61%	-58%	-90%	-97%	-99%	-82%
Demand	CO	-88%	-75%	-75%	-72%	-94%	-96%	-99%	-43%
	PM	-82%	-88%	-88%	-86%	-91%	-99%	-99%	-99%
	CO_2	-77%	-77%	-77%	-77%	-77%	-77%	-77%	-83%
Vallejo									
Zero	NO_X								
Induced	HC	-37%				-57%	-87%	-97%	-20%
Demand	CO	-46%				-73%	-84%	-96%	
	PM	-22%	-48%	-48%	-40%	-63%	-95%	-96%	-95%
	CO_2	-2%	-2%						-25%
30%	NO_X								
Induced	HC	-30%				-52%	-85%	-96%	-11%
Demand	CO	-40%				-70%	-82%	-96%	
	PM	-12%	-41%	-41%	-33%	-59%	-94%	--96%	-95%
	CO_2								-15%

Note: Shaded values indicate an increase in emissions. Land route is 40 miles long (round trip) and includes two cold starts. Average ferry occupancy is 50% (ferries are, on average, half full at every departure). See Tables 18-27 in the text for other scenarios. LNG-fueled vessels would have emissions very similar to those shown for CNG.

The Vallejo route, however, is quite different. Even with the zero-emission shuttle assumption, emissions of HC, CO and CO_2 can either rise or fall, depending on the technology, while NO_X emissions always increase, and for some technologies do so very substantially.

These results are largely driven by the fact that Vallejo ferry passengers report that if the ferry was not available, that many of them would either take mass transit or simply not make the trip, while only a few would drive. The higher speed and longer distance the vessel travels also contribute. Even if the current Vallejo ferry riders who report they would not make the trip were to actually drive to work alone, the net effect of the ferry's operation would still be to increase NO_X emissions several times relative to the on-land travel that would take place.

These results show that commute patterns involving ferry trips are complex and vary considerably from one service to another (as have previous studies). Comparing the results across the three services studied illustrates how sensitive any analysis is to such landside factors as mode split among local commuters, and variations in landside commute distances. This sensitivity makes analyses based on average values suspect and suggests that extrapolation of these results to other cases is unadvisable.

A few general observations seem possible. First, emissions from existing ferry operations can be reduced significantly with technologies that are rapidly being commercialized (Tier 2 engines), and may be reduced even further by technologies that are being commercialized in other sectors, or in passenger ferry applications elsewhere. These technologies include advanced diesel engines, improved emission control devices, fuel cells, and clean fuels.

Second, technologies that can reduce emissions from Tier 2 levels by 85%-98% are needed to make the air pollution impacts of ferry commutes lower than those from on-land commutes (assuming no net induced travel demand). This result makes sense in light of the fact that on-road transportation modes (especially the automobile) have become extremely clean in the last decade, with emissions reduction levels (relative to direct engine exhaust) of 98% or more. However, it also depends on many context-dependent factors such as landside commute options.

Third, this study suggests that the proper framework for considering ferry system expansion is one that balances competing social and private objectives in transportation planning and operation, including providing affordable and equitable military options, protecting the environment, and providing communities with the opportunity to prosper. Such an analysis is clearly beyond the scope of this report, but is necessary. Factors, such as the impact of induced demand reviewed here, demonstrate that it is not possible to reduce congestion in urbanized areas by increasing transportation system capacity by any method.

Fourth, in keeping with the above theme and providing a foundation of good planning techniques is taken as a given, it should be feasible to design and implement an enhanced ferry scenario to conform to regional mobility and air quality planning goals. Such a scenario could provide new high-occupancy mobility options, possibly at a lower subsidy per passenger than other transit options, and almost certainly at a lower cost than the total cost of new freeway lanes and structures within a congested urban commute shed. Advantages of ferry over highway building options stem from the right-of-way, environmental and construction costs associated with lane additions in congested areas. In addition, ferry service could be implemented in a much quicker time period, thus bringing mobility, access and socioeconomic benefits on-line much sooner.

Finally, the development and deployment of new technologies to accomplish these goals will require government action. Possible next steps in development of low-emission ferry technologies include: 1) the collection of more accurate data on in-situ emissions and duty cycles; and 2) demonstration projects for promising technologies. Following this, the

deployment of new low emission ferry technologies could be aided by performance-based incentive mechanisms that reward innovation and improved environmental performance.

The purpose of an EIR is to present sufficient information to the public, decision making agencies and members of the legislature to lead to a decision on a project which will best protect the environmental interests of the public. The public has a large interest in energy consumption.

Section 3.13.2.3 attempts to show the increase in total transportation energy consumed due to increased ferry use is negligible by aggregating all transportation energy and comparing the impacts of alternative levels of ferry service. This tends to conceal the actual approximate energy consumed by each transportation mode. Fortunately Table ENRG-A-1, in the appendix, partially clarifies this issue. This table shows the energy consumed per passenger mile, (Btu/PMT). This is a useful number for those entrusted to make transportation decisions. Unfortunately this table, which is part of a ferry EIR, does not include this information for ferries. However, there is sufficient information to calculate Btu/PMT by combining data from the appendix with data from section 3.13.2.3. We submit this calculation below:

Alt No.	Energy Mbtu/day w/ferries	Energy Mbtu/day wo/ferries	Energy Mbtu/day ferries	PMT/Day ferries	Btu/pmt ferries	Btu/pmt BART	Energy Ratio Ferry: BART	Btu/pmt Buses	Energy Ratio Ferry: Buses
	A	B	C	D	E	F	G	H	I
1	1,215,814	1,202,079	13,736	659,178	20,838	69.38	300.34	696.40	29.92
2	1,212,888	1,202,357	10,531	630,431	16,705	68.57	243.62	661.50	25.25
3	1,207,165	1,203,393	3,772	307,296	12,274	68.03	180.42	641.50	19.13
4	1,204,174	1,203,428	746	249,150	2,993	68.02	44.00	628.60	4.76

A is from the EIR page 3.13-4
B is from the EIR appendix, Tab_
C = A - B
D is from the EIR appendix, Table ENRG-A-3
E = C / D
F is from the EIR appendix, Table ENRG-A-1
G = E / F
H is from the EIR appendix, Table ENRG-A-1
I = E / H

The EIR further shows in ENRG-A-1 that for a car with 1.17 people consumes 5,321 Btu/PMT, or 6,226 for one person. This means that car pool car carrying three people consumes 2,075 Btu/PMT and ferries today consume less energy per person than a car with one person but more than a car with three people. However the EIR also shows that the Alternative with the smallest increase in ferry service being considered consumes about twice the energy per person mile as an auto with one person.

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Technology Overview

FarSounder's Technology Overview:

We at FarSounder believe that our products and technology are fundamentally different from any competing system on the market. While there are relatively established players in the sonar area, they are all selling conventional 1D and 2D systems, which can be forward-looking, but are not capable of providing depth information at navigationally useful ranges. FarSounder has several important differentiators:

- FarSounder's systems are true 3D – they provide range, bearing and depth. This is particularly important in shallow water, where the seabed itself becomes an object on the sonar display. FarSounder's systems give navigationally important information to mariners – allowing them to discern the bottom from other objects around them.
- FarSounder's Orca systems have a max range of 500 and 1000 meters or 25 water-depths (with potential for far greater distances), which considerably surpasses the competition. This allows a captain to view the range, bearing and depth at a far enough distance that he/she can change course in time to avoid obstacles or shallow water.
- FarSounder's systems are virtually real-time – they provide information every 1 to 2 seconds.
- The resolution provided by FarSounder's products is dramatically better than the competitors, thus making the information easier to read and shortening response time.

Learn about FarSounder's technology and marine sonars in general with the following white papers.

Active High Frequency Phased-Array Sonar for Whale Shipstrike Avoidance: Target Strength Measurements PDF file

by: Dr. James H. Miller (V.P Research and Development, FarSounder, Inc/Department of Ocean Engineering, University of Rhode Island)

David C. Potter (Northeast Fisheries Science Center, NOAA Fisheries)

Abstract: Ship-strike is a major cause of death for large whales For the northern right whale (Eubalaena glacialis) ship-strike is the leading cause of documented deaths. Forward-looking sonar provides one possible solution to this problem A forward-looking sonar could provide information to the ship operator about the presence and location of large whales ahead of a vessel. This paper documents two sea tests in which target strength data was collected for humpbacks (Megaptera novaeangliae) and for northern right whales Results are compared to previously published whale target strengths Blubber thickness and frequency are used in a reflection coefficient model to explain the differences between the previous results and those presented in this paper

A Basic Sonar Primer: 1D, 2D, and 3D Sonars, What is the Difference? PDF file

by: Dr. James H. Miller (V.P Research and Development, FarSounder, Inc)

Abstract. Discusses the difference between 1D, 2D and 3D sonars and how FarSounder's sonar technology is unique.

Farsounder, Inc.
165 Dean Knauss Drive
Narragansett, RI 02882
ph: (401) 788-3625 fax: (401) 788-0395
Email: info@farsounder.com

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Member, Board of Supervisors
District 10

City and County of San Francisco

SOPHIE MAXWELL
蘇菲妮亞(蘇菲)・馬克斯韋爾

EIR 140

October 18, 2002

Ms. Charlene Haught Johnson
President, Board of Directors
San Francisco Bay Area
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: WTA Implementation & Operating Plan

Dear Ms Johnson:

After many years, my constituents, who include the residents of the Bayview-Hunters Point (BVHP) community, are well on their way to helping to clean-up and create a new vibrant development at the former Hunters Point Shipyard (Shipyard). When completed, the new Shipyard will house 5000 residents, employ 10,000 workers, provide cultural and retail services including an unique and distinctive African Festival Marketplace which reflects San Francisco's rich cultural diversity and contains extensive parks and open space, all along the edge of the Bay. To meet these goals, I strongly believe that the BVHP community will need to have good transportation connections to overcome its geographical isolation and limited roadway access. Water transit is an essential element of the new Shipyard. Indeed, my work with the City and the designated developer Lennar/BVHP, as well as, the community at large, has anticipated a new ferry terminal, which will serve this need. I envision a system through which residents could travel to work along San Francisco's waterfront and to East Bay points, and workers and tourists from around the Bay could easily get to the Shipyard and the surrounding community. 1

I was dismayed to learn that the Shipyard has not obtained the priority treatment by the WTA that we believe it deserves. 2

From a planning point of view, the Shipyard is part of the Bay Area's "smart growth" initiative – sustainable in-fill development in an existing urban area. It goes without saying that the BVHP community has been economically disadvantaged. Thus, an initiative to provide water transit service to the Shipyard would help the Water Transit 3

City Hall • 1 Dr Carlton B. Goodlett Place • Room 244 • San Francisco, California 94102-4689 • (415) 554-7670
Fax (415) 554-7674 • TDD/TTY (415) 554-5227 • E-mail: Sophie_Maxwell@ci sf ca us

Authority (WTA) conform to the US Department of Transportation's "Environmental Justice" policies. Further, the Shipyard provides an ideal facility to address disaster preparedness, including helping to protect the well being of BVHP community residents in the event of a disaster. This site could also provide for a potential Park-N-Ride facility, reducing congestion on already crowded roadways, thus reducing the impacts of poor air quality in an already disadvantaged community. Finally, as a former Navy shipyard containing extensive equipment for maintenance of watercraft such as ferryboats, the WTA should encourage the construction and repair of new ferryboats at the Shipyard. This would create an economic and job stimulus in an area which is currently economically challenged. 3 4 5 6

I believe that your consideration of the Shipyard as a terminal location, will ideally meet the "Need Statement" that you have described in your environmental document: its use will reduce congestion; reduce transbay automobile trips; provide a relief point for accidents and natural disasters; and, increase transportation options for travelers. More specifically, in the BVHP community, it will provide transportation options for a low income minority community. 7

I strongly recommend that you consider the Hunters Point Shipyard as a first priority implementation project for the San Francisco Bay Area Water Transit Authority. 8

I am available to discuss my concerns at your convenience

Sincerely,

Sophenia Maxwell

OFFICE OF THE MAYOR
SAN FRANCISCO

WILLIE LEWIS BROWN, JR.

(EIR 141)

October 24, 2002

Ms. Charlene Haught Johnson
President, Board of Directors
San Francisco Bay Area
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: WTA Implementation & Operation Plan

Dear Ms Johnson:

It has been brought to my attention that the Hunters Point Naval Shipyard, located along San Francisco's southeastern waterfront, is not recommended for inclusion in the WTA ferry system as a location for a New Route. I think there are some compelling reasons that merit that the Hunters Point Shipyard receives further study in the WTA's Implementation and Operations Plan.

Over the last several years, the Bayview Hunters Point community and City officials have worked to create a Redevelopment Plan that will breathe new life to the 500-acre former Shipyard and stimulate much needed economic development for the community. I am pleased to announce that our hard work is beginning to bear fruit. As currently envisioned, the Shipyard redevelopment effort will result in at least 5,000 new residents and provide commercial and retail services employing 10,000 people, right at the water's edge. Environmental review for the Redevelopment Plan and the transfer of property from the federal government is complete and we anticipate that construction of this new community will begin as early as 2004. As such, I believe the Shipyard is a natural fit for inclusion in the WTA's plan for new terminals and routes.

The City of San Francisco is committed to making the Shipyard and the wider Bayview Hunters Point neighborhood a model for 21st century "smart growth." Accordingly, we've made a $500 million investment in developing the new 3rd Street Light Rail system, which will connect the Southeast sector to downtown San Francisco. As part of the Shipyard redevelopment effort, we intend to create new transit opportunities by increasing Muni service between the Shipyard and Light Rail stops. In addition, we will be extending the Bay Trail into the Shipyard and making other improvements that will create new pedestrian and bicycle connections between the Shipyard and other parts of the City and region. 1

Along with these transit improvements, the City has already received a $9.4 million federal grant to design a new bridge connecting the Shipyard to Candlestick Point and the 101 Freeway. With the planned Stadium/mall complex at Candlestick Point likely to generate a significant increase in ridership demand to the area, a Terminal and appropriately-sized park-and-ride facility at the Shipyard would help to significantly reduce congestion on the Bay Area's already congested roadways.

1 DR CARLTON B GOODLETT PLACE, ROOM 200, SAN FRANCISCO, CALIFORNIA 94102-4681
(415) 554-6141
RECYCLED PAPER

In addition, as a former Naval facility with extensive maritime infrastructure, I believe the Shipyard also has the potential to serve as a location for ferryboat construction and repair. The Shipyard would also be an good location for a disaster preparedness and emergency response facility serving Southeast San Francisco as well as residents of the South Bay.

For the last 150 years, San Francisco has been the hub of Bay ferry service and we remain committed to this important form of public transportation. San Francisco has also shown a strong commitment to transit-oriented development, the Shipyard being a prime example.

In summary, I urge you to raise the profile of the Shipyard in the WTA's Implementation and Operations Plan and to carefully consider our plans for the Shipyard and adjacent areas in analyzing at future demand for ferry service at this location. I've directed staff in the Mayor's Office of Economic Development to work with the WTA in this effort so that we can ensure that the Hunters Point Shipyard is given the highest possible priority.

1

Sincerely,

Mayor Willie L. Brown, Jr.

October 22,2002

EIR 142

Water Transit Authority
120 Broadway
San Francisco, Ca. 94111

Re: Draft IOP and Program EIR

To Whom It may Concern,

Thank you for all the hard work that went into the draft EIR for expansion of ferry transit service in the S.F. Bay area.

My husband and I strongly support expansion of an environmentally sound ferry service in the East Bay. 1

After the '89 earthquake, we depended upon and were happy to use the ferry service to Berkeley for our daily trips from S.F. It was a wonderful, relaxing experience and we regret that the service ended. 2

At that time, we were new to California, having lived all our lives in N.Y. We felt fortunate to be in this beautiful area, and were grateful for the ferry system that allowed us to fully enjoy this necessary daily excursion.

Sincerely,

Helen B. Canin

Helen B. Canin
201 University Avenue
Berkeley, Ca. 94710

October 22, 2002

Dennis Fay
Alameda CMA
1333 Broadway, Ste 220
Oakland, Ca. 94612

Re: Proposed Bridge Toll Increase for new Ferry Service

Dear Mr. Fay,

After the '89 earthquake, my husband and I depended upon, and were happy to use the ferry every day to come to Berkeley from S.F. It was a wonderful, relaxing experience and we regret that the service ended.

We strongly support expansion of an environmentally sound ferry service in the East Bay.

The S.F. Bay Area Water Transit Authority is now developing a plan to expand ferry service in the Bay area.

We support the $1.00 bridge toll increase, conditional on the Bridge Toll Advisory Committee including ferries in their priority list of projects for Alameda County.

Thank you for your consideration.

Helen B. Canin

Helen B. Canin
201 University Ave.
Berkeley, Ca. 94710

Cc: Sen. Don Perata
S.F. Bay Area Water Transit Authority

(EIR 143)

10/12/02

Dear Mr. Castleberry -

I am writing to comment on the draft IOP and EIR regarding "Expansion of Ferry Transit Service in the S.F Bay Area."

I oppose both proposed sites for a ferry terminal due to adverse impacts to birds in Eastshore State Park Area. At the Gillman St side, the large number of birds in the area would suffer due to dredging, ferry traffic and automobile traffic.

The Port Sonoma site would have non-mitigable impacts on the endangered Clapper Rail and all other water birds. A ferry terminal at a large tidal marsh is inappropriate. Ferry wakes prevent nesting. Even small recreational craft should be prohibited. Ferries are out of the question. 1

Ferry impacts to rafting ducks has not been adequately evaluated and are obviously harmful. Please don't approve the DEIR. 2

Thank you

Sincerely,
Myra Ulvang

Ms. Myra Ulvang
192 Seal Rock Dr. Apt. 2
San Francisco, CA 94121-1454

Tristan Bettencourt

From: keithstahnke@cs.com
Sent: Friday, October 25, 2002 9:03 AM
To: email@watertransit.org
Subject: IOP Comments

EIR 144

Below is the result of your feedback form. It was submitted by
(keithstahnke@cs.com) on Friday, October 25, 2002 at 09:03:09
---

email: keithstahnke@cs.com

Name: Keith Stahnke

IOP_Comments: Water Transit Authority
Dear Madam, Sirs

The operational issues for high-speed passenger vessels are unique and very different from ships or conventional ferries. The captains that operate these vessels on San Francisco Bay must be included
In navigational and safety planing. The already excellent safety record can be improved and the captain’s experience can be used to develop plans that will work in the real world. The captains are an obvious stakeholder but have not been consulted or surveyed by the WTA. Everyone agrees that safety is the top issue and it only makes sense to use the people that are out there everyday. It is in all of our best interest to make sure that the WTA creates the best transit system in the nation

1

2

Sincerely,
Keith Stahnke
Senior Captain Blue & Gold Fleet

SUBMIT: SEND COMMENTS

Water Transit Authority

IOP Public Hearing

Solano County

Vallejo

Thursday, October 17, 2002

Public Comment Session:

EIR 121

Joyce Sharp: I am not used to this formal presentation here. First of all I would like to say how pleased I am that there is going to be a way to get some of the congested traffic off of our freeways. I think it is a great idea. One of the things I would like to say, I have a little concern about it. It does not need to be addressed but wanted to make you aware of it. Vallejo is planning to build a LNG facility near Mare Island. How will the additional tankership traffic impact the Bay? The tankerships are 950 long, the draft is 38 feet and they will be making 3 trips a week to Mare Island. How will this impact the bay? How can you mitigate the dredging that will be required for the channels, the impact on navigation of ferry services, and impact of dredging to communities along the bay. What will the impact be on communities where the tankers will be delivering. I wanted to make you aware of this situation.

1

2

Ms. Johnson: Thank you very much. Katie Misner.

EIR 122

Katie Misner: Hi I am Kate Misner. I am going to talk a little bit about the LNG facility as Joyce talked about. LNG is liquid natural gas. There is a power plant proposed at the southern tip of Mare Island by Pepco and Shell. This proposal is estimated to supply CA with 1.3 billion cubic feet of natural gas per day. Gas will be shipped in liquid form in vessels coming from Indonesia, Asian and Eastern European countries. Ships will enter under Golden Gate Bridge and travel through the bay to Mare Island three times a week. It is estimated to take 12-24 hours to unload this stuff. The Coast Guard in the East Coast has mandated a security zone around these LNG vessels that are 2 miles forward and one

mile back and 1000 yards each side. Shell said if ferry service is affected they will not go forth with the project. But seems to me, and many folks in Vallejo, that this project will be detrimental to ferry service. A lot of people move to Vallejo because ferry service is fabulous, including me. I take it every working day. My question to WTA is, who has jurisdiction over shipping lanes and commercial shipping? If there is a conflict over LNG ships and ferry, does WTA have veto power to LNG shipping? Can anyone get back to me, or by email. I am not sure who in the bay oversees all this stuff

1&3

2

4

WTA: Do not know off the top of my head. Let us take your comment and we will see what we can find out.

Kate Minser: My email is on the card, you can use that to get back to me.

EIR 123

Ms. Johnson: Gail Ednoson Watkin.

Gail: Good evening. I also support the expansion of the ferry service. I would like to know more about the expansion plan specifically for the Vallejo ferry. As the slide shows, Vallejo is one of the areas that is proposed for further expansion for ferry service. Which I think is quite wise because we have had such significant growth in our area. And significant air pollution in Solano County and Vallejo is from the freeway. 93% of air pollution is from the freeway. So I support expansion of ferry service. I was also wondering when zero emissions might be, 2004, 2008, 2020. Not sure if waiting for answer or if this is for being recorded.

1

2

Also concerned about dredging of proposed project, especially by Mare Island and Carquinez Strait. Quite a lot of contamination and litter in area and concerned about disposal, hoping that we do not have wetland disposal of sediments. Also, would like to know when final comments are due.

3

Ms. Johnson: October 31. Dan Seltzer

EIR 123.5

Dan: Hi my name is Dan Seltzer. I am actually a former transit consultant of the firm Nelson Nygard. It is exciting to see three years later, after I did a little bit of work on the project when it was first coming out, that this project is moving forward. I too have a lot of hesitations and worries about the proposal for the LNG plant. The previous speakers have said everything I wanted to mention. 1

I do have a couple of concerns about proposed ferry service. Currently Vallejo ferry is stratified by income in terms of who rides it in comparison to who rides the Vallejo buses. I wonder if indeed people who are currently taking automobiles, especially single occupant vehicles, would in fact be moving over into the ferry system. My experience is that it rarely happens. Ferry often moves people off of other modes of transits. Another thing that has happened that you should be aware of if is that we have the casual carpool system. A lot of ferry riders have moved off the ferry service and unto the carpool system. Generally speaking, casual carpool is free for riders and the ferry system is 200 dollars a month. And I think for a lot of people that is too much money. Everyone should be thinking of these things. 2 3 4

EIR 124

Ms. Johnson: Thank you. David Dasidoff

David: I just have a couple of questions. You made comments about the reduction in smog. Is that a net decrease when you anticipate ferries would be operated as they presently do, with the technology you have? Would there still be a net decrease in smog levels as a result of a loss of vehicles on the freeway but with the gain of ferries in the water? 1

Who would operate the system? Would it be multiple or single operators? Who would oversee the logistics of overseeing the operators? 2

Ms. Johnson: Does anyone else wish to speak?

Steve Castleberry: Let me touch the ones I remembered to write down. Firstly, air quality reduction is emissions from the cars that aren't driving anymore balanced with emissions from the new ferries- the net difference between the two.

Public: Are you assuming the current technology? You are not assuming super clean ferries?

Steve Castleberry: No, we are assuming super clean ferries

The question on is who is going to operate it - It is important to know our legislation does not give us the authority to manage the Vallejo terminal. Exact details of how Vallejo will be managed is Vallejo's call. At this point we do not know who will operate them. There are a number of different operators and agencies that can do it. We are not even sure where some of these ferries are going to go. It is essentially premature to make these decisions.

Ridership studies- we were concerned about our shifts as well. In our ridership studies there is some shift between transit modes But the majority riders shift from highways. Commuter rail has had similar observation. They generally get people off of highways and that is what our studies show. The ferry barely takes any riders from AC transit, few from BART, and mostly from highways. People ask where are all these riders are coming from. Well, generally people living 2-5 miles from ferry terminal that are still riding their car. We are going after these people.

Zero emission - if I had a crystal ball and could accurately predict it but we don't know. Probably ten years down based on what technology we have today and the regulations that make technology change in the future. It's a little bit of chicken and egg, in that we think technology will happen sooner if people are interested in implementing it. We hope to help with that technology and bring it to the present.

Ms. Johnson: We did get a grant to design a zero emission vehicle, which we are implementing now. Someone is doing the design now. We don't have money in our pockets, but supposed to get. 1.5 million dollars from federal government and 1.5 million dollars from a Treasure Island developer. Most likely a smaller vessel would work best. It would not be a fast ferry, most likely go on a shorter run, San Francisco to Treasure Island. There is some money now and anticipated money to build it.

Public: When I studied access to Vallejo ferry, we found only 1-2 percent are getting to ferry other than driving. I am curious, With all these new proposed ferry terminals, what is the thinking of access to these ferries?

Steve Castleberry: Transit access to Vallejo is low. But if you look at all transit terminals, BART and other stations, the terminal that has the highest transit access, meaning the lowest driving access, is the Sausalito ferry terminal. Essentially everything is located within a 1-2 miles of the terminal in Sausalito. They have a healthy commercial area and shuttle service. We have done a fair amount of studying, and we could use the Sausalito model for other terminals. We hope to develop Sausalito in Alameda and Redwood City. It is a land use issue. We really want to make this work. Sausalito has a population of 20,000 -30,000 with 5,000 people taking mass transit a day. That is amazing.

Duplicate Sausalito experience in other areas. For instance, Alameda Point is a blank slate, a reuse site. Redwood City is the same story.

Public: You mentioned you were studying 39 types of alternative fuels you did not say which type you would be using on the ferries.

Steve: When we did the study we identified 4 different technologies that met criteria for lowering emissions. We put costs on those and today the most cost effective is a diesel-powered vessel with a catalytic converter. They lower emissions in the most cost-effective way. It is changing though. Fuel cells may become more cost effective. The

other ones we looked at were fuel cells, gas turban on diesel fuel and can not recall other ones.

Ms. Johnson: If you have more questions about fuel and other technologies you should speak with Ms. Culnane. She knows a lot about this, you can ask her.

Public: [Question about funding]
Steve Castleberry: Last spring the State Senate identified a potential need for increase in tolls to fund expanded transit. They selected a committee made up of bay area regional transit agencies, congestion agencies, and management agencies. And cast committee to develop expenditure plan to guide spending. The committee has been meeting since summer and considering different projects. The committee is in process of weighing through projects and making decisions. They hope to have a draft bill to initiate by January 2003.

Another source that doesn't exist yet, but is currently in the works is that the Feds have a program ferry boat discretionary fund just to fund ferry service. Alaska, Washington and New York get 25 million and everyone else fights over 13 million. The expanded San Francisco ferry service would be as big as these other ones and we would potentially get some of that money.

Adjourned.

STATE OF CALIFORNIA
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

PUBLIC HEARING ON DRAFT IMPLEMENTATION AND OPERATIONS PLAN -- SUNNYVALE	)

Monday
October 21, 2002

City Council Chamber
456 West Olive
Sunnyvale, California

The public hearing came to order at 7:00 p.m.

BEFORE: CHARLENE HAUGHT JOHNSON
President, WTA Board

STAFF PRESENT: TOM BERTKEN
Chief Executive Officer, WTA

LISA KLAIRMONT

P R O C E E D I N G S

(Whereupon, a staff presentation was given.)

(Whereupon, public comment was invited.) EIR 125

MS. MILLER: Julia Miller.

I just want to compliment you on the presentation this evening. It's very informative. I'm just disappointed our audience is so slight.

Just speaking to the south bay portion of this plan, could you speak to the time frame of that? I'm assuming that Moffett field would be in plan B, and if where if total build-out is 2025, when would Moffett -- 1

MR. BERTKEN: Actually the build-out is 2015. Our plan is only a 10-year plan, it goes from 2005 to 2015. So, and it could be that any additions or revisions to our plan, as I mentioned, we'll be doing it on a regular basis, probably on a, at least, on a two-year basis where we'll be looking at the development that's going on in the various areas.

So it doesn't mean that this plan is not a fixed plan in the sense that it's a -- it's basically a constant plan for improving and expanding the ferry system. But it is also a living document. There's a lot of changes that go on in the bay and as those changes are recognized by the

various regional agencies they will also be recognized by us and potential improvements be done at any time during that time.

MS. MILLER: Tom, if the San Francisco bay area should win the 2012 Olympics, do you see this living document accelerating? 2

MR. BERTKEN: I'm sure that that could have an effect, right.

MS. MILLER: In regard to the Moffett potential facility, I understand that the ridership numbers aren't projected at a great number, and I believe that's because you haven't included what the City of Sunnyvale is working on, and it's Moffett park specific plan. Has staff given you that input at all? 3

MR. BERTKEN: I think that we have; I'm not really sure. The point being though is that in order for us to redo the forecasting using the MTC model we basically have to look at what the regional model has recognized, the regional land use models have recognized.

As you know, the -- as an individual area, may develop faster than they have in their plan right now, it means that some other region that isn't developing as quickly would probably, would have to give up jobs and so on

like that, because there's an overall regional forecast that still has to maintain as the regional forecast.

So when new jobs come in in one place that weren't planned for, then jobs have to be -- they have to look and see where those jobs are not happening someplace else.

MS. MILLER: My concern is that the redevelopment of the Moffett federal airfield into a world-class research and development project with their additional housing and jobs were not included in the ridership, as are Juniper Networks, redevelopment of about 90 acres that were previously owned by Lockheed-Martin. And I think that would significantly alter those numbers. 3

MR. BERTKEN: Well, we'll be looking at those, as I say, as we continue to look at and update the plan.

MS. MILLER: Great. Well, thank you for coming to Santa Clara county tonight.

MR. BERTKEN: Thank you.

MS. JOHNSON: Thank you.

EIR 126

Jennifer Gunderson.

MS. GUNDERSON: Good evening.

MS. JOHNSON: Good evening.

MS. GUNDERSON: My name is Jennifer Gunderson, and I represent the Moffett park business and transportation 1

association. We are an employer-based organization in Moffett park which is directly adjacent from Moffett field and we represent about 10 companies, nine of whom are not here tonight, but we just had a meeting today and discussed this in detail. 1

And I would like to say that we do support the plan, so we hope that it is approved and goes forward.

One point that I would specifically like to make is that we definitely emphasize and advocate for the Water Transit Authority continuing to study the Moffett field terminal. I believe Julia actually spoke to several points that I was going to say, but our companies actually do have their corporate headquarters there and as they continue to develop and grow, we believe that the membership or the -- excuse me, the ridership numbers that you have predicted currently will increase by, I don't know, but a lot, I can guarantee that. 2

So we would definitely hope that you continue to look at that seriously.

MS. JOHNSON: Thank you very much.

(Staff confer.)

MS. JOHNSON: Oh, I didn't realize we had the mayor here, Mayor Fowler.

EIR 127 6

MR. FOWLER: Right here.

MS. JOHNSON: Hi, how are you. Thank you for coming. Would you like to say something?

MR. FOWLER: Thank you. I hadn't really planned on saying anything, but I'll lend my support to the vice-mayor and also to the director of the business and transportation association. We see Sunnyvale as being really a center of new development, because we've had business folks tell us that we're in the middle of several large circles that are drawn in the area. Basically they are circles about near radiuses of concentration of high-tech professionals, concentrations of housing where executives could find places to live.

And basically what that means is that part, some of the hottest real estate property in this part of the world is in Sunnyvale. We're in a downturn right now; that downturn probably won't last forever, and we are currently trying to plan ahead in order to shape the development that we believe will happen the next time the economy starts to heat up again. 1

So I would urge you to make sure that your plans include a contingency that would recognize all that development, because to me it makes perfect sense that water

transit could be a way for people to get into the Moffett park area without having to fight their way down all the congested freeways and other transportation modes that exist. 1

So I just urge you to make sure that that's not overruled by any decision that you make in the short term.

And thank you very much for having your meeting here in Sunnyvale. I do appreciate it when regional bodies come to our town to have these meetings. Thank you.

MS. JOHNSON: You're welcome.

We'd love nothing better than to put a ferry terminal down there, so as soon as these numbers ring out, well, you're in.

MR. FOWLER: All right.

MS. JOHNSON: Anybody else have a comment about the plan or about our environmental impact report, statement?

Okay, we will -- I think that slide over, I can't exactly read it, but I think it gives addresses if you have comments; written comments, we will accept them on the EIR and on the implementation and operations plan through October the 31st.

And if no one else is going to speak, well, if no

one's going to speak, we're going to adjourn the meeting.

Thank you very much for coming.

(Whereupon, at 7:43 p.m., the public hearing in the above-entitled matter was concluded.)

C E R T I F I C A T E

This is to certify that the attached proceedings before the State of California, San Francisco Bay Area Water Transit Authority, in the matter of Public Hearing on Draft Implementation and Operations Plan -- Sunnyvale, were held on Monday, October 21, 2002, in Sunnyvale, California, as therein appears, and that this is the original transcript thereof for the files of the State.

/S/ Kent Andrews

KENT ANDREWS

Official Reporter

Date: 10/22/2002

California Shorthand Reporting
415/457-4417

Tristan Bettencourt

Sent: Wednesday, October 23, 2002 12:01 PM
To: email@watertransit.org
Subject: IOP Comments

EIR 128

Below is the result of your feedback form. It was submitted by
() on Wednesday, October 23, 2002 at 12:01:01

Name: ED Hollomon

IOP_Comments: I endorse the ferry system and would like to ride a ferry all over the Bay Area at little or no cost. 1

SUBMIT: SEND COMMENTS

Tristan Bettencourt

Sent: Wednesday, October 23, 2002 12:05 PM
To: email@watertransit.org
Subject: EIR Comments

EIR 128

Below is the result of your feedback form. It was submitted by
() on Wednesday, October 23, 2002 at 12:04:37

Name: Ed Hollomon

EIR_Comments: I endorse the use of ferry's around the San Francisco Bay. I would like to see the use of hydo boats on the Bay for rapid movement and a safe for the fish.] 2

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: gjohnson@co.marin.ca.us
Sent: Wednesday, October 16, 2002 12:31 PM
To: email@watertransit.org
Subject: WTA Feedback

EIR 129

Below is the result of your feedback form. It was submitted by
(gjohnson@co.marin.ca.us) on Wednesday, October 16, 2002 at 12:31:09
---

email: gjohnson@co.marin.ca.us

Name: Gwen Johnson

WTA_Comments: Re: Low-emission ferry. I understand that the new ferry design has settled on a super efficient diesel engine. Has bio-diesel been considered as a fuel for the ferry? While you would be paying a premium for the fuel (distributors pay ~$2 per gallon per barrel) biodiesel is said to have 80% less carbon dioxide emissions (and almost no NOx, SOx) than regular diesel. 1

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: John_Davey@sfport.com
Sent: Thursday, October 17, 2002 8:14 AM
To: bettencourt@watertransit.org; sanchez@watertransit.org; morrison@watertransit.org; email@watertransit.org
Cc: denise_turner@sfport.com; peter_dailey@sfport.com; Kari_Kilstrom@sfport.com; Kirk_Bennett@sfport.com; nieret_mizushima@sfport.com; Diane_Oshima@sfport.com; Dan_Hodapp@sfport.com
Subject: CLARIFICATION: IOP comments Port SF Maritime Dept.

EIR 130

Regarding my third comment on Home Port/Husbandry facility." Location adjacent to the main hub" at the ferry building was not best choice of words. I do not believe there is room nor appropriate use at the Ferry building. My intention was that the facility s/b located on the SF side of the Bay, possibly somewhere in the southern waterfront to include Hunters Point. This logistically makes sense from the aspect of shorting dead head runs while bringing vessels into the service routes. 1

I've also met with Port Planning and we are preparing a letter outlining our vision for the ferry building, plaza,terminals and commitments that will serve to strengthen our coordination with the WTA. You should recieve by 10/31/02.

thank you.

----- Forwarded by John Davey/SFPORT on 10/17/02 07:53 AM -----

John Davey
10/16/02 12:08 PM

To: bettencourt@watertransit.org, sanchez@watertransit.org, morrison@watertransit.org, email@watertransit.org
cc: denise_turner@sfport.com, peter_dailey@sfport.com, Kari Kilstrom/SFPORT@SFPORT, Kirk Bennett/SFPORT@SFPORT, nieret_mizushima@sfport.com
Subject: IOP comments Port SF Maritime Dept.
(Document link not converted)

After review of your IOP I submit the following comments on behalf of the Port of San Francisco Maritime Department. Our Planning Department is reviewing separately and will forward their comments directly.

First I would like to commend the WTA Staff on a very thorough report. The sections on Demand, Route, Riders and all of your work on vessels, fuels and emissions provide data and recommendations that the Port finds very useful. I do not have any additions or comments in that regard.

My first comment is related to the environmental aspects of the system. This might be of a detail that you did not wish to drill down to in this report however I suggest its inclusion would underscore the commitment to the environment.

Each terminal/float should be fitted with a system to pump off gray water and sewage from the vessels and connect directly to the local sewer system.

My second comment relates both to the environment and emergency preparedness.

Each terminal should be fitted with an emergency power supply capable of providing power for the entire Terminals' lighting and mechanical requirements. This power supply should make use of renewable sources such as solar ,wind and clean fuel generation. A wind generator (were conditions permit) could become a signature design element of terminal design and signal the WTA commitment to the environment.

My last comment concerns an area I do not find addressed in the IOP and is fundamental.

Vessel Husbandry- Home Port Facility.
While the location(s) need to be studied, location adjacent to the main hub in San Francisco makes logistical sense.
Lay berths for idle vessels and maintenance need to be provided.
Centralized dispatch and control for the vessels . Scheduling and security for the floats system wide.
Crew ready rooms, training rooms, maintenance shop , administrative offices and meeting rooms.
Fuel Dock, capable of above ground storage of multiple fuels and lubes. This fuel dock could also serve other commercial users providing it with a secondary income and volumes to achieve lower fuel costs.

This home port facility assumes the centralized management of the ferry services. Should the system evolve with a more decentralized emphasis the need for lay berths / maintenance docks will remain features that must be added to terminal developments. Currently maritime fuel dock facilities are deficient in San Francisco Bay. Given the fleet envisioned and alternative fuels suggested, the WTA could be poised to fill that deficiency.

regards

John Davey, Deputy Director of Maritime
Port of San Francisco
415 274-0522 fax 544-1722

Tristan Bettencourt

From: colleen.luethje@barclaysglobal.com
Sent: Friday, October 18, 2002 8:05 AM
To: email@watertransit.org
Subject: IOP Comments

EIR 131

Below is the result of your feedback form. It was submitted by
(colleen.luethje@barclaysglobal.com) on Friday, October 18, 2002 at 08:05:06

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email: colleen.luethje@barclaysglobal.com

Name: Colleen Luethje

IOP_Comments: As a ferry rider from Vallejo, I am enthusiastic about the plan to add more ferry routes and service to the bay. It is a great way to commute and it greatly reduces traffic and stress. [1] Is the WTA aware of the proposed LNG facility on Mare Island that Bechtel and Shell want to foist on the Bay Area? [2] If the facility is approved, it would negatively affect water transit as the tankers carrying LNG (from Indonesia and other terrorist-plagued nations) need a wide clearance zone where no other water traffic is permitted as they travel under the bridges and across the bays. [3] The majority of the citizens of Vallejo do not want the facility to be built but it seems our protests are falling on deaf ears. The support of the WTA for the defeat of this project is needed, otherwise your transit plan could be all for naught. [4]

SUBMIT: SEND COMMENTS

Tristan Bettencourt

EIR 132

From: amiller@hrblaw.com
Sent: Friday, October 18, 2002 9:54 AM
To: email@watertransit.org
Subject: IOP Comments

Below is the result of your feedback form. It was submitted by (amiller@hrblaw.com) on Friday, October 18, 2002 at 09:54:26

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email: amiller@hrblaw.com

Name: Andy Miller

IOP_Comments: I have been a regular passenger on, and enthusiastic supporter of, Vallejo Baylink Ferries since moving from Mill Valley to Vallejo 30 months ago. Because my daily commute to San Francisco would be intolerable without the ferry, I am writing to seek information regarding the possible implications on ferry service of the LNG terminal and power plant that Shell and Bechtel contemplate building at the western end of Mare Island.

I have heard from various sources that Coast Guard regulations mandate that a rather substantial minimal distance (in the order of 1,000-2,000 yards) be maintained between loaded LNG tankers and other commercial marine traffic. Related regulations supposedly require that a lesser minimum distance be maintained when such tankers are berthed -- something in the order of 200-300 yards. At public briefings before the Vallejo City Counsel, I have heard projections of three LNG tankers off-loading at the proposed terminal each week. These tankers apparently take some 12 hours to off-load their cargo.

If my understanding of the above matters is remotely close to the truth, the effect on the Vallejo-San Francisco commute would be disastrous. Ferry service would necessarily be suspended for at least a portion of the day several days each week, necessitating travel by other means -- car, bus, or BART. To many of us who travel (and work) on the ferry, these are terrible alternatives. There is no way I could consider remaining in Vallejo if I could not commute by ferry. Many of my fellow commuters feel the same way.

I would greatly appreciate something more authoritative than the second- or third-hand intelligence on which many of the above concerns are based. Although I oppose the proposed LNG terminal and power plant for many reasons -- environmental, aesthetic, economic, emotional -- beyond its potential impact on ferry service, I nevertheless value the kind of objective analysis I would hope the WTA can provide. Accordingly, please let me know whether the WTA has conducted an appraisal of the potential effects of the LNG plant on ferry traffic (to and from Vallejo, as well as other existing and contemplated routes in the North Bay). If you can point me to any literature or statutory authority bearing on these matters, I would be grateful.

1

Thank you for your attention. I look forward to hearing from you, either at my home address (below), by reply e-mail, or by phoning my direct line at work: 415-403-8805.

Very truly yours,

Andy Miller
845 La Canyada Drive
Vallejo, CA 94591

SUBMIT: SEND COMMENTS

Tristan Bettencourt

EIR 133

From: steve.schnaidt@sen.ca.gov
Sent: Friday, October 18, 2002 12:27 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(steve.schnaidt@sen.ca.gov) on Friday, October 18, 2002 at 12:27:23
---

email: steve.schnaidt@sen.ca.gov

Name: Steve Schnaidt

WTA_Comments: Veronica Sanchez, Manager
Community and Government Relations

Dear Veronica: Thank you for your update and draft water transit IOP. I'll look forward to seeing the final plan to be submitted to the Legislature later this year.

I noted in the draft plan, page 8, a quote from Senator Torlakson identifying him as Chairman of the Senate Transportation Committee, Senate Select Committee on SF Bay Area Transportation. That is inaccurate. Senator Kevin Murray chairs the Senate Transportation Committee (the Senate's standing committee on transportation) and Senator Torlakson chairs the Senate Select Committee on Bay Area Infrastructure. These are important distinctions and should be corrected in any future publications. 1

Thanks for your attention to these matters.

Sincerely,
Steve Schnaidt
Staff Director, Senate Transportation Committee

SUBMIT: SEND COMMENTS

Tristan Bettencourt

EIR 134

From: beniciabear@aol.com
Sent: Monday, October 21, 2002 12:35 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by (beniciabear@aol.com) on Monday, October 21, 2002 at 12:34:40

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email: beniciabear@aol.com

WTA_Comments: I am extremely disappointed that Benicia was not selected as a potential ferry location because I understand that more than 15% of the Vallejo Baylink ferry commuters are from Benicia. How much did good old boy politics impact these other locations??

1

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: bmickeln@ispwest.com
Sent: Monday, October 21, 2002 8:25 AM
To: email@watertransit.org
Subject: IOP Comments

EIR 135

Below is the result of your feedback form. It was submitted by
(bmickeln@ispwest.com) on Monday, October 21, 2002 at 08:24:53
---

email: bmickeln@ispwest.com

Name: brian mickel

IOP_Comments: I would like to add to your study by pointing out the massive disruptions and inconvienience of LNG tankers being brought into the Bay to Mare Island, and to ask that you openly and publicly oppose such tankers being routed through the bay if you expect us (citizens) to actually consider and support your ferry enhancements. I love the ferry system and would like to see it expanded but I will not be using it or very supportive if LNG tankers are brought through the bay. 1

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: clairesiverson@juno.com
Sent: Sunday, October 20, 2002 11:25 PM
To: email@watertransit.org
Subject: IOP Comments

EIR 136

Below is the result of your feedback form. It was submitted by
(clairesiverson@juno.com) on Sunday, October 20, 2002 at 23:25:14
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email: clairesiverson@juno.com

Name: Claire Siverson

IOP_Comments: The IOP plan for creating safe, economical, ample and environmentally sound ferry service in the SF Bay sounds good.

As a resident of Vallejo and routine (and satisfied) ferry commuter to San Francisco, I am very concerned about the proposed Liquified Natural Gas (LNG) Plant that may be built if the Mayor and City Council approve of it. If huge tankers transport the LNG to Vallejo on a daily basis how will you implement your ferry plans? How will current ferry service continue? 1

Personally, I'm strongly opposed to the LNG plant in Vallejo for a variety of reasons. I hope that the WTA is actively learning about the LNG plans for Vallejo and I urge the WTA to take a stand against this plant. 2

Thanks for your time.

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: akestrl@aol.com
Sent: Sunday, October 20, 2002 4:50 PM
To: email@watertransit.org
Subject: IOP Comments

EIR 137

Below is the result of your feedback form. It was submitted by
(akestrl@aol.com) on Sunday, October 20, 2002 at 16:49:38
---

email: akestrl@aol.com

Name: Joan M. Ferguson

IOP_Comments: I believe that LNG tankers in the Bay will be detrimental to ferry services. 1
Ferry service on the Bay Area waters are & will enhance commuter choices. 2

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: Aquus@att.net
Sent: Saturday, October 19, 2002 12:28 AM
To: email@watertransit.org
Subject: IOP Comments

EIR 138

Below is the result of your feedback form. It was submitted by (Aquus@att.net) on Saturday, October 19, 2002 at 00:28:20

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email: Aquus@att.net

Name: David Fisher

IOP_Comments: I'm a concerned Vallejo citizen and very worried about the potential harm that an LNG facility would create at the end of Mare Island and in the Carquinez strait. I largely moved to Vallejo from San Francisco because of the Ferry and am very much in favor of its unobstructed proposed expansion. Ferry's help elliminate cars and are much more in keeping with our Bay oriented life and will help with traffic and environmental issues cause by this suburban expansion! I highly recommend a new proposal to connect them with a northbay rail system and parking facility for Sacramento and Fairfield-Vacaville neighbors by Marine World and connect them by rail to the ferry. 1 2

Bechtal/Shell would have us believe there is no issue here, but current LNG facilities are issues for bridges and maritime traffic and under jurisdiction of the Coast Guard. How will this affect us? 3

SUBMIT: SEND COMMENTS

Tristan Bettencourt

EIR 139

From: Katy Miessner [katym@mindspring.com]
Sent: Friday, October 18, 2002 12:32 PM
To: email@watertransit.org
Cc: tshore@bluewaternetwork.org; Mayor@ci.boston.ma.us; damayor@sfgov.org
Subject: Liquefied Natural Gas (LNG) shipping and detriment to Bay Area ferry rouDan Genova <gayanilo@hotmail.com>tes and maritime traffic
Importance: High

Ms. Charlene Haught Johnson, WTA Board President
Mr. Anthony Withington, WTA Board Member
Hon. Anthony J. Intintoli, Jr., Mayor of Vallejo, CA and WTA Board Member
Mr. Steve Castleberry, Manager, WTA System Planning
Ms. Lisa Klairmont, WTA Executive Manager and Secretary of the Authority
Bay Area Water Transit Authority (WTA)
120 Broadway
San Francisco, CA 94111

CC: Hon. Willie Brown, Mayor of San Francisco, CA
Hon. Thomas M. Menino, Mayor of Boston, MA
Ms. Teri Shore, Fast Ferries and Ship Emissions Director, Blue Water Network

Re: Liquefied Natural Gas (LNG) shipping and detriment to Bay Area ferry routes and maritime traffic

Dear Madams and Sirs:

Thank you so much for presenting the Bay Area Draft Implementation and Operations Plan (IOP) for Solano County last night. It is an exciting plan and one that Vallejo and Solano County as well as the Bay Area can truly benefit from. It will provide a greater link to other Bay Area Cities and will expand job opportunities for residents in Solano County.

As I stated during last night's meeting, there is a serious threat in the Bay to ferry service, and that is the proposed Liquefied Natural Gas facility on Mare Island that the partnership of Bechtel and Shell want to build. The gas to supply this facility will be shipped from overseas, most likely from Indonesia, as well as other Asian and Eastern European countries. LNG tankers will come into the Bay an estimated 3-5 times per week, and take 12-24 hours to unload their cargo into storage tanks to be built on Mare Island. It is predicted that Bay maritime traffic will be disrupted by militarized buffer zones around these LNG tanker ships as is currently required in Boston.

In Boston, LNG Tankers the length of three football fields travel in a huge moving safety zone in which no other maritime traffic is permitted. The US Coast Guard requires this safety zone of two miles ahead, one mile behind and one thousand yards on either side of the ships. It is believed that the US Coast Guard will treat the West Coast no differently than Boston and require a similar security zone for any LNG tanker ships in the Bay.

1

This LNG proposal could devastate Vallejo's ferry service, as the ferries pass only yards away from the end of the proposed LNG unloading terminal. This security zone could shut down all maritime traffic going into and out of the Mare Island Straight and the Napa River. Because these ships will travel under the Golden Gate and Richmond bridges through the Bay to Vallejo, they will also impact all Bay maritime traffic, including recreational and commercial boating and shipping, windsurfing and Bay ferry services.

Time to investigate this matter is of the essence. As was illustrated by incidents in Boston, once these ships are allowed to travel in the Bay, Bay Area communities, including the city of San Francisco will lose the ability to control LNG shipping traffic. After 9-11, the Mayor of Boston and the Boston Fire Chief

chose to halt LNG shipping through Boston Harbor to a facility located in Everett, MA. Federal authorities overruled the city of Boston's decision and so LNG tanker ships continue to travel through Boston Harbor, against the wishes of the Mayor and Fire Chief. 1

My question to the WTA is, if there is a conflict between these LNG tanker ships and Bay ferry and other Bay Maritime traffic, what veto power, if any does the WTA have over proposed LNG shipping? What jurisdiction, if any, does the WTA have over commercial shipping and coordination of shipping lanes in the Bay? If the WTA does not have authority over commercial shipping, is there a local and/or state agency that I can be referred to that does have this authority? 2 3

Please feel free to contact me by phone or email if you have any additional questions regarding this matter.

Sincerely,

Katy Miessner
135 Scenic Way
Vallejo, CA 94590-3071
707 642 2100

Friends of the Albany Ferry

1393 Solano Avenue, #B, Albany, CA 94706

Phone & Facsimile: 510/559-9119

EIR 107

October 14, 2002

Water Transit Authority
Draft IOP and Program EIR
120 Broadway
San Francisco, CA 94111

To Whom It May Concern:

On behalf of the Friends of the Albany Ferry, we would like to say that the hard work of the WTA staff and consultants has paid off in the Draft EIR for Expansion of Ferry Transit Service in the San Francisco Bay Area as well as the Implementations and Operations Plan. The Reports are remarkably thorough in their study of the impacts of expanded ferry service in the Bay. A delicate balance of competing visions and interests has been well addressed, and produced a Plan that will add an important new asset to our area's congestion management resources. 1

Ferry service is a necessary addition to our urban waterfront. Given the proximity to urban development, it is obvious that successful ferry and traffic will be one of the most important planning issues for the future of this region. Ferries are also necessary for disaster preparedness in our region and will do much to enhance our East Bay recreational connections to other parts of the San Francisco Bay, such as Golden Gate National Recreation Areas. 2

Because of the need for ferry service in the Albany/Berkeley area, it is anticipated in many Berkeley and Albany policies. Not surprisingly, WTA studies indicate that a new terminal somewhere along the Berkeley/Albany waterfront would be a top-priority, Tier I site. They estimate that by 2025 approximately 3000 riders could be using this ferry service every day. Consequently, it was encouraging to see that expanded ferry service in the Bay has practically no negative impacts and can be mitigated with new technologies and/or route adjustments. An environmentally sound ferry service in the Bay, which provides affordable water transit, is absolutely essential for traffic management in our near future. 3

Congratulations on a balanced and sensitive approach to expanded ferry service that will satisfy the vast majority of likely users very well!

Sincerely,

Jerri Holan, Captain
Friends of the Albany Ferry

Friends of the Albany Ferry

1393 Solano Avenue, #B, Albany, CA 94706

Phone & Fax: 510.559-9119

October 14, 2002

Dennis Fay
Alameda CMA
1333 Broadway, Ste. 220
Oakland, CA 94612

RE: Proposed Bridge Toll Increase for new Ferry Service

Dear Mr. Fay:

The WTA is seeking to fund new ferry routes out of a proposed $1.00 toll increase to state-owned bridges. This letter is to urge you to include capital and operating funds for new regional ferry service in the California Senate Select Committee on Transportation's Bridge Toll Expenditure Plan. On behalf of the Friends of the Albany Ferry, we request that Alameda's representative to the Bridge Toll Advisory Committee include ferries in their priority list of projects for Alameda county, especially the much anticipated route to the Berkeley/Albany waterfront.

As you probably know, Berkeley and Albany rank highest in ridership demand for new ferry service. Both of these cities support ferry service because it would help relieve congestion along the very-congested I-80 corridor. Not surprisingly, WTA studies indicate that a new terminal somewhere along the Berkeley/Albany waterfront would be a top-priority, Tier 1 site. They estimate that by 2025 approximately 3000 riders could be using this ferry service every day. Consequently, it was encouraging to see, in the WTA's Draft EIR, that expanded ferry service in the Bay has practically no negative impacts and can be mitigated with new technologies and/or route adjustments.

Furthermore, creating a water transit system that includes Berkeley and Albany is a smart transportation investment and is sound planning for future disasters or emergencies that will almost certainly close bridges and roads.

Thank you for supporting ferries. We believe they are the wave of the future.

Sincerely,

Jerri Holan, Captain
Friends of the Albany Ferry

cc: Chair, Alameda CMA
Sen. Don Perata
San Francisco Bay Area Water Transit Authority

Alameda/Oakland Ferry Service

September 18, 2002

SCHEDULE CHANGE

Beginning Monday, September 30, the 7:40 a.m. Oakland and 7:50 a.m. Alameda weekday departures will be discontinued. This schedule change is part of an expense reduction plan adopted last Winter.

The 7:40/7:50 a.m. departures are financially viable only when associated crew costs are shared with the 10:00, 11.20 a.m. and 12 40 p.m. Blue and Gold Fleet bay cruises. Those cruises are seasonal and will be discontinued September 30.

We apologize for any inconvenience resulting from the schedule change. If you have questions or comments regarding this issue please contact Andy Anderson at panderso@ci.alameda.ca.us or at (510) 749-5837.

Sincerely,

Ernest Sanchez

Ernest Sanchez
Ferry Manager

EIR 108

WTA - HERE WE ARE TALKING ABOUT ALL THIS INCREASED FERRY SERVICE AROUND THE BAY AREA OVER THE NEXT 20 YEARS + THEY GO AND CANCEL MY FERRY + RAISE THE TICKET PRICE BY $2.25 PER RIDE FOR THE REMAINING RUNS. DOESN'T LOOK GOOD FOR THE FUTURE. 1

-DANIEL HOY
STEVENS + ASSOCIATES
415.397.6500

Tristan Bettencourt

From: John_Davey@sfport.com
Sent: Wednesday, October 16, 2002 12:09 PM
To: bettencourt@watertransit.org; sanchez@watertransit.org; morrison@watertransit.org; email@watertransit.org
Cc: denise_turner@sfport.com; peter_dailey@sfport.com; Kari_Kilstrom@sfport.com; Kirk_Bennett@sfport.com; nieret_mizushima@sfport.com
Subject: IOP comments Port SF Maritime Dept.

EIR 109

After review of your IOP I submit the following comments on behalf of the Port of San Francisco Maritime Department. Our Planning Department is reviewing separately and will forward their comments directly.

First I would like to commend the WTA Staff on a very thorough report. The sections on Demand, Route, Riders and all of your work on vessels, fuels and emissions provide data and recommendations that the Port finds very useful. I do not have any additions or comments in that regard.

My first comment is related to the environmental aspects of the system. This might be of a detail that you did not wish to drill down to in this report however I suggest its inclusion would underscore the commitment to the environment. 1

Each terminal/float should be fitted with a system to pump off gray water and sewage from the vessels and connect directly to the local sewer system.

My second comment relates both to the environment and emergency preparedness. 2

Each terminal should be fitted with an emergency power supply capable of providing power for the entire Terminals' lighting and mechanical requirements. This power supply should make use of renewable sources such as solar ,wind and clean fuel generation. A wind generator (were conditions permit) could become a signature design element of terminal design and signal the WTA commitment to the environment.

My last comment concerns an area I do not find addressed in the IOP and is fundamental.

Vessel Husbandry- Home Port Facility.
While the location(s) need to be studied, location adjacent to the main hub in San Francisco makes logistical sense. 3
Lay berths for idle vessels and maintenance need to be provided. 4
Centralized dispatch and control for the vessels . Scheduling and security for the floats system wide. 5
Crew ready rooms, training rooms, maintenance shop , administrative offices and meeting rooms. 6
Fuel Dock, capable of above ground storage of multiple fuels and lubes. This fuel dock could also serve other commercial users providing it with a secondary income and volumes to achieve lower fuel costs. 7

This home port facility assumes the centralized management of the ferry services. Should the system evolve with a more decentralized emphasis the need for lay berths / maintenance docks will remain features that must be added to terminal developments. Currently maritime fuel dock facilities are deficient in San Francisco Bay. Given the fleet envisioned and alternative fuels suggested, the WTA could be poised to fill that deficiency. 8

regards

John Davey, Deputy Director of Maritime

Port of San Francisco
415 274-0522 fax 544-1722

David Clark

EIR 110

October 15, 2002

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: **Comments on Draft Implementation and Operations Plan (IOP)**

Dear Mr. Bertken:

The Water Transit Authorities Draft Implementation and Operations Plan (IOP) is certainly an impressive document. It portends a useful and exciting new potential for water transit in the Bay Area, and the Golden Gate Bridge, Highway and Transportation District looks forward to working with your agency to facilitate this beneficial new transportation system in future years.

We do have concerns with a number of technical aspects of the IOP, though, and the following comments are offered in a constructive and positive manner:

1. The IOP mentions that the cost-per-rider of the WTA service will be higher than existing ferry service due to three reasons (page 16):
    a. New emissions monitoring protocol – we believe that the IOP should more clearly state that emissions produced by existing operators should be "grand fathered" to allow existing boats and their respective power plants to remain in service for the life of the equipment. 1
    b. Planning and implementing good connections with other transit – this is certainly a critical component of the WTA IOP and we applaud your follow-up to the enabling legislation in this area. Coordinating such connections with multiple agencies is a complex task, and we would suggest that a more definitive description of what staff will be devoted to this activity be more thoroughly described in the IOP. 2
    c. Acquiring new riders who are not as readily inclined to ride transit – this is an essential element of success but not much detail regarding the potential marketing strategy is offered in the IOP. We would suggest that a more detailed description of how the WTA intends to introduce the new system to the public and maintain the projected utilization rates be included in the IOP. 3
2. On page 30 of the IOP it is stated that a ferry terminal and parking facility is "not the highest and best use" – many would argue that this is a value judgment and that in fact those who rely on their ferry service for basic daily transportation would consider this use "highest and best". You may want to reconsider the phrasing of this paragraph. 4
3. The IOP mentions that the new ferries will be affordable and yet they will be ten times cleaner than existing vessels (page 38). This is a worthy goal but the technology and certifications to make this happen are at this point remain unproven on this class and speed of vessel. We suggest you consider the following relative to this point:
    a. Is the R & D funding required to develop ferryboats this clean fully provided for in the WTA plan? 5

b. What future impact will this position have on the ability of other operators to secure funding for new vessels and vessel refurbishment? We would ask that there be mention of the fact that if such goals are not achievable in the first phases of your operation an alternative timeline for emissions reduction performance be established. 6

c. We would further suggest that, depending on the feasibility and cost for the final specified equipment, an analysis of the cost/benefit ratio of such equipment be referenced. 7

d. As mentioned above, the existing vessels should be "grand fathered" so they can utilize existing propulsion plants for the life of the vessel? It would likely prove infeasible to install SCR and PT on existing vessels due to space and weight limitations. The new generation boats will basically have the machinery plants built around the emissions reduction equipment and it would be a very difficult thing to retrofit existing vessels to bring them in line with the "ten times cleaner" standard. 8

e. In the New Technologies and Alternative Fuels Working Paper (NTAFWP) there is analysis of the space and weight impact of diesel SCR but we would point out that a more thorough analysis of the actual space, weight and cost requirements for this technology will be necessary to prove out the potential. The report also mentions a 10% passenger capacity loss to offset the weight of the emissions reduction apparatus combined with a 20% increase in capital cost and an approximately 10% to 15% operating cost increase. We would like to point out that the cumulative effect of these factors could significantly effect the financial and operating viability of the system. We further predict that to equip a high speed, 400 passenger ferry the cost will be upward of $500,000 and the weight gain is yet to be determined. The additional weight alone may make this technology very difficult to provide on the current generation of high speed ferries. In addition, the following drawbacks are listed in the NTAFWP and we believe any one of these issues could prove very difficult to solve: 9

   i. Ammonia release and odor could be a serious passenger comfort issue

   ii. The large size and weight is yet undetermined

   iii. Potential temperature control issues over varying duty cycles and horsepower curves could be significant operational issue

   iv. The cost and availability urea is uncertain but reports within the industry indicate that this chemical can be difficult to obtain and the operational costs are potentially high

   v. USCG certification for urea and ammonia is highly uncertain at this time

4. The IOP mentions that the new WTA vessels will meet the design requirements of the USCG, the American Bureau of Shipping (ABS), and the International Maritime Organization (IMO). This indicates that the WTA is recommending that the new generation vessels be "classed". We are not sure that building the vessels to class is necessary with this size vessel, depending on the cost involved. More problematic is the position that the new WTA boats will comply with the IMO High Speed Craft Code (HSC): 10

   a. Many in the industry are concerned with the WTA decision to pursue this course of action, as all domestically-built vessels in this class, with the exception of two 11

on the East Coast, are built and certified to the existing regulations embodied within 46 CFR, *Shipping*.

b. Industry players strongly feel that the requirement by the WTA to comply with the HSC Code will unnecessarily raise design and construction complications, increase manning requirements and result in significantly higher costs than a more balanced approach, that of meeting existing regulations.

11

c. This WTA recommendation is based on the consultant's recommendation that the boats be built to this standard. The consultant states in the Safety Plan that the builders and other ferry operators, who have objected to this recommendation, be asked to identify and quantify why they object. We would offer that this should be the other way around – the consultant should be required to better identify exactly why it is that they have chosen to divert from the standard regulatory structure in use across the nation. This recommendation, in our opinion, is out of sync with current trends within the domestic high-speed passenger sector and so the onus should be on the consultant rather than the existing operators and shipyards to make the case for compliance with the IMO High Speed Craft Code.

12

d. The consultant in the Safety Plan made a comment that the WTA could simply generate bid documents that required shipyards and other contractors to bid on boats built to the current domestic regulations and the High Speed Craft Code concurrently. In our opinion, this concept is infeasible and it would greatly complicate not only the generation of bid documents but also the bidding process in general.

13

5. The IOP does not go into any detail with regard to security and this is certainly an emerging concern that could dramatically effect vessel and terminal design, training, budgets and manning. We suggest that system security design should play a larger role than currently indicated in the IOP.

14

6. The IOP recommends that all passenger ferries, presumably existing boats included, "be further equipped with sonar to assure that . . . collisions with whales do not occur" (page 45). This recommendation is made even though the IOP states, "according to the National Marine Fisheries Service (NMFS) there have been no documented collisions between gray whales and any type of vessel in San Francisco Bay". This could be detrimental to and costly for existing operators and the WTA for the following reasons:

   a. We are not aware of an affordably priced sonar designed to operate effectively at speeds of 35 to 40 knots – even surface radar has been under scrutiny at times due to the inability of some units to provide appropriate data display at the higher speeds of current vessels, and radar only transmits through air, not through water.

15

   b. If such sonar does exist its cost has yet to be identified but we predict that these would be very expensive units as they must certainly be a military derivative product of very high quality and complexity.

   c. Vessel Masters should be concentrating on navigation and vessel operation and given the lack of whale incidents in the Bay there is no justifiable reason, in our opinion, to complicate the vessel bridge, where essential navigation equipment already occupies important line of sight positions.

7. The IOP refers to "speed reductions or route-bending" as a mitigating factor for wake control (page 46). It also mentions that this has been a successful tactic for wake reduction in Scandinavia. We are concerned about this for the following reasons:

16

a. Speed reduction requirements, if not carefully considered, could dramatically impact headway and transit timing. Certainly speed reduction is an impact mitigation tactic, and as a matter of fact Golden Gate Ferry uses such a control on it's Larkspur Route, but the assumption that a simple speed limit will suffice to mitigate wake in all conditions should be discouraged or reduced in importance.

b. Route-bending could affect headway and transit times as well, in addition to trip costs, because these vessels could be forced to navigate a route less efficient than one might otherwise design. There must be a process for evaluating route bending to determine whether the benefit is worth the additional cost and emissions.

16

c. With regard to acceptable wake height, the IOP does not address it but the EIR creates a very stringent restriction of less than 16 cm of wake height. This could be very problematic for existing operators if the technology necessary to provide such small wakes is not developed for vessels of the size and speed needed to operate on new or existing routes.

17

8. The WTA budget found in the IOP (beginning on page 52) does not give any detailed indication of plans for funding expansion of existing services over the next ten years. It appears that this detail will be refined as the WTA IOP is approved by the State Legislature. We have the following concerns with the financial plan outlined in the IOP:

a. Based on the Financial Plan shown on page 53, it is difficult to determine how many vessels are actually planned for the 10 year program. The total of those shown on the Subtotal, Number of Vessels is shown as $107 but we suspect that the total projected new vessels is actually 25 and that the $107 total is a typographical error.

b. We interpret the table to mean that the budget calls for 25 boats over ten years at a cost of $179m. This would result in an average per vessel cost of $7.16m, and given the complexity of the proposed vessels this may be low in current dollars, especially in light of the fact that many of the vessels will be built at 2011 and 2012 costs. We assume that this projection allows for an assortment of 149 and 300 to 350 passenger vessels but we'd also like to point out that on page 40 the IOP refers to 400 and 149 passenger vessels while on page 41 149 and 300 to 350 passenger vessels are discussed. A more descriptive breakdown of what vessel types would be built in certain years might be useful to both the WTA as well as other operators and local constituents interested in what vessel might serve their market.

18

c. The budget lists $66m between 2006 and 2009 for vessels to expand existing services, but we are not able to find a schedule indicating when and where these boats would be deployed. More detail regarding the WTA thinking regarding expansion of existing fleets would be useful.

d. The budget lists $54m for improvements to existing terminals between 2006 and 2009, but like the vessel category above, the IOP is silent as to where these improvements to existing terminal facilities will be concentrated. We understand that the WTA work is at the "program" level, but it would be useful to be provided with more foundational detail on the financial plan if such information is available.

e. The financial plan mentions the "renewal of half-cent sales taxes in . . . San Francisco, Marin and Sonoma Counties", in addition to the other counties listed.

We are not sure which half-cent sales tax this refers to in Marin and Sonoma counties and in the interest of accuracy further elaboration on this item is recommended. 18

9. WTA Safety Plan - The IOP summary mentions the following as components of the Safety Plan:
    a. Increased Mutual Assistance Plans,
    b. Increased training and emergency drills
    c. Installation of Closed-circuit TV to monitor unmanned areas
    d. Development of enhanced preventative maintenance programs
    e. In addition to the items mentioned above, which we certainly support, the Safety Plan and the IOP propose the following measures, which could impact existing operators:
        i. "Develop, implement, enforce and audit standard procedures for emergencies, adverse weather and normal operating conditions"- We interpret this to mean that the WTA will be authorized to oversee virtually all existing operators in these areas. Depending on their ability to do so, this could have a significant impact on the way current operators run their businesses as these companies currently answer to the USCG directly in these matters. It would be the preference of existing operators to avoid an additional layer of regulatory oversight by another regional agency, though existing operators certainly recognize that full cooperation and coordination with future WTA operations will be fully expected. 19

1. Another item from the SAFETY PLAN is mentioned in the detail of the IOP but not in the summary:
    a. "Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as Master-in-charge."
    b. This is consistent with the work currently being done with the USCG to enhance operational safety and training for the nations high speed vessels, so we don't object, but the responsibility for this requirement should remain with each individual operator, as is the current industry norm. 20

2. There are two more elements of the Safety Plan that do not appear to be replicated in the IOP, but which could have a significant impact on existing operators:
    a. The Safety Plan proposes that the coordination of all ferry schedules should be overseen by WTA in order to reduce crossing conflicts and enhance safety – this would make it difficult for existing operators to expand and revise our own schedules without undue complication. Once again, coordination of routes and schedules with WTA is certainly expected but the issue of authority and responsibility will need additional resolution. 21
    b. The SAFETY PLAN proposes that "positive control" would be exerted by a central traffic control asset, either by the USCG VTS center or by a 22

dispatcher setup by the WTA. We know of no other domestic or international maritime traffic control services that emulate air traffic control to this extent, and to operate such a service long term would likely be prohibitively expensive and potentially dangerous.

22

Thank you once again for the opportunity to comment. The IOP is a very impressive and important document with great potential to benefit the region. If we may answer questions regarding these comments please do not hesitate to call.

Yours truly,

David Clark

Deputy General Manager
Golden Gate Ferry Division
Golden Gate Bridge, Highway and Transportation District

October 14, 2002

Nancy Soares
145 Harbour Drive
Half Moon Bay, CA
94019

SF Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

EIR 111

Dear People,

My family supports all efforts to develop a ferry system that reduces air pollution, protects wetlands and wildlife, and contributes to wise community planning. 1 Please mandate cleaner ferries, 2 fund low-emission demo vessels, 3 exclude wetland sites, 4 avoid dredging, 5 offer cyclists free rides, 6 and recommend cost-effective routes. 7

Federal regulations are insufficient to guarantee cleaner air, one of the primary reasons to support ferries in the first place.

Thank you very much,

Nancy Soares

BAY AREA BIOSCIENCE CENTER

651 Gateway Boulevard, Suite 1145
South San Francisco, CA 94080
Phone: (650) 871-7101
Fax: (650) 871-7555
www.baybio.org

Sue Markland Day
President

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SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

EIR
112

Chair
Brian C. Cunningham, Esq.
President & Chief Operating Officer
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Walter T. Anderson, Ph.D.
Futurist and Environmental Author
Michael Arbige, Ph.D.
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Mina J. Bissell, Ph.D.
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Council Member
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Russell C. Hirsch, M.D., Ph.D.
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Larry N. Vanderhoef, Ph.D.
Chancellor
University of California at Davis
William D. Young
Chairman & CEO
ViroLogic, Inc.

Chair emeritus
G. Steven Burrill
Chief Executive Officer
Burrill & Company

October 18, 2002

RE: The San Francisco Bay Water Transit Authority's **draft Implementation & Operations Plan (IOP) and the Programmatic Environmental Impact Report (EIR)**

TO: Board of Directors, San Francisco Bay Water Transit Authority
Commissioners, Metropolitan Transportation Commission

The Bay Area Bioscience Center (BayBio), founded in 1990, serves the bioscience community of Northern California. Our constituent institutions are located in clusters scattered throughout the region with most in sight of the San Francisco Bay. Those who work at bioscience companies and relevant research facilities live all over the region with a large number concentrated in the East Bay. Our industrial sector employs more than 85,000 persons directly, with total (direct and indirect) San Francisco Bay area employment of over 250,000 residents.

Make no mistake, the Bay Area bioscience community supports new ferry service if it provides a cost-effective alternative to driving from one's home to work and back again. An additional way to lessen dependence on cars and increase the use of public transit deserves our support. Yet, the expense of new and expanded ferry routes and service can not be ignored and planning trips exclusively between the East Bay and the San Francisco ferry terminal is not, in our opinion, a sound way to spend our limited transportation funds. 1 2

The distribution of employees' homes in relation to their employer's location is the reason we are writing you. This is **a current problem**, not one dependent on models for future growth. 3

No longer is San Francisco the only employment destination in our region. Since the demise of the high tech and dotcom companies, the bioscience industry has taken its rightful place as **a major employer in the Bay Area**. For that reason, we urge the Water Transit Authority to plan transportation needs and the necessary environmental analysis for our region's present and future (with subregional bioscience clusters ringing the Bay), not its past (with most employers in the City).

The purpose of our letter is to ask for the inclusion of additional ferry routes that directly connect the East Bay [e.g. Richmond, Berkeley/Albany, Alameda, Jack London Square/ Oakland, Harbor Isle (Alameda)] and points to the West (e.g. Mission Bay, South San Francisco, Foster City and Redwood City). BayBio and its member companies request that the final **IOP and EIR include these new direct routes in sufficient detail to comply with their stated purposes- to reduce traffic congestion and improve air quality**. 4

Thank you.

Director emeritus
Ronald E. Cape, Ph.D.
Biotechnology Investor

Director emeritus
Edward E. Penhoet, Ph.D.
Director, Science and Higher Education Programs
Gordon and Betty Moore Foundation

Names and affiliations of those who signed above

Brian Croeni, AIA
MBT Architecture, Inc.

Carol Mimura
UC Berkeley,
Dept. of Technology Licensing

Mike Arbige
Genencor International

William Srigley
AltaGen Bioscience, Inc.

Brian Cunningham
Rigel Pharmaceuticals, Inc.
Chair of BayBio

Daniel Perez
Berlex Biosciences, Inc.

Diane Leite
UC Berkeley

Hon. Gene Mullin
Mayor, South San Francisco

Fred Dorey
Cooley Godward

Lynn Pasahow
Fenwick and West

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

EIR 113

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: JOEL SUTY Date: 10/21/02

Affiliation (if applicable): BAY AREA COUNCIL / TAC MEMBER

Address: 13289 CLAYTON RD, SAN JOSE, CA

Topic: GENERAL

Comment:

"JOE SIXPACK" DESIGNATOR MAY BE SEEN AS VETEANING AND LOSE UNION SUPPORT. NEED NEW DESIGNATOR! 1

A GOOD "GEE WHIZ" FINANCIAL MAY BE COST PER MILE OF VARIOUS OTHER TRANSPORTATION COMPARISONS — WE COVER MANY MILES AND ONLY AMORTIZE CAPITAL COSTS. 2

Please continue on back side.

Comments should be submitted by **October 31, 2002**

BAY AREA COUNCIL

200 Pine Street, Suite 300
San Francisco, CA 94104
(415) 981-6600
Fax (415) 981-6408
http://www.bayareacouncil.org

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Ex Officio
SUNNE WRIGHT McPEAK
President & CEO
Bay Area Council

Founded in 1945, the Bay Area Council is a business-sponsored regional public policy organization which promotes economic prosperity and quality of life in the Bay Area

EIR 114

October 23, 2002

The Honorable Charlene Johnson
Board President
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Board President Johnson:

I am writing to offer Bay Area Council commendations for the vigorous efforts of the Water Transit Authority to develop its Implementation and Operations Plan. Senate Bill 428 laid out a demanding set of tasks, and the WTA has admirably met this challenge. 1

Even as the WTA shifts its attention to gaining legislative approval and implementing the IOP, the Bay Area Council encourages you to maintain and expand lines of communication with communities that can host additional terminals. In particular, Moffet Field and Hunters Point are both undergoing large scale redevelopment that will bring new jobs and housing to waterfront locations. These redevelopment efforts can produce ideal sites for water transit, but only if transportation and land development planning are closely coordinated from the start. 2

Water Transit Authority staff have already assured the Bay Area Council that the WTA remains open to adding additional terminals to its proposed system and will work with all interested parties. The Bay Area Council believes that Hunters Point and Moffett Field are two very serious candidates, and I encourage you to continue and expand your efforts at these locations. 3

Sincerely,

Michael Cunningham
Vice President

IOP Public Hearing
Sonoma County
October 15, 2002

Submitted Comment Sheets
&
Speaker Cards

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 115

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: MIKE KERNS

Topic: THANKS AND PORT SONOMA

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 116

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Gina Fregosi

Topic: Expanding Svc to Sonoma County

Comment: Environmental impact

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 117

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jessica Vann Gardner The WTA

Topic: Maintaining Port Sonoma as North Bay Ferry Site

Comment: The potential for positive consumer service to meet consumer demands and provide Ferry / Commuter/ Excursion offers to the North Bay will be best served by expanding opportunities in PORT SONOMA 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 118

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: BERNARR DAWSON

Topic: SHALLOW WATER NAVIGATION

Comment: how make shallow draft vessels serving the north and south bay. 1

smaller boats - ? Go capacity 2

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 119

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Hal Beck

Topic: Ferry rail connection at Port Sonoma

Comment: Written comments are in the record.
Copies are available here.

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 120

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: John FitzGerald

Topic: Maintain Port Sonoma for study

Comment: Rail - Hwy - Water Connection 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

EIR 120 continued

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: John FitzGerald, C.E. Date: 10/15/02

Affiliation (if applicable): River Committee (Petaluma Chamber of Com), Petaluma River Authority

Address: 1010 Lakeville St. Ste 2-B
Petaluma Ca. 94952

Topic: Port Sonoma Connection

Comment: We should not let go of the fact that the Port Sonoma location offers a highway-rail-water connection that does not exist in many other locations in the Bay Area. We already have a long history (1860's) of transportation on the Petaluma River - Passenger & Freight. Today we are moving over 200,000 tons (Corps of Engrs) of Commerce out of Petaluma, which pass by the proposed Port Sonoma site - so what's new? 1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

WATER TRANSIT AUTHORITY

PUBLIC HEARING

Petaluma Community Center

N. McDowell Road

Petaluma, California

October ~~16~~ 15, 2002

7:00 P.M.

AUDI-X REPORTING

52 Longwood Drive, San Rafael, California 94901/ (415) 457-4417

OCTOBER ~~16~~ 15, 2002 7:10 P.M.

P R O C E E D I N G S

---o0o---

Ms. Haught Johnson - We would like you to address your comments either to the Implementation and Operations Plan or the Environmental document. We are not going to engage in a dialogue tonight. We want to get down what you have to say and we will respond to it in the plan itself. Because we do not have a very large crowd, and because we do not have very many speakers, we are not going to be too technical about the three-minute limitations, so just say whatever you want to say, and if you go on too long, we will get out the hook and get rid of you. Okay, our first speaker is Gina Fregosi. Did I pronounce your name right?

Ms. Fregosi - Fregosi, yes. I just was hoping you could talk a little bit more about the environmental impact effects of having a terminal here in Sonoma. At one of the last meetings I went to, you discussed some of that, and I was hoping I could hear some more of that. But I am all in favor of Water Transit coming up to Sonoma County.

11/6

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Ms. Sanchez - Would you like me to respond?

Ms. Haught Johnson - Well, tonight we have to -- instead of having a dialogue, we have to -- we are just obligated to have these public meetings to give everybody a

chance to say what they want to say, criticize the plan, or whatever, so that we can respond to it. But after the meeting is over, we will be around for a while so we can talk about it if you like.

Ms. Sanchez - And we can save your question, too, just to provide that clarification.

Ms. Haught Johnson - Okay. Hal Bech?

Mr. Bech - Hal Bech, Fulton, California. Thank you for coming up. It is a long drive. I hope to take less than three minutes. I served on the last two sales tax committee meetings, or steering committees. We lost both. That happens. I have a newspaper version of a letter that I submitted some time ago to the Water Transit Authority. I made copies of it and I am looking for an integrated transportation system that gets cars off the road, and I would like to see a connection with the rail that is existing at Port Sonoma and perhaps running it up the east side of the Petaluma River to connect with the rail at Petaluma. So I have got some in the back. And thank you very much. 119 1

Ms. Haught Johnson - Thank you, Mr. Bech. John Fitzgerald.

Mr. Fitzgerald - John Fitzgerald, Petaluma. Thank you very much for this opportunity. I would like to say 120

that when I had the opportunity to learn about these hearings and so forth, I was very excited. I kind of participate in three aspects of the point I want to try to make here. One is I am a kayaker and I have kayaked actually all of the river between Petaluma and its mouth and its connection with the Bay. Secondly, I am an auto enthusiast. I love automobiles and I actually race cars and have for 40 some odd years. And, third, I have always been a railroad buff and, so, guess what? All three of these things happen at Port Sonoma. We have a rail, highway, and water connection. And as a kid growing up in San Francisco in the 40's, I remember the great trips that we used to take on Sundays putting the car on the ferry and going over to Oakland, and driving up and taking the Richmond Ferry back to San Rafael, and then coming back across it was a great adventure. I would urge you to consider and to continue to keep on the study list a connection to Port Sonoma. I think it is very important. If we lose the opportunity to have this connection or this location, I think we have lost an opportunity forever. Thank you. 1

Ms. Haught Johnson - Thank you, Mr. Fitzgerald. Jessica Van Gardner.

Ms. Van Gardner - Good evening, WTA Board members. 117
Thank you so much for hosting this meeting in Petaluma so

that we have an opportunity to indeed speak with you. And thank you for the process. It has been very open all along the way that we have been participating in. My name is Jessica Van Gardner and I am with the Petaluma Visitors Program in Petaluma Area Chamber of Commerce. I am also with the Sonoma County Tours and Program and am an elected representative to the Rural Marketing Advisory Committee for the State of California. And it is not a surprise that I am here to indeed encourage and urge you to keep Port Sonoma as a consideration for high speed ferry service to the North Bay. I think certainly with the increased eight million people in patronage in the new services that you have planned, as well as understanding that you are looking for return on investment with fair services and, also, that you do note that the North Bay is poised for this ferry service and the patronage is of "reasonable size." I think that all points we are leading to, the Port Sonoma is a very viable option in the North Bay. Petaluma has been known for hundreds of years since its inception as a town that has been built on industrial activity along the river. Currently, we have a service that comes in with very high end luxury cruises of 120-foot yachts that are coming in regularly year after year, in addition to over 200,000 tons of commercial tonnage on the Petaluma River. And when you

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have a lot of not only interest by commuters but also excursion and visitor and tourism traffic coming into the North Bay and recognize that both the Napa and Petaluma Rivers are served from the San Pablo Bay, I think that that speaks very highly of continuing to look at Port Sonoma as a viable option. I would also just say that the excitement of this possibility, I think, is very high when you look at the tax measures that have been discussed for increased 101 widening, etc., that this is a win, win, win for all community environmental concerns, as well as differing user groups, both the commuters, as well as visitors, as well as you mentioned public lands -- connecting with public lands. I also sit on the California Round Table for Recreation, Parks and Tourism, and this is all the kinds of conversations that are happening -- how to interconnect all of the wonderful resources that we have. And I thank you for this opportunity.

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Ms. Haught Johnson - Thank you, Ms. Van Gardner. Bernard Dawson?

118

Mr. Dawson - Um, I am one of the three hats. I am trying to cover my head. I am a Mechanical Engineer, semi-retired. I am looking at bringing some tourist business up to Petaluma in the boating, but I am also a licensing safety analysis engineer, so I am familiar with environmental

impact reports. So those are the two issues I want to talk about now. The first issue I would like to talk about is, having reviewed what has been available on the Web, is that there seems to be some concern over the shallow ends of the Bay, speaking of Moffitt Field and Port Sonoma. I feel that two solutions need to be possibly looked at. One is shallow water boats that produce small wakes. The wakes that you are looking at for larger craft in deeper bodies of water. Once the water gets shallow, then the wave phenomenon is more pronounced. Also, what I would like to have you consider is the possibility of water shuttle. By "water shuttle," I mean a smaller boat that can service Port Sonoma to Larkspur, or Port Sonoma to Vallejo, or Moffitt to Redwood City. And by having smaller boats, meaning 30 persons, you could have a higher occupancy rate. So I know that the pollution requirements are based upon a per person passenger travel mile, based on full occupancy. But the reality is that at these outlying locations going into Antioch, you are not going to support a full boat. So I believe that we should consider smaller boats and I would like to leave with the staff at a later date -- I did bring some slides that I would like to show you at the end of the meeting. There is a picture right there that speaks for itself. Thank you.

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Ms. Haught Johnson - Thank you. Mike Kerns. 115

Mr. Kerns - Good evening. I just wanted to take a moment and welcome you to the Second District of Sonoma County and I really do appreciate you holding this meeting here tonight and giving people an opportunity to comment. I think it is extremely important. I obviously am very supportive of this project. I want to thank the Board members and the staff for all of your work. I think this is moving ahead in a very positive manner. I am also on the Smart Commission and we are trying to get a passenger rail system up and running, and I think it is critical that we have a connection here in Sonoma County to an expanded ferry system on the Bay. If we are going to expand public transit for people, these different systems, it is critical that they be integrated. And I think a connection here in the North Bay is extremely important. So I appreciate the fact that you are looking at Port Sonoma. I know some other sites were considered, but it would appear that Port Sonoma is the most viable site now. And I know there are some environmental concerns, some concerns about growth and future development, but I think those concerns can be addressed and we can provide that critical link to a future rail system and for vehicles and buses also. Anyway, thanks again and I appreciate all your hard work. Ms. Haught

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Johnson - Thank you Supervisor Kerns. Are there any other cards? No one else has another comment? Well, this meeting is adjourned. Thank you very much for coming everyone.

[Adjourned.]

EIR 1022

Winston H. Hickox
Agency Secretary

Air Resources Board

Alan C. Lloyd, Ph.D.
Chairman
1001 I Street • P.O. Box 2815 • Sacramento, California 95812 • www.arb.ca.gov

Gray Davis
Governor

RECEIVED
JUN 20 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

May 15, 2003

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, California 94111

Dear Ms. Haught Johnson:

Thank you for providing us with the opportunity to review and comment on the revised draft Program Environmental Impact Report (EIR) prepared for the proposed expansion of the ferry transit service in the San Francisco Bay Area. Our review of the EIR was limited to the revised subject matter pertaining to air quality issues, since we understand that our previous comments on the earlier draft will also be addressed in the Final EIR.

Overall, we are supportive of revision to the EIR, which now focuses on the proposed project described in the Implementation and Operations Plan (IOP). In particular, we applaud the commitment to ferries that will exceed EPA's 2007 Tier II air quality standards by 85 percent, as described in Section 2 of the EIR. However, we do have one comment on the analysis in section 3.6. It appears from the discussion under "Ferry Emissions," that the air quality impacts are based on a 90 percent reduction in nitrogen oxides, and a 95 percent reduction in PM_{10}. These higher emission reduction figures may alter the impacts of the project (see Impacts A-1, A-3, A-4, A-6). We suggest the analysis be based on the 85 percent emission reduction specified in the "Proposed Project," or else redefine the Proposed Project with these higher emission reductions.

Thank you again for this opportunity to provide comments. If you have any questions about our comments, please contact Mr. Daniel E. Donohoue, Chief of the Emissions Assessment Branch, at (916) 322-6023, or by email at ddonohou@arb.ca.gov.

Sincerely,

/s/

Peter D. Ventunni, Chief
Stationary Source Division

cc: Mr. Daniel E. Donohoue, Chief
Emissions Assessment Branch
Air Resources Board

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

Comments on San Francisco Bay Area Water Transit Authority's Implementation and Operations Plan and Program Environmental Impact Report

Comments on the Implementation and Operations Plan (IOP)

Air Quality Benefits of the Proposed Ferry Expansion:

There are several statements throughout the IOP describing the proposed expanded ferry service as a "strategy to improve air quality." However, there is no technical data in the IOP to support that claim, and it does not appear that the data in the EIR supports this claim (see comments on EIR below). In the event the WTA has technical data to support the claim, we recommend the IOP include that information, or reference the appropriate documents. If such data is available, we suggest adding an additional question to the IOP, such as "How and to what extent will the IOP improve air quality in the Bay Area?" In the event the data does not support this claim, we recommend the IOP place emphasis on the other positive aspects of the project.

In addition, while the IOP reflects a strong commitment to an 85% emission reduction goal below EPA Tier 2 standards, the EIR presents a different view. The ferry project emissions in section 3.6 under the section "Ferry Emissions" in the EIR are estimated assuming only that the EPA Tier 2 standards would be in effect. Under this scenario, all of the proposed ferry projects are correctly assumed to result in significant air quality impacts. The use of selective catalytic reduction and particulate traps (which could achieve an 85% emission reduction) is only listed as one possible mitigation option, not a commitment. We continue to believe that the best available technology should be used in the ferries. It has been our experience that new transit services of any kind must be the cleanest possible in order to benefit clean air.

In-Service Emissions Testing

In Chapter 5, it is reported that the existing fleet of ferries is cleaner than previously reported. We do not believe the data presented in the IOP substantiates this. In particular, we have the following concerns with Figure 23 in the IOP, which compares reported in-use emissions values (based on the report entitled "Measurement of Air Pollutant Emissions from In-Service Passenger Ferries") to published values.

- All of the in-use values are based on the "high-speed cruise" operating condition, which generally results in the lowest emissions value on a grams per horsepower-hour basis. There appears to be no attempt to

incorporate the other operating conditions and arrive at a composite emission factor, which is the convention for reporting emissions factors. For example, the "published" oxides of nitrogen (NOx) emission factor in Figure 23 for the Cummins KTA 50 is based on the ISO 8178 E3 Cycle, which is a composite value using engine power at loads of 25%, 50%, 75% and 100%.

- References are not provided for the "published" values, making it difficult to verify their accuracy, and the conditions under which they were generated. Of the three engines, we were only able to find published data for the NOx emissions of the Cummins KTA 50 engine. Information was also provided to us by a Bay Area marine dealer on the MTU engine that is inconsistent with the published values in Figure 23.

- According to the emissions report prepared for the WTA by Engine, Fuel, and Emissions Engineering, Incorporated, the in-use particulate matter (PM) emission value for the Caterpillar engine is based on emulsified diesel fuel instead of conventional diesel fuel.

- The in-use hydrocarbon (HC) emissions value for the Cummins engine in the IOP does not correspond to the value in the emissions report prepared for the WTA by Engine, Fuel, and Emissions Engineering, Incorporated.

- The in-use emissions values presented in the IOP were generated using a testing methodology different from the standard laboratory testing for marine engines. The in-use testing methodology (referred to as "ride-along vehicle emission measurement" system or "RAVEM") has not been fully correlated to reference laboratory methods. Until this correlation is completed, it may not be correct to assume that the in-use emissions values based on the RAVEM test method most accurately represent the marine fleet's "true" emissions. It is possible that the test method itself is not as accurate as test procedures conducted in a laboratory setting (although satisfactory given the constraints of in-use testing).

Comments on the Program Environmental Impact Report (EIR)

Emissions Estimates for Ferry Expansion Alternatives

More information is needed to understand how the emissions figures provided in Tables 3.6-5, 3.6-6, and 3.6-7 were derived. In addition, it appears there are errors in the figures provided. For example, in Table 3.6-6, a *decrease* in NOx and PM is estimated for ferries under the expansion project termed "Reduced Routes" Alternative 2, as compared to the "No Project" scenario. It appears that the only way it is possible to achieve an overall emission reduction with more ferries (and disregarding cars and buses) is to add SCR and Traps to all ferries --

both for *existing* routes and the expanded routes the WTA is proposing. Our understanding is that the project does not include retrofit controls on ferries serving the existing routes.

Dredging

Due to the significant amount of dredging that would be required under ferry expansion alternatives #1 and #2, we recommend that the air quality impact of dredging operations be included in the EIR under either section 3.1, "Dredging," or section 3.6, "Air Quality." We also recommend that mitigation measures be investigated. Since most dredges are diesel powered, many of the same emission control options investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels" could be applied to dredges. For example, selective catalytic reduction is being used to control NOx emissions on some dredges in California. Another option is electrically-powered dredges, which have been used at the Port of Oakland, and in other areas.

Auxiliary Engines

It is not clear in the EIR whether the ferry emissions figures include the emissions from on-board diesel generators. If not, we suggest the WTA include these emissions and their impacts in section 3.6 of the EIR, and investigate mitigation measures such as those investigated for vessels in the John J. McMullen Associates, Incorporated report entitled "New Technologies and Alternative Fuels."

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To Kristen | From S. Bourguignon
Co./Dept. WTA | Co. BAAQMD
Phone # | Phone #

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May 13, 2003

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SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

EIR 1021

Ms. Charlene Haught Johnson
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: Water Transit Authority Revised Draft Program Environmental Impact Report

Dear Ms. Haught Johnson:

On November 25, 2002, Bay Area Air Quality Management District (District) staff submitted a comment letter in response to the Water Transit Authority's (WTA) Draft Program Environmental Impact Report (DEIR) for the expansion of ferry transit service in the San Francisco Bay Area. The DEIR and the Draft Implementation & Operations Plan (IOP) describe expanded water transit systems for the region. District staff have received a Revised DEIR, and we have the following comments.

We note considerable improvement in the organization and readability of the Revised DEIR and are especially pleased that the WTA has included the IOP ferry system as the proposed project alternative. This provides a logical comparison between the environmental impacts from the proposed project and no project alternatives. We are also glad that your agency included a copy of the District's Independent Analysis of the WTA's Implementation and Operations Plan in the Revised DEIR (*Appendix AIR-B*). Our analysis was approved by our Board of Directors on February 19, 2003, and we believe it fulfills the requirements specified by the California Health and Safety Code Section 66540.22k. As noted in our report, we concluded that the expansion of ferry service proposed in the WTA's IOP should result in less emissions than the current passenger ferry system.

While the Revised DEIR is an improvement over the earlier environmental document, we still have some questions about the WTA's analysis. First, the *Program Description* section does not mention the Alcatraz route; however this route is included in the *Air Quality* section and *Table 3.6.1*, which summarizes the proposed ferry power usage. Please clarify whether the Alcatraz route is considered part of the proposed project.

In our November 25, 2002 comment letter, we recommended a discussion of the air quality impacts from dredging. The Revised DEIR still does not address this issue. According to the *Dredging* section, the proposed project alternative would call for construction dredging at the Hercules/Rodeo terminal, amounting to approximately 49,830 cubic yards of dredged material. The kinds of dredging tools listed in *Table 3.1.2* are primarily diesel powered, and with continuous use, can lead to significant particulate matter emissions. We urge the WTA to require the

implementation of all feasible control measures. Some of our suggested mitigations include: use diesel oxidation catalyst or particulate filters on dredging equipment; use alternatively fueled equipment (CNG, biodiesel, water emulsion fuel, electric); minimize idling time of equipment; maintain properly tuned equipment; and limit hours of operation of heavy duty equipment.

As we mentioned in our earlier comment letter, we are concerned about potential land use conflicts that might arise from the development of new terminals and residential units in areas with existing sources of air pollutants. Air quality problems arise when sources of air pollution and sensitive receptors are located near one another. If there are nearby industrial uses, ferry riders and new residents may be affected by odors, dust, and diesel exhaust impacts from activities associated with those existing uses. Citizen complaints can lead to nuisance cases that are difficult and expensive to resolve. We suggest that the WTA's environmental document contain a screening level analysis of potential land use conflicts between existing sources of pollutants/odors and proposed terminals and residences. A screening level analysis will indicate if more detailed review will be needed in subsequent site-specific environmental impact reviews.

In our independent analysis, we assumed that an appropriate No Project Alternative would use regional vehicle miles traveled (VMT) projections from the Metropolitan Transportation Commission's most recent Regional Transportation Plan (RTP) as the most likely scenario for future transportation projects and activity in the region. However, in reviewing MTC's 2001 RTP, we note that their No Project VMT figures for 2025 are significantly higher than those listed in your Revised DEIR. This leads us to believe that the WTA has a different set of assumptions about the No Project Alternative than what has been forecasted in the RTP. We recommend that the WTA's environmental document and the IOP use MTC's estimates for the No Project Alternative or provide an explanation for using different estimates.

As we commented in our earlier letter, the WTA should provide more information about the assumptions that were made concerning the transportation modal split for the proposed project. For example, the IOP states that the WTA has conducted ridership surveys which conclude that the new ferry system will "draw most of its riders from vehicles and that these are people who have proved unwilling to regularly use other forms of transit." However, *Table 3.12.3* shows ridership changes by alternative between different transit modes. The figures indicate that ridership from the majority of existing transit modes will decrease with the implementation of a more robust ferry service (except for an increase in commuter rail), indicating there would be a significant number of riders switching to ferries from other transit modes. Figures from *Tables 3.12.3* and *3.12.4* seem inconsistent, because the projected change in ridership on other forms of transit (12,243 riders) and the number of automobile trips reduced (9,058 trips) do not add up to the approximate number of projected new ferry riders (36,974 according to the Revised DEIR). We suggest that the WTA better explain the projected effect of the proposed ferry system on transit ridership, and how the WTA came to the conclusion that the majority of new ferry riders would come from single-occupant vehicles.

We are encouraged that the WTA intends to minimize cold-start emissions with *Mitigation A-2.1* which states that "cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals." However, it is not clear how this parking-related mitigation measure will be implemented. The amount of potential available parking spaces at the ferry

terminals and the projected demand for those parking spaces is provided in *Table 3.12.6*. However those demand figures do not coincide with the number of riders who are projected to be accessing the terminals in automobiles (*Table 3.12.5*). Please provide clarification about how many riders are expected to drive to and park at ferry terminals. According to the details provided in the earlier DEIR and its technical appendices, the WTA's ridership model is predicated on providing ample parking at the majority of the ferry terminals. Again, if this mitigation measure includes a reduction in the amount of available parking, the environmental document should analyze the effect upon projected ferry ridership.

The DEIR analysis estimates the overall mode split for accessing the ferry terminals to be: 66% drive, 16% bus/rail and 18% walk/bike. The WTA's environmental document should clearly show how these figures were determined and how they fit into the concept of creating more transit-oriented development near existing and new ferry terminals. If there is an expectation that a majority of ferry riders will be driving to terminals, please give more detail on how the areas surrounding terminals can provide adequate parking and also be appropriately transit-oriented.

If you have any questions regarding these comments, please contact Michael Murphy, Principal Planner, at (415) 749-4644 or Suzanne Bourguignon, Environmental Planner, at (415) 749-5093.

Sincerely,

William C. Norton

William C. Norton
Executive Officer/ APCO

WN:SB

cc: BAAQMD Board of Directors

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY GRAY DAVIS, Governor

DEPARTMENT OF TRANSPORTATION
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OAKLAND, CA 94623-0660
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EIR 1011

Flex your power!
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May 14, 2003

ALAGEN191
SCH2001112048

Mr. Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Castleberry:

FERRY SERVICE EXPANSION – REVISED DRAFT PROGRAM ENVIRONMENTAL IMPACT REPORT

Thank you for including the California Department of Transportation (Department) in the environmental review process for the Ferry Service Expansion project. The following comments are based on our review of the Draft Environmental Impact Report (DEIR). Since the DEIR does not contain a detailed traffic analysis, our comments pertain to future analysis based on specific sites for ferry terminals and associated facilities. 1

Traffic Analysis
Please ensure that the information detailed below is provided in the Traffic Study to ensure a thorough assessment of project-related impacts to State roadway facilities. We encourage the Water Transit Authority to coordinate preparation of the study with our office, and we would appreciate the opportunity to review the scope of work. The Department's *"Guide for the Preparation of Traffic Impact Studies"* should be reviewed prior to initiating any traffic analysis for the project; it is available at the following website: 2 3
http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf

1. Site plan clearly showing project access in relation to nearby state roadways; ingress and egress for all project components should be clearly shown.

2. Project-related trip generation, distribution, and assignment; the assumptions and methodologies used to develop this information should be detailed in the study.

3. Average Daily Traffic, AM and PM peak hour volumes and level of service (LOS) on all significantly affected streets and highways, including crossroads and controlled intersections for existing, existing plus project, cumulative and cumulative plus project scenarios. Calculation of cumulative traffic volumes should consider all traffic-generating developments both existing and future, that would affect study area roadways and

Traffic-related mitigation measures will be incorporated into the construction plans during the encroachment permit process.

Sean Nozzari, District Office Chief
Office of Permits
California DOT, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Please feel free to call or email Patricia Maurice of my staff at (510) 622-1644 or patricia_maurice@dot.ca.gov with any questions regarding this letter.

Sincerely,

for

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

c: Philip Crimmins, State Clearinghouse

City of Albany

1000 SAN PABLO AVENUE • ALBANY, CALIFORNIA 94706-2295

EIR 1012

May 7, 2003

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  FAX (510) 524-8940
- Teen Center
  PH. (510) 525-0576

Steve Castleberry, System Planning Manager
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Comments on Revised Draft Programmatic Environmental Impact Report (DPEIR) for Expansion of Ferry Service in the San Francisco Bay Area

Dear Mr. Castleberry,

Thank you for sending the city of Albany a copy of the revised DPEIR for review and comments. The city of Albany commends the WTA for its continuing efforts to reduce traffic congestion throughout the Bay by exploring the use of ferries. 1

The city of Albany has the following comments on the revised DPEIR:

- What effect would increasing the bridge tolls, as is being pursued to fund the possible ferry expansion, have on reducing vehicle traffic and increasing public transit ridership? The DPEIR should examine the possible affect of reducing vehicle traffic if the bridge tolls were increased to $3, $4 or $5. The issue is whether an increase in bridge tolls, by itself, will result in a reduction in vehicle traffic comparable to that envisioned with an expanded ferry service. 2
- In section three, page 3.6-2, Air Quality, the evaluation of the proposed project's impacts on air quality was based on "the assumption that all ferries in the year 2025, with or without the project, would have engines that would at least meet the USEPA Tier 2 standards." What do you base this assumption on? 3 In addition, how will the WTA ensure that the independent operators of an expanded ferry system will purchase ferries that comply with the USEPA Tier 2 standards? 4
- According to Table 2.1 the Albany/Berkeley terminal is envisioned to be located at the end of University Avenue. The DPEIR should consider as an alternative located the new terminal at the end of Gilman or Buchanan Street. 5 Table 3.7.1 under "Predominant Use(s)" states "Golden Gate Field Parking." This needs to be corrected to reflect the land use adjacent to the "proposed project" new terminal location at the end of University Avenue. 6
- Map Figure 3.5.2 does not show the Albany/Berkeley eelgrass locations. It appears that this portion of the Bay was omitted from this map by accident. 7

In addition to our comments on the DPEIR the city of Albany has the following concerns that should be addressed as part of any site specific EIR (These comments assume that the new terminal for the Albany/Berkeley area is not located at the end of University Avenue.):

- If a ferry terminal is proposed at the end of Gilman Street or Buchanan Street, what impacts will the facility have on wildlife in the area?
- How will the wave action generated by the ferries be handled and what impacts will erosion have on Albany Beach and the Eastshore State Park proposals?
- How are traffic, circulation and parking going to be addressed? Who will be responsible for making the necessary improvements and maintaining them?
- There needs to be adequate parking to handle current and possible future development of Golden Gate Fields, a ferry terminal and Eastshore State Park? If the terminal is in one city and the parking is in another city, how will the disparity in impacts be addressed?
- How will the ferry terminal be accessed and what impacts will the terminal have on the freeway system, Buchanan Street and Gilman Avenue?

8

We look forward to reviewing your responses to our comments on the DPEIR and being actively involved in the review of any future ferry terminal that would be located in the Berkeley/Albany area.

Please feel free to contact our Planning Manager, Dave Dowswell, if you have any questions. He can be reached at (510) 528-5769.

Respectfully,

Jewel Okawachi

Jewel Okawachi, Mayor
City of Albany

cc: City Council
Beth Pollard, City Administrator
Ann Chaney, Community Development Director

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EIR 1013

Marin Audubon Society Box 599 Mill Valley, California 94942-0599

May 15, 2003

Via Facsimile and US Mail
Water Transit Authority
120 Broadway
San Francisco, CA 94111

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To WTA | From [illegible]
Co./Dept. | Co. MAS
Phone # | Phone # 415-924-6057
Fax # | Fax #

RE: Draft Programmatic EIR Comments

Dear Sirs:

We again thank you for the opportunity to submit comments on the Revised Draft Programmatic EIR for the Expansion of Ferry Service in the San Francisco Bay Area. We commend the WTA for changing to project by reducing the number of sites to address environmental impacts and for reissuing a Revised PEIR as a Draft. In our view, confining the project to that described in the IOP, by eliminating 20 new sites including many or most with potentially significant environemtal impacts, has reduced or eliminated most of our concerns at least in the short term. We greatly appreciate your willingness to clarify the project and reduce its extent. 1

Our current broad concerns are as follows:

- The DEIR (at ES.3) describes that Alternatives 1 and 2 could not be determined to be feasible without undertaking extensive further studies pertaining to their potential significant environmental impacts." It states further (page 2-1 at 2.2), "Prior to the development of any new terminal or addition of any new route, all associated activities would be reviewed to ensure that the environmental imapcts have been appropriately addressed in this EIR. It is likely additional documentation would be prepared pursuant to CEQA and the CEQA Guidelines," and there should be a public process to ensure all environmental imapcts including cumulative impacts and Alternatives. This means an EIR should be prepared. The WTA should commit to preparing an EIR for any of the sites that may be reconsidered. 2

- A number of potential terminal sites (other than Port Sonoma and Recreation Loop) are identified as for future study because their deletion was based on insufficient projected ridership at this time. It is not clear whether Port Sonoma and the Recreational Loop would still be in this "future study" category. We understand that recent legislation aims to provide funding for such studies. The PEIR needs to clarify which sites could be the subject of future study and what environmental imapcts would be the subject of environmental review. 3

- The discussion at 2.2.1 states that Port Sonoma does not appear feasible because adjacent wetlands would severely constrain the ability to provide parking. We agree with that assessment, but that site has numerous other adverse impacts including endangered species, high rate of sedimentation, dredging needs, wake impacts eroding adjacent wetlands. Should this site be reinstated as a potential terminal location, these impacts should be on record. 4

- There are still cumulative impacts that are not adequately addressed, even though a Programmatic EIR is the most logical place to address the cumulative significance for each impacts and of all impacts 5

considered together. A cumulative analysis should be included for each impact category.
- The biological impact discussions, specifically regarding endangered species, is incomplete. The Implementation and Operations Plan (IOP) contains information that is not included or discussed in the DPEIR but that is relevant to the DPEIR analyses. In some cases the IOP information is different than information that is addressed in the DPEIR. The IOP should be included by reference as part of the DPEIR and that all statements and analyses that are different, unresolved or not included in the EIR should be addressed in the DPEIR. We identify a number of these problem areas in our comments below.

Our comments on specific sections of the DPEIR are:

Vessel Technology

The DPEIR should include a comprehensive comparison of the adverse impacts including erosion, noise, wildlife impacts, air and water quality, dredging, noise, air pollution, endangered species and migratory species. growth inducing, etc., and the benefits of the various vessel types (hydrofoil, catamaran, conventional monohull, surface-effect ship and hovercraft). The discussion at 2.4 only air impacts appear to have been evaluated. The reader needs to know the pros and cons of each vessel type in order to be able to adequately evaluate vessel suitability. 6

Dredging

It is not just the disposal of dredged material that adversely impacts Bay resources, it is dredging itself. Dredging increases turbidity, erosion, stirs up pollutants, and destroys benthic organisms. Discuss the cumulative significance of these impacts. 7

Hovercraft is mentioned as a vessel type that would eliminate the potential impacts of dredging. This benefit must be evaluated against possible adverse impacts of this vessel type. Hovercraft noise is a major concern. What is the noise level of hover crafts and what adverse affects would the noise have? Discuss the economic feasibility of using hovercraft for the various site types? 8

Impact D-4 addresses impacts to threatened, endangered and protected species. Migratory shorebirds are protected by the Migratory Bird Treaty Acts. Discuss the potential impacts of dredging away mudflats to shorebirds stopping for food during migratory journeys and overwintering in the Bay. Intertidal mudflats are the primary foraging habitat for shorebirds. 9

What are the estimated costs of initial dredging and annual maintenance for the Martinez site? 10

Wake Analysis

The discussion of California Clapper Rail at 3.3.1.2 only mentions disturbances such as inundation of nests. While this impact is important, other significant impacts would also result from operation of ferries near Clapper Rail habitat: the potential loss of habitat due to erosion of wetlands would permanently eliminate foraging and nesting habitat for Clapper Rails. Identify erosion as an impact on Clapper Rails and address mitigation measures, the first of which should be avoidance. 11

Changes in sediment movement resulting from ferry operations (3.3 .1.6, page 3.3-8) certainly must be "considered in the context of a dynamic system that has daily seasonal and long-term temporal variations." The cumulative impacts of ferry-induced sediment movement must be considered in addition to the naturally occurring sediment movement, which could increase the cumulative significance of this impact. 12

Impact WW -1 the discussion indicates that wake wash at rocky shorelines is not expected to be significant. This evaluation contradicts the experience of Tiburon shoreline residents whose shorelines 13

have undergone considerable erosion due to wakes of the Larkspur ferry.

How would dredging channels through mudflats impact the remaining adjacent mudflat, the benthic organisms, feeding patterns of fish and birds, and the stability of the mudflat habitat? 14

WW -3 The conclusion that no significant impacts would occur because no nesting sites are within 50 meters of shoreline is inaccurate. Rails move their nests and could very well nest away from the shoreline in one year and not in the next. This must be considered a significant impact. That Clapper Rail nest more than 50 meters from a fringe marsh is not supported by any scientific evidence of which we are aware. Cite the study or studies that support this conclusion.

A study undertaken by Point Reyes Bird Observatory biologists Gary Page and Jules Evans for Marin Audubon Society at the Corte Madera Ecological Reserve that Clapper Rails nest in different locations within their territory, during different breeding seasons, and even that the boundaries of territories change. We know of no documentation that Clapper Rails do not nest within 50 meters from a fringe marsh. 15

The discussion in the third paragraph (page 3.3-16) states that harbor seals tend to be on rocky areas. This is not the case with two haul-out areas in southern Marin: at the Corte Madera Ecological Reserve and Strawberry Point. Both are dirt/mud areas. 16

Water Resources

Mitigation W -1.2, for impacts to water quality during construction and operation of the ferry, is inadequate. There are many BMPs. What specific BMP's are recommended for use during and after construction to ensure there is no degradation of water quality? Oil and grease would be deposited from cars on the parking lots and litter would increase. Identify specific measures that would remove these pollutants and clean up the runoff before it flows into the Bay. A mitigation measure should recommend that treatment facilities or methods (swales, structures) be constructed, utilized, and maintained in each lot. 17

Impact W -2, Construction in floodplains. Avoidance should be considered as a mitigation for impacts of developing in floodplain. The potential impacts of contributing to flooding of adjacent properties by building new terminals should be identified and addressed. 18

What measures should be required to protect against spills? 19

Biology

The "Environmental Setting" section (5.1) should be transferred from the Draft DEIR and repeated here for clarity, since this Revised Draft document is intended to replace the Draft. In the document we recommended the following changes: 20

- Sturgeon should be identified as a species in decline. 21
- The North Bay, at any given time during the winter months, may have the majority of the Pacific Flyway Canvasback and Scaup. This should be considered in evaluating the significance of impacts to open water habitat in the North Bay. 22
- Open Bay habitat also provides feeding/foraging habitat, not just loafing and roosting, for diving birds and fish. 23

The list of Significance Criteria should include impacts that would substantially affect migratory species. 24

Impact B-1 Loss of jurisdictional wetland habitat would not just occur as a result of dredging and construction. The erosion from ferry wakes would also cause the permanent loss of wetlands and this 25

should be discussed.

Mitigation B-1.1 Wetlands that would be lost should be mapped and the acreage calculated to enable a clearer evaluation of the cumulative imapcts of the project. There is sufficient data from agencies and private scientific organizations, such as San Francisco Estuary Institute, to provide information on the location of wetlands. This is necessary to enable the reader to evaluate the significance of this impact. Comparing the estimated area of wetland impacts with the areas available for mitigation is not a relevant or acceptable method to assess the significance of this impact. 26

This mitigation should recommend that avoidance be considered first, instead of going immediately to acres available for mitigation. A significantly increased ratio of mitigation wetlands must be required but only after it has been clearly demonstrated that avoidance is not possible. Mitigation B-1 lumps avoidance together with site-specific mitigation. 27

Mitigation B 2-1 This discussion should address removal of cordgrass that might invade tidal marsh areas denuded by dredging to construct ferry terminals or channels. Any removal of non-native cordgrass should be coordinated with the Spartina Program. 28

Impact B-3 Loss of eelgrass. Eelgrass is an extremely valuable resource in the Bay. Impacts to eelgrass beds should be avoided altogether. Furthermore, the success of replacing eelgrass is uncertain. The discussion should be expanded to address the potential for success in restoring eelgrass beds in the bay. What is the potential impact of turbidity on eelgrass? 29

Maps of the Bay's eelgrass beds do not include the northern part of the Bay. The North Bay map stops at China Camp. Does this mean there are no beds north of that, or was a map left out? The discussion on page 46 of the IOP that "Eelgrass, and wetlands subject to special protection are located throughout San Francisco. Another map showing eelgrass in the North Bay or San Pablo Bay should be provided. 30

Air quality benefits, as discussed in the IOP, do not justify or in any way compensate for adverse impacts to wetlands or endangered or migratory species. 31

Impact B-4 The turbidity discussion minimizes the importance of this impact based on the small scale of the dredging operations. The impacts of the Hercules dredging and new channels for the other sites should be evaluated together with the existing ferry dredging to determine the cumulative nature of this impact. 32

The turbidity discussion should also address the cumulative impact of reducing the visibility of diving birds that depend on visibility to find prey. This discussion should be included and should be expanded to consider the ferry dredging together with all of the other dredging projects going on in the Bay. 33

Impact B-5 Disturbance to benthic organisms. The frequency of the need for dredging also must be considered in evaluating this impact. If mudflat is being lowered or eliminated by initial dredging, and by relatively frequent subsequent dredging to maintain channels and berth areas, organisms will not be able to recolonize. Therefore, this impact this should be considered a permanent and significant impact. The loss of foraging habitat for shorebirds would be significant. 34

Impact B-6 Invasion of non-native species. As above, the cumulative impact, i.e. the project impacts together with other areas where nonnative species have invaded, must also be considered. 35

Impact B-9 Impacts of pile driving. This discussion assumes that the piles driven would be small. The

accuracy of this assessment should be verified. This impact should be considered significant until proven otherwise. Because of the already significant impacts, i.e. the death of special status fish, Caltrans has to change its pile driving methods for current projects at the Bay's bridges. 36

Impact B-10 Potential effect on shorebirds and wetland species. This discussion refers to mitigations B-1 and B-3 as being adequate mitigation measures for this impact. B-1 would avoid the impact, but then goes on to state that the Goals Report describes many acres that could be used for mitigation. Similarly, Mitigation B-3 mentions avoidance but goes on to recommend mitigation. Avoidance should be recommendation of choice. The discussion should focus on locating the ferry terminals in locations where wetland impacts would not occur and not on mitigation sites. 37

Impact B-11 Disturbance to roosting and foraging waterfowl. This discussion specifies that it applies primarily to the South Bay. The maps themselves demonstrate the importance of the North Bay for overwintering waterfowl, particularly Canvasback and Scaup, so there is no justification for not including the North Bay. Potential impacts to San Pablo Bay rafting waterfowl are dismissed with the comments that "disturbance would not result in permanent loss of habitat," that "waterfowl would use these areas when ferries are not present" and the "undisturbed shallow open water roosting and foraging habitat" would remain. This is an inadequate evaluation. 38

The IOP admits that there is not adequate information on the impacts of disturbance on overwintering birds. It cannot be assumed that the birds would just move to another area and return in 10-35 minutes. Even if birds return, there still would be impacts because the birds would have to use extra energy to move to avoid the disturbance and return. Even if the habitat remains, if birds cannot use the habitat, the impact is adverse.

This impact should be considered potentially significant in both the North and South Bays. The assessment should evaluate the cumulative impact of new channels together with the existing dredging. 39

Should any new sites be added in the future that would traverse a new route, WTA should commission independent studies to determine the local and cumulative significance of the disturbance of rafting waterfowl on both the North and South Bays. This is a potentially significant cumulative impact that should be addressed now, and cannot be pushed aside to be dealt with by individual terminal projects where the discussion of cumulative significance can be ignored.

Impact B-13 Marine Mammal impacts from pile driving. As noted for the fish, it cannot be assumed that the impacts on marine mammals from pile driving would not be significant without describing the specific nature and location of the piles and the pile driving. Would any terminals be located near haul out areas? 40

Impact B- I 6 Impacts on Clapper Rails and Harvest Mice. Only avoidance should be considered acceptable as mitigation for endangered species impacts. The location of habitat for listed species is already well known. Known or suitable habitat for endangered species should be avoided, and not depend on pre-construction surveys.

Considering that Clapper Rails and Salt Marsh Harvest Mice are at the brink of extinction, this mitigation should clearly recommend avoidance, instead of mitigating by restoring or creating replacement habitat. The success of wetland restoration is always uncertain, and even when successful, there is a long time period before a restored wetland can provide the functions and values of the habitat lost. 41

The discussion in the IOP (page 42) about Clapper Rail nesting is incorrect (see PRBO letter and

discussion above). Clapper Rails do not always nest in the same place. The studies that demonstrate they generally nest away from shorelines so that large waves do not harm the nests should be cited. This is not the same circumstance as repeated waves generated by ferries eroding the shoreline where rails could nest.

The IOP states (page 17) that site-specific environmental study will be required to determine each route's specific impacts." While this may be true, enough is known about the location of endangered species and wetlands to make a reasonable and informed evaluation and decision now, and not waste public money any further on infeasible sites. 42

Air Quality

Mitigation A-1. Cumulative air quality emissions. List the ferry routs that would reduce air quality emissions. The mitigation should specifically recommend eliminating the routes in order to ensure emissions are reduced to less than significant. With the newly deleted sites, would the net pollutant load would be the same or less than today? 43

Impact A-3.1 This mitigation speaks to parking management strategies that would reduce the impact of cold-start vehicles by limiting the amount of parking at ferry terminals to a level less than full ridership. How would this mitigation likely affect ridership rates. Discuss the potential for decline in the number of users if the lack of parking extends travel time. 44

Land Use

Zoning/Future Developments - The discussion on page 3.7-8 states that the existing ferry terminal facilities tend to be incompatible with industrial and open space/recreation land uses. Which potential terminal locations have these adjacent land uses? 45

The Land Use Significance Criteria are inadequate to address potentially significant land use impacts. They should be revised to include at least the following: 46

- growth inducement in currently unpopulated areas;
- potential loss of agricultural lands to developed uses;
- failure to conform to existing land use designations in current General Plan, and
- inducement of the loss of further wetlands/baylands that would remove potential restoration sites.

The land use impacts identified only address impacts to established communities and to existing residents. Potential impacts to restoration of the Bay/estuary resulting from development of terminals and operation of a ferry service would result in increased growth pressure to adjacent or nearby agricultural lands and/or diked historic baylands which could be restored to tidal and/or seasonal marsh. Address the potential land use impacts in the areas of growth inducement, loss of agriculture and loss of opportunity for tidal marsh restoration or seasonal wetland enhancement, in the undeveloped area of Martinez and Hercules that would result from the establishment of ferry service in undeveloped areas: 47

Noise

Identify potential noise impacts to Clapper Rail and possibly other species which, like the Clapper Rail, depend on sound to develop pair bonds and nest successfully. 48

Transportation

Impact T-2 New parking would be needed to accommodate users. The discussion indicates that WTA would "seek to encourage and increase transit access to terminals." How would this be done? Is this a feasible mitigation? How would this impact ridership? Mitigation T-2.1 is too vague to evaluate. What components would a terminal specific plan need to include to address this impact? 49

Ridership

Discuss the potential for riders to be taken from existing modes to ride a ferry system with an end result that there is no or minimal decrease in congestion? 50

Discuss the impacts of increased ferry service on other modes of transportation ferry. Would bus service lose riders because they are attracted to ferries? 51

Sincerely,

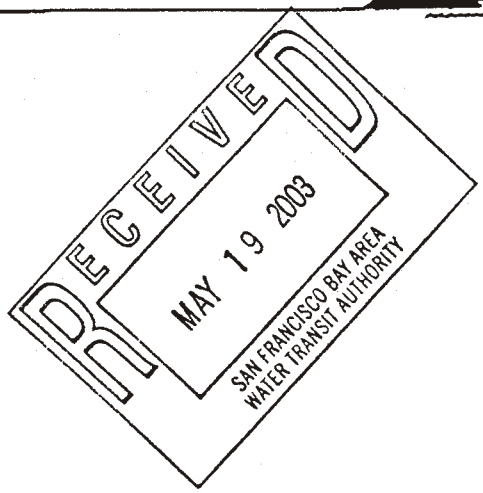
Barbara Salzman, Co-chair
Conservation Committee

Phil Peterson, Co-chair
Conservation Committee

EIR 1014

LEAGUE OF WOMEN VOTERS OF THE BAY AREA

An Inter-League Organization of the San Francisco Bay Area



TO:

Water Transit Authority
120 Broadway
San Francisco, CA 94111

sent via facsimile: 415.291-3388

Including Cover Page: 4 pages

FROM: LWVBA

1611 Telegraph Avenue, Suite 300, Oakland, CA 94612
www.lwvba-ca.org

LEAGUE OF WOMEN VOTERS OF THE BAY AREA
An Inter-League Organization of the San Francisco Bay Area

May 16, 2003

Water Transit Authority
120 Broadway
San Francisco, CA 94111

sent via facsimile: 415.291-3388

Re: Revised DRAFT Programmatic EIR

Dear Sirs:

The League of Women Voters of the Bay Area appreciates the opportunity to comment again on the Revised DRAFT EIR (DEIR) for the Water Transit Authority Implementation and Operations Plan (IOP). We commend you for revising and reissuing the DPEIR and for reducing the size of the project in response to comments you received. 1

We have attached our original comment letter dates January 6, 2003, as we feel some of the key points have not yet been included. We refer to the cumulative impact analysis which is one of the values of a programmatic EIR. The wide-range of potential combinations of terminals and routes complicates this requirement but does not eliminate it (bulleted points [5] noted on page one and two of the January letter). 2

Again, as there are numerous facets to ferry service for decision makers to weigh, we urge more information in a summary table format. This would provide information in a form simpler to review and compare in terms of impacts and proposed mitigations. For example: 3

1. A chart comparing vessel types with regard to potential impacts of noise, degradation of air and water quality, erosion potential, impacts on endangered species, ridership projection and cost effectiveness. 4

2. A transit chart including the number of existing transit routes serving the proposed terminal vicinities and their frequency, and new transit service anticipated in the ridership and cost estimates. 5

3. Terminal design, including bike and predestrian use, should be discussed as a mitigation for increased terminal land-use and traffic impacts, not just for aesthetic impacts. 6

These comments are being sent in the hope that the EIR will reflect answers to these important issues. Thank you for considering our comments.

Sincerely,

Eva Alexis

Eva Alexis, President

Sandra Threlfall, Vice President

attachment

LEAGUE OF WOMEN VOTERS OF THE BAY AREA
An Inter-League Organization of the San Francisco Bay Area

January 6, 2003

Water Transit Authority
120 Broadway
San Francisco, CA 94111
Fax: (415) 291-3388; email@watertransit.org

Re: Draft Program EIR on the Water Transit Authority Implementation and Operations Plan

The League of Women Voters of the Bay Area appreciates this opportunity to comment on the DRAFT Program EIR (DPEIR) for the Water Transit Authority Implementation and Operations Plan (IOP). We appreciate that the Water Transit Authority has been under very tight time constraints for preparing the IOP and DPEIR for such a wide-ranging project. We are cognizant of the many unknowns about future transit links that affect the evaluation of possible terminals and look forward to joint study of those sites by WTA and landside transit agencies. For now, WTA's final documents could better inform decisions by including more of the following information:

Cumulative impact analysis is one of the values of a programmatic EIR. The wide-range of potential combinations of terminals and routes complicates this requirement but does not eliminate it. Examples of areas where cumulative analysis seems essential are:

- On the waterside, cumulative impacts on threatened and endangered bird and fish species and their habitats are critical. The Clapper Rail is one of the few species discussed in the Appendix. Yet the total extent of Clapper Rail habitat that may be impacted by the various alternatives and the recommended ferry program due to wake, erosion, filling, excavation and indirect impacts is not clear. Cumulative impacts to steelhead and salmon are similarly critical.

- On the land side, the cumulative adverse impacts of large parking lots and air and water quality problems related to many cars driving to ferries is not clear. The estimated acres of new parking by the Bay to support the ridership postulated for each terminal and the relation to runoff, traffic generation and any induced low density development need to be developed.

Consistency between the Implementation and Operations Plan and the DPEIR needs to be improved. Most noticeably:

- Potential impacts on rafting migratory waterfowl that depend on the Bay waters during winter months acknowledged in the IOP should be assessed in the DPEIR and recommended impact mitigations or avoidance included in the DPEIR.
- Mitigations for negative land use impacts of car linkage to ferries are included in the IOP but not in the DPEIR. Pedestrian, bike and transit access preference in terminal design and transit oriented land use at the terminal are included as an aesthetics mitigation. Such terminal standards are more importantly a land use mitigation to support transit and pedestrian oriented ridership.
- The DPEIR includes only land use impacts and mitigations for developed areas. Impacts on sensitive habitat and agriculture must be included.

As there are many facets of ferry service for decision makers to weigh, we urge more information in summary tables including:

- A chart comparing the vessels analyzed with regard to the potential impacts of noise, degradation of air and water quality, erosion, and loss of endangered species, as well as cost effectiveness. The chart should identify which vessel type is being suggested for each route to aid evaluation of the cumulative significance of the impacts.
- A complete chart of existing land use and planned land use at proposed terminals (the Land Use Matrix following Appendix page 3.7-25 omits Gnoss Field, Hamilton, and Port Sonoma). It should be clear in the chart which locations require a general plan amendment.
- A transit chart including the number of existing transit routes serving the proposed terminal vicinities and their frequency; the consistency of ferry terminal location with local jurisdiction transportation and transit agency plans; and new transit service anticipated in the ridership and cost estimates.
- A chart listing ferry terminal sites being dropped from consideration for this ten year plan and those retained with the relevant findings (eg. amount of dredging, estimated ridership, cost per passenger and/or environmental damage). This would provide a very valuable reference as the ferry program unfolds and the plans and considerations of localities and agencies shift.

The latter chart is of particular interest to our 21 local Leagues as we endeavor to promote a cost-effective, balanced regional transportation system. Thank you for your consideration.

Sincerely,

Eva Alexis Bansner,
President

Sandra Threlfall
Administrative Vice President
510-339-9233 <threlfall@pacbell.net>

1611 Telegraph Avenue, Suite 300, Oakland, CA 94612
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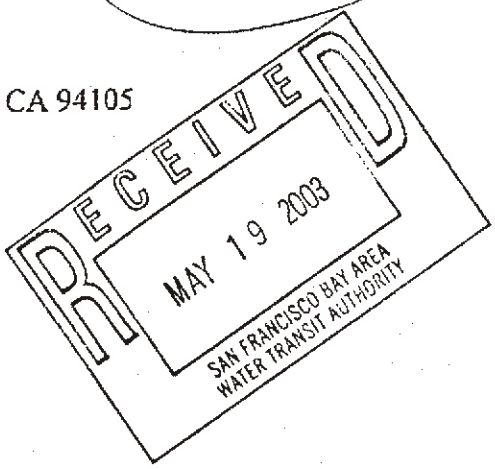
EIR 1015

SIERRA CLUB

85 Second Street, Box SFG, San Francisco, CA 94105



May 16, 2003

Attention: WTA EIR Comments - April 2003
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111, Fax: 291-3388

Re: Additional Sierra Club Comments

Thank you for reissuing the WTA EIR with some necessary enhancements. The following comments are in addition to Stuart Flashman's May 14, comment letter.

Energy Impacts: Table 3.13.1 shows useful information for the comparison of ferry service to other transportation including Btu/PMT - thank you. This Table should also include similar data for current and Alternate 3 (expansion of current) ferry service). These routes are described in detail in the appendix. However, passenger counts for each run on each route are not provided. This information must be readily available because it was included in the totals shown in the Table and should be shown in the Appendix. In addition the Table should be expanded to show the same information by route for the preferred and expanded service alternatives. When ferry funding is available, this information will be useful to decision makers and the public to decide which routes should be funded first. 1

In addition the performance characteristics of the proposed vessels, including: maximum speed, fuel consumption and maximum passenger capacity, for each route, should be shown in Table 3.6.1. Again all of this information is available and will be useful in the future. 2

Parking Impacts: The EIR should include the parking fee proposed for each terminal that induces the high level of driving to each site. Each terminal should also include an alternative parking facility based on parking fee covering all costs of construction and land acquisition plus a contribution to the feeder bus system to reduce the price of a monthly bus pass and encourage transit use to the ferry terminal and other sites. This alternative should describe a smaller parking facility and increased feeder bus ridership along with the changes to total ferry ridership. It is important to reduce parking because each parking place represents two daily "cold starts" and studies show that most automobile air pollution is generated during "cold starts". This alternative should also be shown in the air quality section as an alternate to Table 3.6.5. 3

Express Bus Alternative: This Alternative should be reconsidered to provide service from where people live, not from terminal location parking lots. Buses are much smaller than ferries and can often reach capacity with a few stops in a neighborhood before going into express mode. This express service should utilize HOV lanes. A small parking lot, near the start of express mode, with a parking fee, can be available for those who occasionally need return service at 4

times when local pick up is not economical. This alternative will be useful to decision makers. The phrase on page 2.8 about limits to additional bus traffic is incorrect because buses from most of the areas proposed for ferry service have easy access to the Transbay Terminal from the Bay Bridge. We do agree that better bus service can be complementary to ferry service because buses can help increase reverse commute on ferries, but more bus service is a function of parking fees. 5

BART Alternative: BART is currently studying and will provide automatic train controls to allow them to reach 2025 capacity. This along with new vehicles with more doors will permit an increase in capacity to San Francisco over 2025 capacity. This will accomplished by shortening dwell time in the stations. This more realistic alternative, which permits incremental increases in capacity at modest cost should be considered instead of the immensely costly new tube. It should be noted that he entire Proposed Project ridership can be accommodated on less than 20 additional BART runs per day. 6

New vehicles will be funded as follows: By 2025 BART will need new cars for service expansions. These new cars can all have three doors with no significant increase in cost. In addition by then some current vehicles will replaced with three door cars. Less dwell time will mean shorter total run times. Thus, this capacity increase will achieved with one additional ten car train and only minor capital cost.

The Sierra Club believes that it will take a full discussion of all of the above for the Bay Area to learn whether a Ferry System is part of our future solution to our transportation problems or just a nice idea that compounds the problem.

Very truly yours,

Howard Strassner

Howard Strassner, Chair Transportation Committee
419 Vicente, San Francisco CA 94116, 661-8786, (h,w,fx)
email: ruthow@juno.com

EIR 1016

United States Department of the Interior

NATIONAL PARK SERVICE
Golden Gate National Recreation Area
Fort Mason, San Francisco, California 94123

RECEIVED
MAY 19 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

IN REPLY REFER TO:

D-18 (GOGA-SPI)
MAY 15 2003

Charlene Haught Johnson
Chairperson
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: Water Transit Authority's (WTA) Revised Draft Program Environmental Impact Report (EIR)

Dear Ms. Johnson:

As per our earlier comments on the Implementation and Operations Plan (IOP) and the Draft EIR, the Golden Gate National Recreation Area (GGNRA) would like to congratulate you and your staff on the level of professional work reflected in both your process and this revised and combined document. It allowed for and acknowledges, many public and agency comments to these previous two documents. The following are our supplementary comments to previous comments on the two documents. 1

While we understand that there was a need to reduce the number of terminals from the previously-proposed alternative from a cost perspective, and to better integrate an evaluation of the IOP into the DEIR, our previous comments requested that you more effectively integrate recreational service into the IOP. That has not as yet been reflected in the revised documents; in fact, recreational ferry access was dropped completely in this last draft as an element of your preferred alternative. We would like to reiterate our concern that such a service would be in the broader interest of the traveling public, many of whom may never use ferries for commuting, and it would provide for revenue during the off-commute periods. 2

Furthermore, with GGNRA now considered to be the most visited destination in California according to the California Department of Tourism with over 15 million visitors (including residents), providing such an alternative water access opportunity will reduce both emissions and traffic on weekends and during non-commute hours. We have provided your office with the market demand estimates which further substantiate this as a viable service. 3

More specifically, there are a few areas where you could improve recreational ferry access in this plan and EIR. First, in Section 2, under a new title "Associated Projects," you could identify and describe our complementary efforts and your agency's commitment to working with GGNRA on an effective and integrated water transit system so as to insure reasonable intra-operational transfers, efficient utilization of available fleets and congestion-relief on weekends. Second, as part of the proposed project, we have discussed the inclusion of an in-line service on the Number 7 route from Berkeley-Ferry Bldg. which would bring it over to Fort Mason or the Presidio during non-commute hours and on weekends. This would provide a vital bridge in service between your proposed commute services into the Ferry building from outlying areas with a supplementary recreational ferry service to national, state park and other recreational sites. 4 5

We wish to also address two issues previously raised regarding park and recreational water access. First, comments from the SF Bay Conservation and Development Commission (BCDC) seemed to indicate a number of concerns with recreational ferry access which included shoreline access for the public, competition for parking between commuters and recreational users, consistency with jurisdictional land use plans, and evaluation of the specific impacts to species. While we share their objectives in raising these issues, we also understand that many of these concerns were focused on non-park sites, and that these concerns will be addressed in more specific project-level environmental documents by the corresponding jurisdictions where new terminals are proposed.

In our discussions to clarify this with Lindy Lowe, author of the comments from BCDC, she indicated that their comments did not pertain to our sites, nor our proposed recreational ferry links; on the contrary, she recognized that we would insure that such a service protected our park and regional resources, and that in fact she was very supportive of recreational ferry access to park sites as an alternative means of transportation, an important linkage to the Bay trail, and an expanded experience and access for those without cars. One of their principal concerns was the use of recreational areas by commuters for parking which is something we think can be addressed through parking management and ticketing in our plan. 6

The second issue relates to water transit access to Berkeley's Eastshore State park. We have commented on the Eastshore State park plan, and asked that recreational ferry access be identified within their state plan as a vital link between park and recreational sites around the SF Bay. This had been identified as an important and early recommendation previously in a Congressionally-mandated, 1977 Golden GateTravel Study undertaken by the Metropolitan Transportation Commission which included the county, regional, state and federal transportation agencies, as well as the state and national park jurisdictions. We understand that the state park is committed to include that in 7

their final planning, and we look forward to working with them and your agency on realizing that objective.

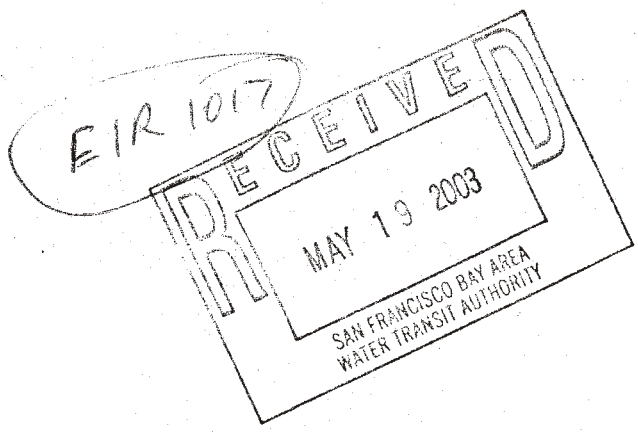
We have discussed these comments with your staff, and want to thank them for their openness and willingness to work with us on our comments and concerns. With the mutual objectives of providing improved ferry access in an environmentally-sensitive manner, we would like to work with you on insuring the visibility and importance of recreational ferry access in your plan while insuring a healthy Bay Area ecosystem.

Sincerely,

Brian O'Neill
General Superintendent

Cc: Tom Bertken, CEO (WTA)
Steve Castleberry, Manager of Systems Planning (WTA)

Tristan Bettencourt



From: email [email@watertransit.org]
Sent: Friday, May 16, 2003 2:24 PM
To: Tristan Bettencourt
Subject: Fw: EIR Comments

----- Original Message -----
From: <pk@well.com>
To: <email@watertransit.org>
Sent: Friday, May 16, 2003 12:13 PM
Subject: EIR Comments

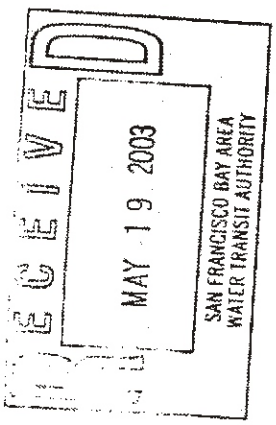
> Below is the result of your feedback form. It was submitted by
> (pk@well.com) on Friday, May 16, 2003 at 12:13:49
> ----------
-
>
> email: pk@well.com
>
> Name: Paul Kamen
>
> EIR_Comments: Why did you toss your detractors such a softball with table Table 3.13.1?
>
> <p>It is inappropriate and self-defeating to use medim-speed and fast ferries for the energy analysis, because these speeds are not necessary for the relatively short ferry runs that would be introduced by SB 915/916. 1
>
> <p>The analysis assumes 8,000 HP for the 350 passenger ferries and 2,900 HP for the 149 passenger ferries. These estimates are based on existing designs optimized for speed, not fuel economy, with hull forms optimized for low construction cost. 2
>
> <p>I refer again to the
>
> preliminary concept design on the
>
> Berkeley Waterfront website. 3
>
> <p>By Optimizing for low speed with long slender hulls, it is easy to show that an 18-knot 149-passenger ferry does not need to have more than 700 installed horsepower. (18 knots is fast enough to cover the 5.6 miles from the Berkeley Marina to SF in less than 20 minutes.)
>
> <p>This works out to 665 BTU/passenger mile, about the same as a bus. Assuming only 50% average passenger load, we are still at 1330 BTU/passenger mile, about four times as fuel-efficient as cars. 4
>
> <p>No new technology is required. Slow, long and thin are basic principles of ship design that have been around for thousands of years. 5
>
> <p>WTA also displays an astounding degree of technical naivety by suggesting fuel cells as a possible answer to the high energy requirement. Come on, you can do better than this. 6
>
> <p>Paul Kamen, naval architect, Berkeley Ferry Committee.
>
>
>
>

Friends of the Albany Ferry

1393 Solano Avenue, #B, Albany, CA 94706

Phone & Facsimile: 510/559-9119

EIR 1018



May 16, 2003

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

To Whom It May Concern:

On behalf of the Friends of the Albany Ferry, we appreciate the effort involved in producing the "Revised Draft Program EIR Expansion of Ferry Service. It is our understanding that the IOP is now identified as the Proposed Project in this EIR. In reviewing this EIR, many of the comments for the previous draft are still legitimate. We believe the new Berkeley/Albany ferry line will be one of the most necessary and popular routes in WTA's proposed system. 1

In this DEIR, however, according to Table 2.1 and Figure 2.1, a preferred terminal location has been relocated to University Avenue in Berkeley rather than Gilman Street in Berkeley which is where many of the initial IOP studies were developed. Gilman Street was initially selected because of its many obvious landside advantages. What decisions or information prompted the relocation? 2 A second "unspecified" Berkeley site is also listed in that Table. Could you clarify what that represents and where that might be? 3

While the University Avenue site has some advantages, it does have serious drawbacks in terms of access, parking, open space conflicts, spatial viability, planning, and expansion potential for a regional ferry. We believe that the Gilman Street site, and the potential Buchanan Street site, offer much better landside connections, will draw many more commuters, and serve the region's transit needs much better. 4

It is obvious that much more information needs to be reviewed before an informed decision can be made about the location of an Albany/Berkeley/Albany terminal. Is it possible to study all three sites (University Avenue, Gilman Street, & Buchanan Street) thoroughly and equally in a future site-specific EIR before any final site decisions are made? 5

Questions that need to be answered for the University Avenue site are as follows:

1) Any EIR or conceptual Berkeley ferry study should explain why two previous lines at the Berkeley Marina failed. Does the Marina site have particular problems for ferry service? Does a Gilman Street or Buchanan Street terminal have potential advantages that might guarantee a more successful ferry line?

2) Given projected ridership numbers and based on ingress and egress configurations, can the University freeway exit provide adequate access for a regional ferry line compared to Gilman or Buchanan Street?

3) Would the University Avenue freeway exit have to be reconfigured to service the equivalent amount of commuters that Gilman Street or Buchanan Street could service? What is the expansion potential for a large number of ferry commuters at the University Avenue freeway exit?

4) In order to most efficiently serve ferry commuters, do local bus operators prefer a Marina, a Gilman Street or Buchanan Street location?

5) Where are the majority of Berkeley/Albany ferry riders coming from and returning to? During peak travel times, how do these commuters enter and exit from a University Avenue ferry terminal? Where would they enter and exit from a Gilman Street or Buchanan Street Terminal?

6) Based on ingress and access, how many ferry riders are projected for a Berkeley Marina Terminal? For a Gilman Street Terminal? For a Buchanan Street Terminal (see Figure 4 of IOP, "Water Transit Ridership Sensitivity Analysis")?

7) Based on parking, how many ferry riders are projected for a Berkeley Marina Terminal? For a Gilman Street Terminal? For a Buchanan Street Terminal (see Figure 4 of IOP, "Water Transit Ridership Sensitivity Analysis")?

8) Based on both parking AND access, how many ferry riders are projected for a Berkeley Marina Terminal? For a Gilman Street Terminal? For a Buchanan Street Terminal (see Figure 4 of IOP, "Water Transit Ridership Sensitivity Analysis")?

9) Based on the Berkeley Marina Master Plan (5/03 Draft) and the 2003 Ferry Implementation and Operation Plan, there is not enough parking to service a regional ferry line at the Berkeley Marina. Where would the required 500-600 parking spaces be located for a Berkeley Marina Ferry Terminal?

10) Based on the Berkeley Marina Master Plan (5/03 Draft) and the 2003 Ferry Implementation and Operation Plan, there is not enough parking to service a regional ferry line at the Berkeley Marina. Could the terminal and required 500-600 parking spaces be more efficiently located at a Gilman Street or Buchanan Street Ferry Terminal?

11) Would the required parking for a Berkeley Marina Terminal interfere with existing businesses and open space areas?

12) Would the required parking for a Gilman Street or Buchanan Street Terminal interfere with existing businesses and open space areas?

13) What is the expansion potential and maximum ridership for a Berkeley ferry line as compared to a Berkeley/Albany ferry line with a Gilman Street or Buchanan Street Terminal (see Figure 4 of IOP, "Water Transit Ridership Sensitivity Analysis")?

14) From an emergency or disaster planning point of view, does a Marina ferry terminal best serve the region with its tenuous connections to East Bay communities, or does a Gilman or Buchanan Street ferry terminal best serve the area?

15) A ferry terminal at Gilman Street is well-documented in Berkeley's 2001 General Plan (Transportation Policy T-9), Albany's 2000 Traffic Management Plan, Albany's 1995 Proposal for Eastshore State Park, the 2002 Eastshore State Park EIR, and the racetrack's proposed 2002 San Antonio Plan for waterfront development. These important policies are not mentioned in your selection of the Berkeley Marina as a preferred location. Were they studied and how do they affect your selection of a Berkeley/Albany terminal site?

16) The 2003 Berkeley Master Marina Plan identifies no potential areas or proposals for a future ferry terminal. In comparison, the racetrack's proposed 2002 San Antonio Plan for waterfront development, Berkeley's 2002 General Plan, the 2002 Eastshore State Park EIR, Albany's 2000 Traffic Plan, and the 1995 Albany Waterfront Plan all include a ferry terminal at Gilman Street. Which site serves a regional ferry best and which offers the most potential for expansion and better public transit?

17) It appears two state agencies (State Parks & Recreation and the Water Transit Authority) are concurrently studying this portion of the East Bay's shoreline. Given the impacts of this popular new transportation element and the many people who will eventually be connecting to a ferry somewhere in the vicinity of the State Park, are you coordinating ferry studies and planning with the California Parks & Recreation Department?

18) Based on the Berkeley Marina Master Plan (5/03 Draft), Albany Plan for the Eastshore State Park (1995), and the Eastshore State Park EIR (2002), which of the three sites provides the easiest integration into the future Eastshore State Park?

19) Could a ferry terminal located at Gilman Street or Buchanan Street provide and integrate the Bay Trail extension from Gilman Street to Buchanan Street to supplement the Eastshore State Park?

20) Could a ferry terminal located north of Gilman Street share parking needs with EBRPD's proposed new ball fields planned for south of Gilman Street?

21) Based on the Berkeley Marina Master Plan (5/03 Draft), Albany Plan for the Eastshore State Park (1995), and the Eastshore State Park EIR (2002), which site could best serve recreational ferry users?

22) Based on the Golden Gate National Recreation Area current planning for ferry service, do they prefer a Marina location or would another location serve them better?

23) Based on the California Department of Parks & Recreation EIR for the Eastshore State Park, which potential terminal location best serves their long-term interests?

24) What kind of user taxes are associated with a ferry service? Would one community, say Berkeley or Albany, collect all the taxes depending on the terminal location or could both communities benefit mutually from a larger, regional more successful ferry?

Thank you for addressing our concerns. Again, congratulations on a balanced and sensitive approach to expanded ferry service that will satisfy the vast majority of likely users very well!

Sincerely,

Jerri Holan, Captain
Friends of the Albany Ferry

cc: Albany City Council
Albany Waterfront Committee
Berkeley City Council
Berkeley Waterfront Committee

EIR 1019a

ALAMEDA COUNTY
CONGESTION MANAGEMENT AGENCY

1333 BROADWAY, SUITE [illegible]

Fax #	Fax # 415 291 3388
Phone # 510 836 2560	Phone #
Co. ACCMA	Co./Dept. WTA
From Dennis Fay	To Thomas Bertken
Date	Post-it® Fax Note 7671
# of pages ▶ 7	

RECEIVED
MAY 19 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

May 16, 2003

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

SUBJECT: Comments on the Revised Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service in the San Francisco Bay Area

Dear Mr. Bertken:

The ACCMA has reviewed the Revised Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service in the San Francisco Bay Area. The ACCMA submitted comments on the original Draft Implementation and Operations Plan and Draft Program Environmental Impact Report on October 30, 2002. With the exception of the revision to Mitigation T-2.1, on Page 3.12-3, which incorporated a measure for local jurisdictions to participate in the study to develop a terminal specific plan, the other comments in the October 30, 2002 letter are still applicable to our concerns about the project. This letter is attached. 1

The ACCMA respectfully submits the following comments on the revised Draft Program Environmental Impact Report: 2

- Page 3.6-5, Mitigation A-2.1: Techniques for encouraging non-drive access should include who is responsible, such as transit agencies and municipalities, in cooperation with the Water Transit Authority, and how it will be funded.

Thank you for the opportunity to review the DPEIR. Please do not hesitate to contact me or Diane Stark at 510/836-2560 if you require additional information.

Sincerely,

Jean Hart
Deputy Director

cc: Chron
Diane Stark, Senior Transportation Planner
file: CMP - Environmental Review Opinions - Responses - 2003

ALAMEDA COUNTY CONGESTION MANAGEMENT AGENCY

AC Transit
Director
Patrisha Piras

Alameda County
Supervisors
Gail Steele
Scott Haggerty

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City of Albany
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Peggy Thomsen

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Jeff Wieler

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Chairperson
Mayor
Tom Pico

City of San Leandro
Mayor
Shelia Young

City of Union City
Mayor
Mark Green

Executive Director
Dennis R. Fay

October 30, 2002

Mr. Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

SUBJECT: Comments on the Draft Implementation and Operations Plan and Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service in the San Francisco Bay Area

Dear ~~Mr. Bertken~~ Tom:

The ACCMA has reviewed the Draft Implementation and Operations Plan (DIOP) and Draft Program Environmental Impact Report (DPEIR) for the proposed expansion of ferry transit service in the San Francisco Bay Area. We respectfully submit the following comments.

- The DPEIR should demonstrate how the proposed ferry system reduces congestion by transportation corridor in addition to using regional reduction in VMT. The DIOP and DPEIR describe the Bay Area highway and transit systems inability to handle current and future demand. The DPEIR lists travel times in various travel corridors and lists the 25 most congested corridors in the Bay Area (in Table 3.12-4). Comparing the proposed WTA Alternative 1 ferry system to Table 3.12-4 of the DPEIR shows that about 6 of the 25 congested Bay Area corridors parallel the proposed ferry routes. A comparison of the proposed ferry system and the location of congestion in Alameda County appear to show that the ferry system will have little impact in relieving congestion except in the I-80 corridor, which is one of the 22 congested locations in Alameda County. The a.m. and p.m. peak hour LOS F segments identified in the 2002 LOS Monitoring Report for Alameda County are attached for your information. Most of our congestion occurs in central, south and east Alameda County where no ferry service is provided or recommended. Reference to the most congested corridors should focus on those where ferry service is proposed.

- Table 3.12-14 of the DPEIR appears to show that 55 percent of the ferry ridership in the Bay Bridge corridor will come from BART and AC Transit. Total ferry ridership for WTA Alternative 1 is about 44,000 riders, of which 23,000 use existing ferry services. Of the 21,000 new ferry riders approximately

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E-MAIL: mail@accma.ca.gov • WEB SITE: accma.ca.gov

41 percent (8,720) come from existing transit services (not ferry) in the Bay Area. The DPEIR should clearly show net new transit riders and discuss what mitigation is proposed to make up for the revenue losses to existing transit service. This is important in terms of making regional investment choices. Alameda County needs to balance the expense of new ferry service with any additional expense to existing transit as a result of implementing new ferry service.

- Table 5 of the DIOP presents cost effectiveness measures for Bay Area Transit Operators. This table should also show the cost effectiveness measures for WTA Alternative 1 (all routes combined) for comparative purposes as well as cost effectiveness for net new riders. Without WTA Alternative 1, it is not possible to compare the relative cost effectiveness of the service being provided. Table 7 of the DIOP presents some comparison of costs per rider between WTA Alternative 2 and the Bay Crossing alternatives. Cost for Alternative 1 should be provided as well.

- The DPEIR should show what an equivalent investment in non ferry alternatives, such as BART or buses, would buy in terms of service and ridership. Also, do the cost include capital replacement?

- For mitigation measures D-1.1 (eliminating Gnoss Field, Moffett Field, SF International Airport and Oakland International Airport/Coliseum terminals), A-1.1 (eliminating low ridership routes) and A-3.1 (limiting the number of cars parking at terminals), the impact on ridership as a result of the reduction in number of terminals, basic route service, and amount of parking should be quantified and analyzed with respect to cost-effectiveness.

- The DPEIR addresses regional impacts, but does not address local impacts at the same level stating that the effectiveness of transportation and air quality impacts after mitigation cannot be quantified because the number and design of the ferry terminals is not defined. However, the DIOP and the DPEIR clearly show the number and location of ferry terminals, and base the ridership projections on the assumed number and size of these locations. Based on the assumptions for ridership and parking demand in the DIOP and DPEIR, types and costs of transportation mitigation measures needed to accommodate terminal impacts and handle parking demand at the local level need to be addressed. This could be handled similar to the way stations are addressed in BART extensions environmental documents.

- The funding of terminal construction and mitigating impacts of terminal activity need to be addressed in the DPEIR. The DIOP, Figure 34, assumes an average

cost of $10 million per terminal, which include costs for waterside facilities and a limited amount of parking. Because ridership projections are based on additional terminal facilities, it is reasonable to include the full costs and impacts of these new terminals; therefore, the terminal costs should also include land acquisition, parking facilities and transportation mitigation. The implementation and funding of the ferry service and construction of terminals should assume adequate parking rather than assuming parking will be reduced or spillover into neighborhoods as stated in Impact T-2. Provisions should also be made with the transit operators in terminal locations where existing bus service cannot be rerouted to accommodate terminal access.

- Page 3.12-2 and 3, Current Highway Bottlenecks: The first paragraph in the section is incorrect. Caltrans' Highway Congestion Monitoring Program was not discontinued in 1998. Reports are available through 2001.

- Page 3.6-12, Section 3.6.2: The air quality assessment should compare the different rates of emissions by travel mode. As noted below, 66 percent of ferry passengers are assumed to drive to terminals. It is inconsistent to assume 66 percent of passengers will drive to the terminals and then not address cold starts in the document by stating that not enough information is available about terminal locations.

- Impact T-1, page 3.12-6: The most aggressive ferry option would have a daily ridership of about 49,000, of which 66 percent are assumed to drive, 16 percent are assumed to arrive by bus or rail and 19 percent are assumed walk. How were the mode splits for accessing the terminals determined? How does the model work with respect to bus access? How will bicycle access be accommodated to the terminals and what percentage will arrive by bike? A clear discussion of the ridership estimates and how they were developed needs to be presented in the DPEIR.

- The DIOP and DPEIR imply that the new ferry service will provide congestion relief to the congested corridors and assumes 66 percent of passengers will drive to the terminals. Is the result of this that congestion is just being moved around? For example, in the I-80 corridor, which has been identified in Caltrans 2001 HiComp report as the most congested corridor in the Bay Area, are passengers using I-80 to access the Berkeley terminal or does the model assume passengers will only be coming from Berkeley?

- Page 3.12-7, Mitigation T-2.1: Local jurisdictions should also participate in the study to develop a terminal specific plan. This plan needs to also include a

financial plan and the cost to fully develop the terminals needs to be assumed in the costs of the project.

Thank you for the opportunity to review the DPEIR. Please do not hesitate to contact me or Beth Walukas at 510/836-2560 if you require additional information.

Sincerely,

Dennis R. Fay

Dennis Fay
Executive Director

cc: Chron
Jean Hart, Deputy Director
Beth Walukas, Senior Transportation Planner
file: CMP - Environmental Review Opinions - Responses - 2002

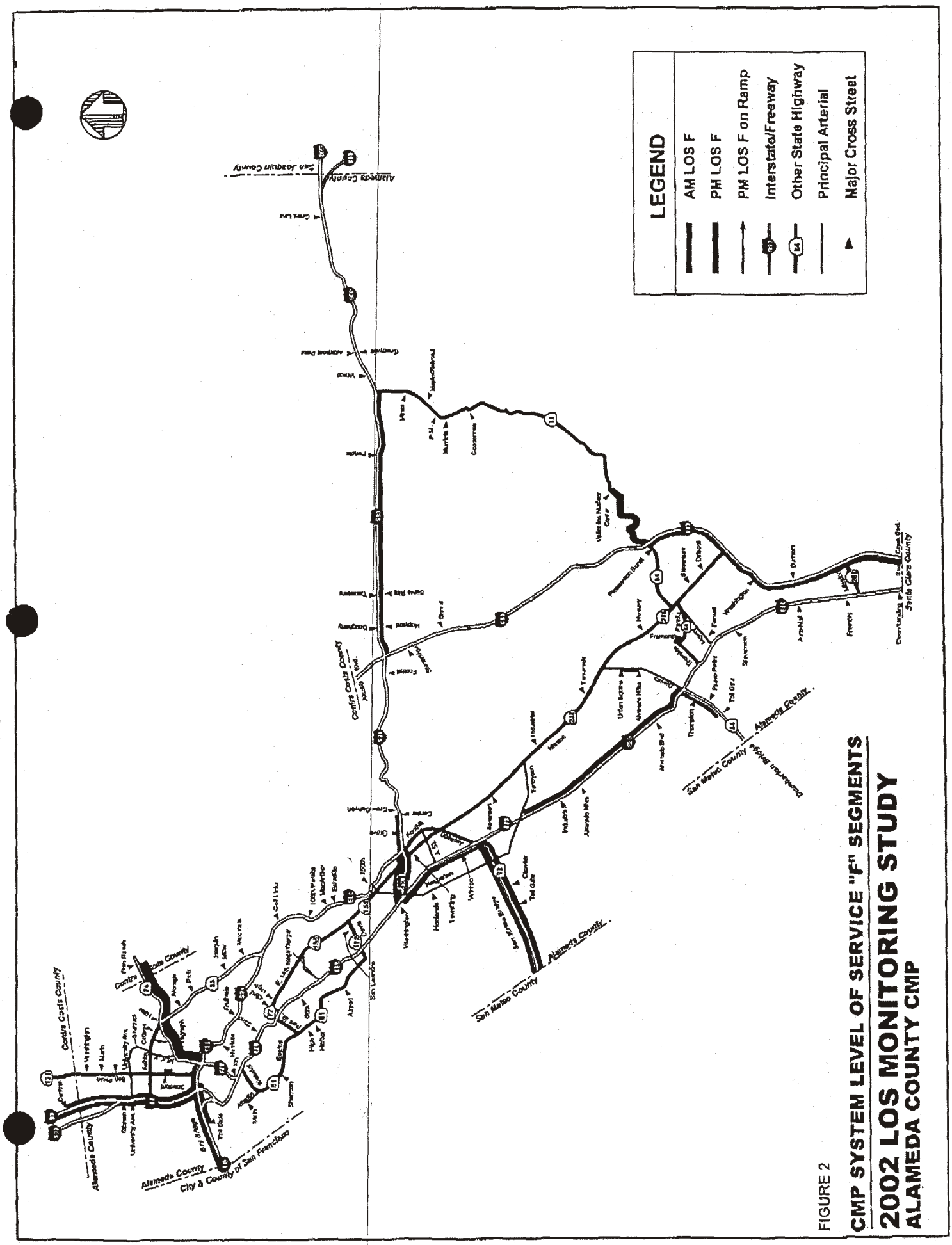

FIGURE 2

CMP SYSTEM LEVEL OF SERVICE "F" SEGMENTS

2002 LOS MONITORING STUDY
ALAMEDA COUNTY CMP

EIR 1020

Berkeley Ferry Committee
The Wave of the Future

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RECEIVED
MAY 16 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

May 16, 2003

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

Sirs:

I write on behalf of the Berkeley Ferry Committee, to commend and consider the Environmental Impact Report on the Revised Draft Program currently being circulated for review by the Water Transit Authority. The Berkeley Ferry Committee was very deeply involved in support and promotion of two prior ferry services from the Berkeley Marina, both set up as an emergency response to a transportation crisis (in the first instance, a fire which closed the BART tube in the 70's and the second, the closure of the Bay Bridge for one month due to damage from the '89 Loma Prieta earthquake.) Neither service survived for as much as a year after the end of the transportation emergency. We realize the many problems associated with the ad hoc nature of these emergency services will have been solved with the advent of thoroughly planned, new regional service, thanks to the efforts of the Water Transit Authority.

In light of this, we are concerned that the current Program Description (Table 2.1) designates the Berkeley Marina at the foot of University Avenue as the specific site for a ferry serving the Albany/Berkeley area. Every study of potential ferry sites that has been made over the past 10 years has indicated that a site at the foot of Gilman Street, near the Berkeley/Albany border, is preferable to the Marina/University Avenue site. Indeed, the WTA's own Demand Study, which identified Berkeley/Albany ferry service as having the highest projected ridership of any site except Treasure Island, was based on the assumption of a Gilman Street site. Moreover, another potential site at the foot of Buchanan Street in Albany (north of Golden Gate Fields) has many of the same favorable characteristics as the Gilman site. Accordingly, we strongly object to the pre-determination of the University/Marina site as the 'Proposed Project' site without fairly and thoroughly studying the Gilman Street, Buchanan Street, or, indeed, any other reasonable alternative. 1

We have the following specific questions that must be addressed:

1. What objective factors justify the apparent selection of the Marina/University Ave. site as the "Proposed Project" site over the Gilman and Buchanan Street sites? 2
2. On what basis or bases was the Marina site considered to be preferable to the Gilman Street site? To the Buchanan site?
3. Is there a reliable and substantial body of scientific evidence on which to base the conclusion that the Marina site involves a lesser impact on birds or wetlands, as compared to the other two sites? Should each site be studied in more detail in order to determine whether there is a reliable scientific basis supporting the selection? 3
4. What is the impact of the Marina site on the ridership projections contained in the WTA's prior planning documents, such as the IOP? Will the Marina site adversely affect ridership, and thereby reduce the positive environmental benefits of ferry service that have been demonstrated 4

to exist in WTA's prior planning and environmental reports? How does the Marina site compare with the Gilman and Buchanan sites in terms of ridership under the WTA's demand model?

5. What are the relative access constraints on the Marina site as compared to Buchanan or Gilman? Which site is most amenable to public transit service? Which of these sites is best able to handle the projected automobile and bus traffic making landside connections to the ferry service? Will the Marina site produce negative effects on traffic circulation in the area around the Gilman, Ashby Street and/or University interchanges? Will gridlock around University Ave. and I-80 result from the additional Marina-bound traffic created by selection of that site? Will the greater travel distance required to reach a Marina terminus as compared to Gilman or Buchanan have adverse effects on automobile and/or bus emissions?

6. What number of parking spaces does the WTA assume are required for the Berkeley/Albany service at the University/Marina site? If this projection is less than the 600 spaces indicated in earlier environmental documents and the original IOP, what basis is there for assuming a lower number of parking spaces will be required?

7. Are the necessary number of parking spaces, or land to create them, actually available at the Marina site? At Gilman or Buchanan?

8. What constraints on parking are created by the Berkeley Marina's contractual obligations to supply specified numbers of parking spaces for each of its tenants? Do these obligations conflict with the assumption that sufficient parking is available at the Marina?

9. What specific location is contemplated for a terminus at the Marina site? Inside the breakwater? Outside? In the South or North Basins?

10. Will the Marina site require significant dredging to accomodate the 12 foot channel depth specified by WTA? What are the relative impacts of anticipated dredging for the Marina, Gilman and Buchanan sites? Has the WTA mistakenly assumed that little or no dredging would be required?

11. What is the relative air quality impact of low speed ferry operations required inside the Berkeley Marina? How does this compare with the anticipated air quality impact of operation from Gilman or Buchanan Streets?

12. Do significant wetlands exist in or around each of the three sites? What wetlands impacts can be expected due to the increased traffic to and from the Marina? Are there substantially equivalent wetlands and impacts at the Gilman or Buchanan sites?

5

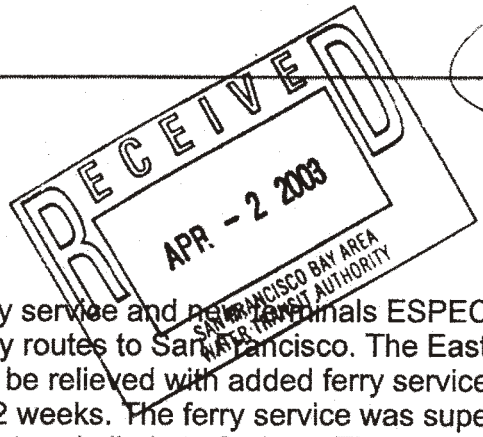
While many of us in Berkeley and Albany have fond recollections of ferry service from the Berkeley Marina, our principal concern is that this service succeed as part of a regional network, so that we make maximum use of the underused transportation resource that is the San Francisco Bay.

Respectfully submitted,

Linda S. Perry
Berkeley Ferry Committee

EIR 1001

Tristan Bettencourt



From: Barbara Cox [bjcox@attbi.com]
Sent: Wednesday, April 02, 2003 9:07 AM
To: email@watertransit.org
Subject: Expanded Ferry Service

My family strongly supports plans for expanded ferry service and new terminals ESPECIALLY for the Hercules/Rodeo and Martinez/Antioch, and Berkeley routes to San Francisco. The East Bay cities are underserved and congested freeway arteries would be relieved with added ferry service. 1

A year ago, my family visited Sydney, Australia for 2 weeks. The ferry service was superb and our own Bay Area would do well to model service and rates similarly to Sydney. The ease of ferry travel around the harbor communities of Sydney was ideal for tourists as well as residents and commuters. We had purchased transit passes at the airport on our arrival to Australia. The passes provided us with 'free' access anytime, anywhere, on trains (such as BART), ferries, buses, etc. ONE PASS for varied transit forms for x number of days. We enjoyed the ferries so very much, chosing to explore the various communities along the many ferry routes - several days were spent just hopping on and off a ferry then back to Sydney to switch to catch another ferry going a different route to explore. The passes were affordable for tourists and families and we were pleased with the ease of mastering the integrated transit system quickly. At the end of our day of exploring, we then boarded the train with the same pass - back to our hotel. 2

Unlike the Bay area where we have to purchase BART tickets and Ferry tickets separately - and then the price becomes too expensive for a family to do so routinely.

Extended multi-day passes need to be available to encourage ferry use by commuters and tourists. 3

Integrating the public transit Ferry and BART and Buses would offer individuals flexibility to explore the fine communites of the Bay area - especially along the waters edge in the Bay area. 4

Barbara & Gerald Cox
Lafayette

San Francisco International Airport

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EIR 1002

RECEIVED
MAY 5 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

May 1, 2003

Mr. Thomas Bertken
Chief Executive Officer
Water Transit Authority, DEIR Comments
120 Broadway
San Francisco, CA 94111

AIRPORT COMMISSION
CITY AND COUNTY OF SAN FRANCISCO

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CARYL ITO

JOHN L. MARTIN
AIRPORT DIRECTOR

Subject: ***Comments on the Expansion of Ferry Transit Service In the San Francisco Bay Area - Revised Draft Program Environmental Impact Report, April 2003***

Dear Mr. Bertken:

Thank you for the opportunity to review and comment on the Revised Draft Program Environmental Impact Report for the Expansion of Ferry Transit Service in the San Francisco Bay Area. San Francisco International Airport (SFO) is interested in opportunities to expand and improve alternative transportation access for the traveling public and those that work at the Airport. 1

SFO believes further study is required to consider ridership demand and operational feasibility to and from a water transit terminal at SFO. 2 The Airport looks forward to working with the Water Transit Authority to consider the surrounding environmental conditions and the practicality of water transit operations. Until such time as more project specific information is available with respect to a water transit connection at or adjacent to SFO, we will respectfully withhold further comment. 3

Should you have any questions or require additional information, please do not hesitate to call Richard S. Walsh, A.A.E. at (650) 821-5391. Thank you.

Very truly yours,

John L. Martin
Airport Director

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

EIR 1003

MAY 07 2003



Regulatory Branch

SUBJECT: File Number 27272S

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, California 94111

Dear Sir/Madam:

In response to the Re-circulated Draft EIR-Expansion of Ferry Transit Service in the San Francisco Bay Area (April 2003), the Corps would like to convey that it has concerns about the choice of Redwood City as a prospective South Bay ferry terminal location. 1

Redwood City and two nearby locations, Foster City and East Palo Alto, were chosen in the original "Comprehensive" Alternative 1 of the Draft EIR (August 2002, Fig. 2-1). A scaled-back alternative, the "Expanded Service" Alternative 2 (Fig. 2-2) dropped Foster City and East Palo as South Bay ferry terminal candidates. The project as presently proposed in the revised EIR has even fewer routes than Alternative 2, and it also chooses Redwood City as the South Bay ferry terminal candidate (April 2003, Fig. 2.1). Thus, the decision to choose Redwood City as the preferred South Bay ferry terminal candidate over East Palo Alto and Foster City appears to have been made early on in the site evaluation process. However, from an environmental standpoint, either one of these alternative locations would be preferable to Redwood City, and we question whether environmental impacts were given sufficient consideration in the ferry terminal site selection process. 2 3

The entrance to Redwood City is flanked by a considerable amount of sensitive tidal marsh habitat, including Bair and Greco Islands, which serve as habitat for numerous sensitive species, including Federally endangered California clapper rail (*Rallus longirostris obsoletus*). Harbor seals actively feed at the entrance to Redwood Creek (April 2003, Figure 3.5.7). In addition, the wake wash from continual ferry traffic may result in shoreline erosion at the approach to Redwood City, a potentially significant impact (April 2003, Summary of Impact WW-1). 4

In a letter to Mr. Thomas G. Bertken of the Water Transit Authority, dated March 25, 2003, we conveyed our concerns regarding this project. Activities that increase boat wake frequency and energy are on the rise in Redwood City, as indicated by the number of past, present, and future planned projects along Redwood Creek. The cumulative impact of these activies is already currently high, yet a Ferry Terminal operation at this location would result in even greater impacts. 5

We urge the Water Transit Authority to consider a South Bay ferry terminal alternative to Redwood City, such as Foster City or East Palo Alto, where shoreline erosion effects and the impact upon sensitive species and tidal marsh habitat would be greatly lessened. 6

If you have any questions regarding this matter, please call Andrew Muss of our Regulatory Branch at 415-977-8442.

Sincerely,

Edward A. Wylie

Edward A Wylie
Chief, South Section

EAST BAY REGIONAL PARK DISTRICT



BOARD OF DIRECTORS
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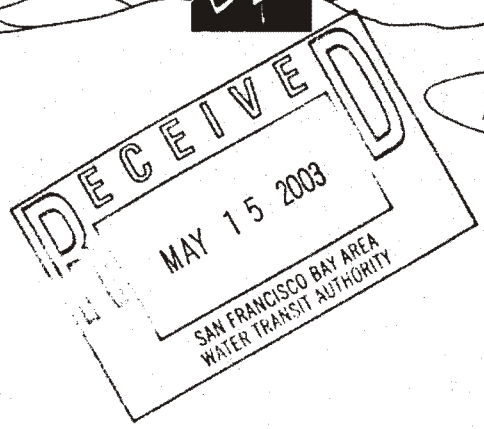

EIR 1004

May 9, 2003

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

RE: Recirculated Draft EIR, Expansion of Ferry Transit Service

Pursuant to the selection of the Proposed Project, the East Bay Regional Park District wishes to submit the following comments to supplement and update comments submitted by letter on October 24, 2002. The Park District owns and/or manages the following Regional Shoreline Parks, adjacent to Proposed Project sites:

Eastshore State Park (Berkeley/Albany)
The State of Park and Recreation Commission approved a general plan for the Eastshore State Park in December 2002. This plan will provide the WTA with information on proposed recreational and resource conservation actions in the Berkeley-Albany area. 1

For example, the adopted Eastshore State Park General Plan classifies most of the water areas along the Berkeley-Albany shoreline as "Recreation-Aquatic" and establishes management guidelines for that use. (ESSP General Plan, fig. III-3, attached) 2

The exact location proposed for the Berkeley-Albany and other terminals is unclear. The document contains references to sites both at the foot of University Avenue and to parking areas at Golden Gate Fields (Table 3.7.1). While ferry service at either site could have positive recreational impacts by providing alternative public access to parks and public shoreline, a terminal at the Gilman site could have several potentially significant impacts: 3 4

- Dredging: the document sites that there would be no need for dredging, except at Hercules. A Gilman Street location would require dredging. If a Gilman St. location is selected, dredging impacts should be considered.
- Wakes: The shoreline along Golden Gate Fields and the Berkeley "North Basin Strip" is not armored, and would be susceptible to erosion from wakes. In addition, Berkeley's North Basin is a calm-water rafting site for migratory waterfowl, and is presently the preferred location for an eelgrass mitigation project associated with construction of the Bay Bridge. A project-level EIR should consider wake-related impacts on these resources. 5
- Land Use: The Park District has recently entered into an option agreement to purchase 16 acres at the southern end of the Golden Gate Fields horse parking area. 6

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TEL 510 635-0135 FAX 510 569-4319 TDD 510 633-0460 www.ebparks.org

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If this purchase is completed, this area is expected to become part of the Eastshore State Park and be devoted primarily to park and recreational land uses.

Hercules / Rodeo

As a point of information, the Park District manages the San Pablo Bay Regional Shoreline, which includes shoreline at Wilson Pt., around Pt. Pinole to the south of Hercules Pt. and at Lone Tree Point, Rodeo. (These locations are best illustrated on the Thomas Brothers map of Contra Costa County, pp. 549 and 569). A project EIR for a Hercules terminal should consider any potential impacts to resources at this shoreline. 7

Martinez

The District owns and manages the Martinez Regional Shoreline, which surrounds the Martinez Yacht Harbor on the east and west. Most of the shoreline is composed of tidally influenced salt-marsh, which provides habitat for the federally listed California clapper rail and Salt-marsh harvest mouse. The 80-acre marsh to the west of the marina has recently been the focus of a $4.5 million project to restore brackish breeding habitat for the Delta smelt. A focused EIR for a Martinez terminal location should address potential wake and pollution effects on this marsh. 8

Pittsburg / Antioch

Various illustrations depict a ferry rout hugging the Contra Costa shoreline of the Carquinez strait en route to Pittsburg and Antioch destinations. This route would run closely adjacent to populations of salt-marsh harvest mouse, black rail and California clapper rail, as illustrated in figs. 3.5.9-11. The document indicates that impacts from wakes and terminal construction (Pittsburg-Antioch area) to be potentially significant *after mitigation*.

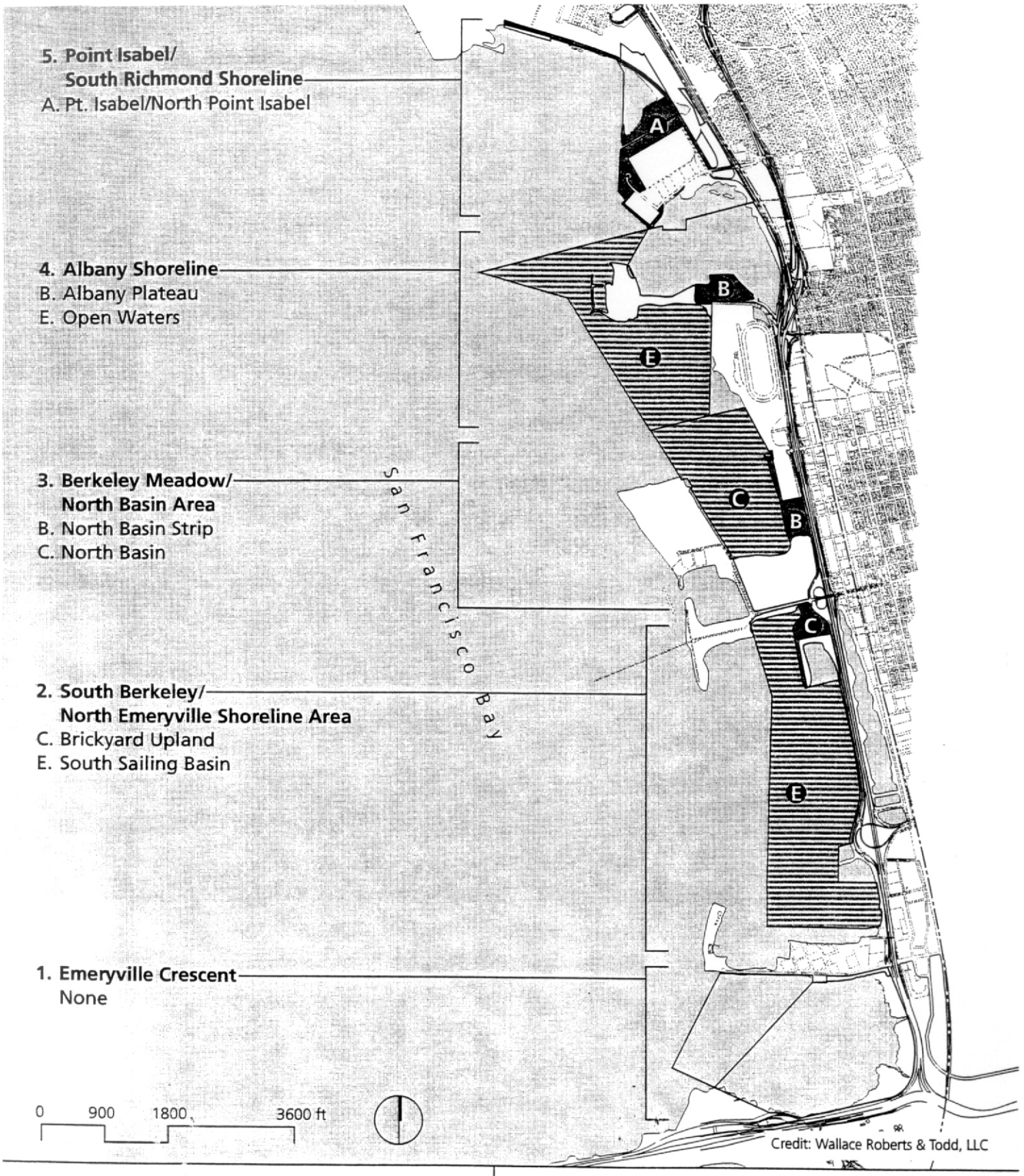
Ferries en route to Antioch would pass closely between the Pittsburg shoreline and **Brown's Island**, which is owned by the Park District. Browns' Island, which is largely tidal marshland, has been designated as one of three sites comprising the San Francisco Bay National Estuarine Research Reserve. A focused EIR for Pittsburg or Antioch projects should therefore consider environmental effects to the Contra Costa shoreline of the Carquinez Strait and to Brown's Island. 9

Thank you for the opportunity to provide further comments on the WTA's Ferry Service plan. Please address specific questions to Brad Olson, Environmental Services Manager, at (510) 544-2622 or Larry Tong, Interagency Planning Manager, at 522-2621.

Sincerely,

Brian Wiese
Interagency Planning

cc: Brad Olson
Larry Tong



Eastshore State Park
General Plan

Figure III-3:
LAND USE - RECREATION

Recreation

Recreation - Aquatic

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

RECEIVED
MAY 9 2003
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

EIR 1005

May 9, 2003

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

BY FAX: 415-291-3388
ATTN: WTA EIR COMMENTS

Subject: Comments on the Draft Program Environmental Impact Report (EIR) - Expansion of Ferry Transit Service in the San Francisco Bay Area, April 2003.

To Whom It May Concern:

Thank you for the opportunity to comment on the above document.

The County of Sonoma continues to support the recommendation of the 12/02 Implementation and Operations Plan (IOP) that "Port Sonoma on Highway 37 should undergo further study, including ridership, conceptual site design, a site-specific EIR (including studies of wetlands and endangered species) and cost effectiveness analysis."; and the future allocation of $1,000,000 in WTA funds for future study of a potential ferry terminal at Port Sonoma. Comments reflected in our previous letter of 10/30/2002 (attached) remain pertinent. 1

Please continue to keep us informed regarding this project. If you have any questions, please don't hesitate to contact me at (707) 565-3790.

Sincerely,

Denise Peter

Denise Peter, AICP
Planner III

Enc. Sonoma County PRMD letter dated 10/30/02

c. Board of Supervisors
Steve Sharpe, CAO
David Knight, TPW
Suzanne Wilford, SCTA
Lillian Hames, SMART
Greg Carr, PRMD
Angus Latta, PRMD

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-1103

October 30, 2002

Water Transit Authority
IOP/EIR Comments
120 Broadway
San Francisco, CA 94111

BY FAX: 415-291-3388
ATTN: WTA IOP COMMENTS

Subject: Comments on the Draft Implementation and Operations Plan and Environmental Impact Report for Expansion of Ferry Transit Service in the San Francisco Bay Area, August 2002.

To Whom It May Concern:

Thank you for the opportunity to comment on the Draft Implementation and Operations Plan (IOP) and the Draft Programmatic EIR for the Expansion of Ferry Transit Service in the San Francisco Bay Area.

The County of Sonoma supports the recommendation that "Port Sonoma on Highway 37 should undergo further study, including ridership, conceptual site design, a site-specific EIR (including studies of wetlands and endangered species) and cost effectiveness analysis."

The County supports the concept of a ferry connection at Port Sonoma, particularly if combined with a rail connection. Your studies have indicated that ridership patronage at a Port Sonoma Ferry Terminal make this a feasible opportunity. However, the County is concerned that the use of Port Sonoma as a ferry site may induce extension of public water and sewer to the site or result in non-transportation-related development at the facility.

Such a facility presents an opportunity unique to the Bay Area in an area in which the following transportation elements intersect:

- Four lane Highway 37 (and within close proximity to Highways 101 and 121)
- San Pablo Bay and the Petaluma River
- North West Pacific Railroad (proposed for passenger service)
- Bay Trail (proposed)

As your organization is aware, planning for a multi-modal transportation facility/connection at Port Sonoma is currently underway through the Sonoma Marin Area Rail Transit Committee (S.M.A.R.T.). This planning effort could result in passenger rail service on the 70 mile Northwest Pacific Railroad corridor from Cloverdale to San Rafael. Within the last several months, S.M.A.R.T. has committed approximately $150,000 to study the Port Sonoma alternative in its rail station/implementation plan EIR/EIS. Public EIR scoping sessions are scheduled for November.

Sonoma County is also in the process of updating its General Plan, including a major focus on circulation and transportation issues. A potential ferry site at Port Sonoma will be considered as part of this update.

Please continue to keep us informed regarding this project. If you have any questions, please don't hesitate to contact me at (707) 565-3790.

Sincerely,

Denise Peter, AICP
Planner III

c. Board of Supervisors
Steve Sharpe, CAO
David Knight, TPW
Suzanne Wilford, SCTA
Lillian Hames, SMART
Greg Carr, PRMD
Angus Latta, PRMD

Golden Gate Audubon Society

2530 San Pablo Avenue, Suite G • Berkeley, CA 94702
Phone: (510) 843-6551 • Fax: (510) 843-5351 • E-mail: ggas@goldengateaudubon.org
Americans Committed to Conservation • A Chapter of the National Audubon Society

EIR 1006

May 13, 2003

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

Re: Revised Draft Program Environmental Impact Report (DPEIR); Expansion of Ferry Transit in the San Francisco Bay Area

Dear Sirs and Mesdames:

The Golden Gate Audubon Society appreciates the opportunity to submit the following comments on the above referenced DPEIR.

1. Wake Analysis, Section 3.3:
Impact WW-1 states that there are substantial amounts of tidal wetlands that may be negatively impacted by wave energy generated by the proposed ferry routes n this DPEIR. In Suisun Bay there are approximately 10,000 acres of wetlands along the south shoreline that may be at risk. Near Redwood City there are substantial wetlands that provide habitat for large numbers of California Clapper Rails and there are also wetlands near Point Pinole that may suffer from wave action. As mitigation for these potential impacts the DPEIR suggests four mitigations (Mitigations WW-1.1 through WW-1.4).

   These mitigations may well solve the wake problems. However, Mitigation WW-1.1 has three functions of which numbers 2 and 3 require low speeds to be maintained. We have had anecdotal reports that some ferries currently exceed the very slow speed limits set on the Vallejo run when approaching Vallejo's wetlands. For this reason we believe that there should be included a monitoring and enforcement component of this mitigation to ensure compliance with routes and speeds. Thus mitigation could be to provide funding for the Department of Fish and Game to monitor routes and speeds on a random basis. We ask that such mitigation be included in the FPEIR. 1

   Furthermore, all of these mitigations (except WW-1.1) include the language, 'However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by route basis (Mitigation WW-1.2, 1.3, 1.4)'.

While service and cost are held out as reasons for why mitigation may not be feasible, this cost is not compared to the economic value that these wetlands provide to the citizens of the Bay Area and to the state. A 1992 study performed by the UC Berkeley Graduate School of Public Policy (*The Value of California Wetlands*, Campaign to Save California Wetlands) reported that the states 454,000 acres of wetlands provided economic value of between $10 and $23 billion dollars (1992 dollars) per year for their water quality, water supply, flood control, commercial fisheries, habitat and recreational functions.

The economic loss suffered as a result of the degradation of wetlands due to ferry wake may exceed the value of the ferry service, which itself must be subsidized. This economic value of wetlands must be factored in to any analysis of service and cost and the Final EIR should have language that requires such an analysis. 2

It is left unclear what steps would be taken if, on evaluation of a route by route analysis, it was shown that significant impacts to wetlands would still occur.

Wake Analysis, Section 3.3.2.4 "Potential Impacts on Indicator Species", also suggests similar mitigations and also provides the proviso that: "…if no mitigation can be implemented to reduce impacts to less than significant levels, impacts to clapper rail could be potentially significant. Until final routes and terminal locations are determined…this impact is considered potentially significant (Impact WW-3; Impact After Mitigation).

We believe that any specific routing that may cause such a potentially significant impact should require a Biological Opinion from the U.S. Fish and Wildlife Service under the federal Endangered Species Act. This should be reflected as a mitigation requirement for final routes and terminal locations that may produce such impacts to clapper rails or other federally-listed indicator species. 3

We are particularly concerned with potential impacts to the clapper rail population located near Redwood City. Recent censuses of the clapper rail indicate that this area is one of the most critical for the clapper rail. The DPEIR fails to address the importance of this site to the effort to protect and recover the clapper rail.

2. Impact B-11: **Ferry Traffic (primarily in South Bay) could disturb roosting and foraging waterfowl in shallow areas of the Bay**

We disagree with your conclusion on page 3.5-11 that, "This disturbance would not result in a permanent loss of habitat, but rather the area of habitat where disturbance may take place. Waterfowl may use these areas when ferries are not present." 4

In the very next paragraph the DPEIR contradicts the last sentence ("Waterfowl may use these areas when ferries are not present.") by admitting that, "[T]here is evidence that waterfowl …avoid areas that experience routine disturbance." This equates with a direct loss of habitat that should be considered a permanent loss of habitat. If the birds will not use that part of the Bay that experiences regular ferry runs then that part of the Bay is lost as habitat for those birds. We understand that studies exist that suggest that water birds will not use waters within a considerable distance on each side of a ferry route. This represents an even larger band of bay water along the entire ferry route lost as habitat for these birds. 4

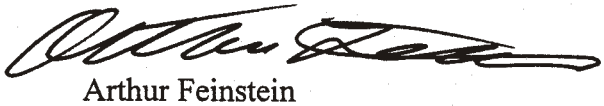
We appreciate the DPEIR's attempt to mitigate these impacts by consolidating routes and using existing shipping corridors. However, waterfowl roost or forage on certain parts of the Bay because those specific Bay waters best provide for the roosting or foraging needs of these waterbirds. If the ferry makes them leave these selected habitats it adds new stresses on their ability to survive. Therefore, we disagree with the DPEIR conclusion found in "Impacts After Mitigation" for Impact B-11 (pg. 3.5-12), "this impact would be considered less than significant after implementation of Mitigation B-11.1 (consolidation of routes, common corridors and shortest routes).

At the very least, we believe that the FPEIR must include a monitoring program in order to determine whether there are indeed only insignificant impacts on these waterbirds resulting from implementation of ferry service.

The establishing legislation for the DPEIR required consultation with the Department of Fish and Game to ensure a minimum of impacts to rafting waterbirds. We suggest that an appropriate mitigation for this issue would be to provide for an ongoing monitoring program to determine impacts and to help realign routes if the monitoring program indicates that such a modification would reduce impacts to waterbirds. 5

Thank your for your consideration of our concerns.

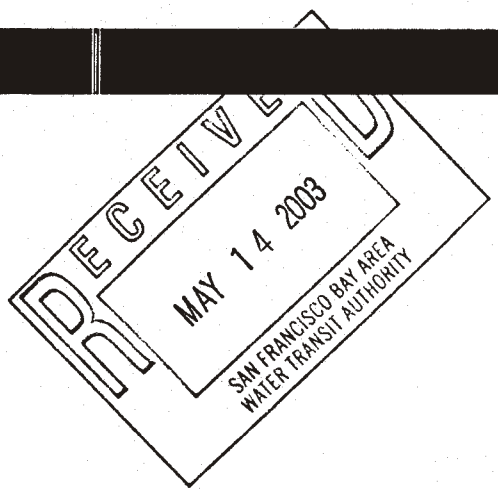
Sincerely yours,



Arthur Feinstein
Director of Conservation

EIR 1007

BLUEWATER NETWORK



Ferry Expansion Revised DPEIR Comments

San Francisco Bay Area Water Transit Authority
Revised Draft Program Environmental Impact Report

By Teri Shore, Bluewater Network

May 15, 2003

311 California St., Suite 510
San Francisco, CA 94104
415-544-0790, ext. 20
tshore@bluewaternetwork.org
www.bluewaternetwork.org

Ferry Expansion Revised DPEIR

Bluewater Network offers these comments with a vision for the most environmentally sound ferry system in the world.

Summary

The Revised Draft Program Environmental Impact Report is a greatly improved document compared to the original Draft Program Environmental Impact Report. It addresses many of the concerns that we identified in comments on the DPEIR.

The document analyzes a proposed ferry expansion project that is closest to what appears in the December 2002 IOP and funding legislation, so it is a much more informative and accurate document.

We appreciate the Water Transit Authority's efforts to provide a meaningful environmental document and to examine in detail the potential environmental impacts from expanded ferry service on San Francisco Bay. We will urge to board to adopt the mitigations proposed in the document and to make some additional findings based on the comments that follow.

Since we have not yet received responses to our lengthy comments on the original DPEIR, we still have unresolved questions about environmental impacts and air emissions calculations that were never answered, and have concerns about several potential impacts that have never been addressed.

However, I shall limit my comments here primarily to the new document and attempt to point out where issues were resolved and/or remain outstanding.

General

From Bluewater Network's perspective, one of the most significant positive changes in the document is that the low-emissions standard adopted by the WTA in its IOP and new authorizing legislation has been incorporated into the project description in the RDPEIR. The standard (exceeding EPA Tier II – 2007 by at least 85 percent) is no longer a possible mitigation for the ferry fleet, but the baseline for the entire project and the RDPEIR. This is an important change that ensures that the new fleet will indeed be as clean as current technology allows. If for some unexpected reason such a fleet could not be built, then a new environmental analysis would need to be conducted and recirculated. 1

However, there are some minor inconsistencies in the document regarding this standard. In particular, the Vessel Technology Section (2.4) states that propulsion technologies were identified that can provide "up to 85 percent reduction in air pollutant emissions in comparison to the EPA Tier II 2007 requirements." This should be corrected to read that the technologies can provide "at least an 85 percent reduction . . ." or the document will be inaccurate and inconsistent. 2

The analysis by the Bay Area Air Quality Management District has been included in the new document as required in the WTA's authorizing legislation, SB428. The RDPEIR incorporated BAAQMD's recommendation that ferry exhaust outlets be situated 20 feet above the deck to prevent passenger exposure to concentrated diesel particulate matter at the Port of San Francisco. 3

We remain disappointed, however, that the WTA has not embraced the use of biodiesel as recommended by BAAQMD in the document, as we have suggested on several occasions. I will provide more comments on the need to use biodiesel in more detail below.

We appreciate that the WTA changed the name of its IOP document to better reflect the findings of the DPEIR and RDPEIR on air quality and congestion reduction. 4

As a result of the change in project description, the new environmental analysis eliminates Port Sonoma from the list of new routes because it was found to be "unfeasible" due to wetlands and other issues. Another key change was that in Berkeley only one site was considered in the RDPEIR (at University), to the exclusion of any others. Therefore, the RDPEIR would not apply to any other potential Berkeley site. The IOP should be updated to reflect these findings. 5

Comments by Section

3.1 Dredging was significantly reduced with the new project, resulting in less overall impacts. Mitigations were also strengthened. 6

Reference to Hovercraft was removed from the dredging section and throughout the document as we requested, since this technology was never studied by the WTA.

3.2 Navigation section was improved and mitigations strengthened. 7

In particular, the requirement for ferry employees to stand watch near windsurfing sites and when recreational traffic is high is an important addition.

3.3 Wake Analysis section was generally expanded and improved to reflect that wake impacts could be potentially significant, and to provide additional mitigation options. The potential habitat for endangered species such as Clapper Rail was added to the scope of possible environmental impacts. These are important improvements. 8

However, we recommend that the "decision tree" option for wake mitigation be eliminated and the criteria for wave height at 16 cm and 1,500 distance be required across for the fleet without exceptions. This would ensure the protection of shorelines when different types of vessels are interchanged between routes. 9

3.4 Water Resources section did not address in any way these potentially significant impacts: 10

- The potential for dioxins from diesel exhaust to be discharged into the air and water.

- The potential for increased surface turbulence across the bay due to increased ferry transits.
- The potential for wastewater from ferries entering the bay.
- The potential impacts on terminal locations from global warming and sea level rise and mitigations to prevent terminal flooding.

10

3.5 Biology section is generally improved and better mitigations required or recommended.

Impact B-11 The RDPEIR lacks any recommendation for monitoring or studies of the ongoing and long-term impacts of disruption of roosting and foraging waterfowl in shallow areas of the Bay. We recommend that the WTA adopt a finding that ongoing monitoring and research be conducted in Bay regions where diving ducks, in particular, are disturbed.

Consolidating ferry routes and traveling deeper channels "as much as possible" and using "shorter routes through shallow areas" is inadequate as it leaves the mitigation to the discretion of each ferry captain and does not provide for any mechanism to determine whether this approach is effective and/or whether waterfowl is being displaced or otherwise harmed by increased ferry traffic.

11

Impact B-15 While equipping ferries with whale detection equipment is a good mitigation, dedicated whale observers during specific times of year should also be required. We don't believe it is reasonable for the captain to be responsible for looking out for whales, roosting waterfowl and other wildlife while operating the vessel.

12

Also, it is notable that the map showing gray whale sightings in San Francisco Bay was eliminated from the RDPEIR, either intentionally or accidentally. It should be reinserted.

13

3.6 Air Quality was greatly improved in terms of analysis and discussion of impacts and mitigations. Emissions calculations for the various transportation modes were more complete and much easier to follow.

14

However, we still have some questions and comments:

The Air Quality section does not mention the project emissions standard specifically, but states that ferries would have "control devices to reduce the levels of NOx and PM10," but not by how much or that the ferries are required to meet the low emissions standard. It does say that SCR and PM traps "would" reduce emissions to the standard, but does not mention that the project description calls for vessels that meet the 85 percent standard.

15

Ferry Emissions: It is not clear whether ferries from other operators that are included in the proposed project are assumed to have SCR plus PM traps. For example, is the 2025 Golden Gate Highway and Transportation District fleet included in the project emissions calculations? If so, are these vessels assumed to have SCR plus PM? Can we be sure that will be the case without new federal regulations?

16

Impact A-3: This section discusses PM 2.5 as a toxic air contaminant and concludes that emissions of would be less than those for the No Project Alternative. However, nowhere does the RDPEIR show PM2.5 emissions calculations, only PM10. Please explain and clarify.

17

Mitigation A-4.1: The document ignores the fact that the use of biodiesel would significantly reduce S02 emissions as it contains no sulfur. The document fails in its mission of finding the best possible mitigations for potentially significant impacts. To be complete, biodiesel should be analyzed and proposed as mitigation for SOx increases as a result of the project. 18

Table 3.6.3 Summary of Criteria Pollutant Emissions from Ferries

The figures for emissions from the Year 2025 No Project Alternative in the RDPEIR differ from the numbers in the DPEIR. Why is that? 19

3.7 Land Use section: no new comments.

3.8 Aesthetics section was improved to reflect possible impacts from terminal and vessel lighting.

However, the question of advertising and signage on board vessels or at the terminal was not addressed as a potential aesthetic impact. 20

3.9 Cultural Resources: no comments

3.10 No new comments on Geology

3.11 Noise section was significantly improved. 21

Impact NOI-4 There are two comments within this section that deserve questioning. One is the statement that "small mammals inhabiting the area are already exposed to airborne ship noise within San Francisco Bay and are presumably habituated to such noise. These small mammals would not be impacted by underwater noises generated as a result of the project." 22

Unless this conclusion can be based on studies or other scientific basis, it is not an assumption that should be made and the impacts should be considered to be potentially significant. For all we know, the mammals are not habituated, but deaf.

Concerning gray whales, this section seems to contradict the Biology Section, which states that gray whales are using the bay in greater numbers. The noise section says that "because gray whales rarely use the Bay, no impacts are expected as a result of the project." 23

Since whales and other marine mammals are extremely sensitive to noise, the finding should either be "unknown" or "potentially significant."

3.12 Transportation Section: No new comments.

3.13 Energy Section was improved to provide a better comparison of energy use by different transportation modes. 24

Mitigation E-2.1: The Water Transit Authority has not embraced a simple solution for reducing use of fossil fuels: biodiesel. This renewable fuel is currently available in San Francisco Bay and would provide significant air emissions benefits. Bluewater Network has provided extensive materials about this fuel to the agency. 25

We continue to recommend use of at least B20 on one or more routes, with a phase-in to 100 percent biodiesel as the fleet rolls out. The WTA should adopt findings that biodiesel should be used in the new ferry fleet.

In addition, the Bay Area Air Quality Management District has recommended use of biodiesel in the fleet, but the WTA has still not recommended any use of this fuel.

A biodiesel ferry study funded by the WTA itself found that use of biodiesel has tremendous air emissions benefits, particularly when used in conjunction with water injection and other technologies that reduce nitrogen oxide emissions. Since the new fleet will be equipped with SCR, the argument that biodiesel increases NOx is not valid. 25

Prices of biodiesel are approaching those of on-road diesel and were recently within 10 to 15 cents, making it financially feasible. The RDPEIR should contain an analysis of biodiesel as mitigation for energy use.

End of Comments

Ten-Shore 5/15/03

EIR 1008

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

5

Memorandum

To: Chairperson Smith and
Members of the Mobile Committee

From: Thomas Perardi
Director of Planning

Date: February 6, 2003

Re: Independent Analysis of the Bay Area Water Transit Authority's *Implementation and Operations Plan*

RECOMMENDED ACTION:

Consider recommending to the Board of Directors that the Executive Officer forward the Air District's independent analysis of the air quality impacts from the Bay Area Water Transit Authority's (WTA) *Implementation and Operations Plan – December 2002* to the Water Transit Authority. The WTA will include the independent analysis in their final plan to the Legislature when it is submitted in Spring 2003.

BACKGROUND

The WTA was created in 1999 by SB428 (Perata). The WTA was created to "... *operate a comprehensive San Francisco Bay regional public water transit system, that includes water-transit terminals, feeder buses and any other transport and facilities supportive of the system." (Health & Safety Code §66540.24)* The legislation also directed the WTA to "... *prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan. The plan shall include all appropriate landside, vessel, and support elements, operational and performance standards, and policies. " (Health & Safety Code §66540.20)* A draft Implementation and Operations Plan (IOP) was submitted to the Legislature on December 13, 2002. A final plan, along with environmental documentation, is due to the legislature by the Spring 2003.

The final plan is to be accompanied by ".. *an independent evaluation conducted by the Bay Area Air Quality Management District to assess the air quality impacts of the complete water transit system, as set forth in the ... Implementation and Operations Plan, in comparison to transporting the same number of people over the same distance by motor vehicles and other modes of transportation." (Health & Safety Code §66540.22(k))* This staff report represents the independent evaluation of the WTA's IOP and covers both regional and localized impacts from the proposed expansion of ferry service in the Bay Area.

SUMMARY FINDINGS

1. Implementation of the WTA's proposal will result in overall emissions that are lower than those attributable to current passenger ferry service.

2. If the future ferry service passengers used automobiles and other modes of transportation (rail, bus, carpools), regional emissions would also be less than current emissions from passenger ferry service. In comparison to the WTA's proposal, regional emissions of

oxides of nitrogen and particulate matter would be less, but hydrocarbon emissions would be higher.

3. The proposed increase in ferry service at the San Francisco Ferry Building has the potential to increase local concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} & $PM_{2.5}$). Future impacts will depend on actual design of boats and piers, and future operating procedures. Based on available information and reasonable assumptions, the NO_2 concentrations could exceed California's ambient air quality standard, unless dockside operations are limited to approximately 5 minutes per landing. The State PM_{10} & $PM_{2.5}$ standards are already exceeded in most urban areas of California, including San Francisco. The Air District staff's analysis shows that the WTA proposal could add from 6 to 55% to existing concentration values, depending on pollutant, boat design, and dockside idle time. Additionally, the Air District staff's analysis indicates that the potential for localized increases in exposure to particulate matter at the San Francisco terminal could lead to a significant increase in cancer risk. Boat design and exhaust height specifications could be used to mitigate local air quality impacts and risk.

DISCUSSION

During the two-year development of the IOP, the WTA studied four alternatives for service expansion: 1) A comprehensive region-wide system based on the Water Transit Initiative developed by the Bay Area Council and Bay Area Economic Forum; 2) an expanded region-wide system that could be implemented within 10 years; 3) enhancements to the existing ferry system; and 4) A "No-Build" scenario based on the Metropolitan Transportation Commission's *2001 Regional Transportation Plan* (RTP), which envisions future ferry service to be similar to today's ferry routes and frequencies.

The current WTA proposal in the IOP is a subset of the second studied alternative -- enhancements to services on existing routes, plus new services between San Francisco and terminals in San Mateo, Alameda, Sonoma, and Contra Costa Counties. As shown in Table 1, the WTA is proposing more frequent service on six existing routes and new service on eight routes.

TABLE 1
PROPOSED FERRY ROUTES AND PROJECT 2025 DAILY RIDERSHIP

Existing Routes	Oakland – Alameda – San Francisco	4032
	Bay Farm Island – San Francisco	679
	Vallejo – San Francisco	4411
	Sausalito – San Francisco	5118
	Larkspur – San Francisco	6576
	Tiburon – San Francisco	2649
New Routes	Berkeley – San Francisco – Mission Bay	2357
	Richmond – San Francisco	1780
	Treasure Island – San Francisco	2485
	Antioch/Pittsburg – Martinez – San Francisco	2038
	Hercules/Rodeo – San Francisco	933
	South San Francisco – San Francisco	2496
	Redwood City – San Francisco	1420
	Port Sonoma – San Francisco	1657
	Total Daily Ridership	38,631

Source: WTA, *Implementation and Operations Plan – December 2002*, page2

Building on MTC's regional transportation model, WTA has projected that the IOP would result in 38,631 weekday ferry passengers in 2025 (See Table 1). This is approximately 14,000 passengers more than the ridership level projected in the 2001 RTP. The WTA assumed that ferry service would operate on an hourly basis on most routes. Service would be provided for 14 to 16 hours per day. They also assumed that bridge tolls will be $3.00 per vehicle and that parking at BART stations will be $2.00 per car.

Integral to the WTA's plan is the deployment of ferry vessels with engines that are 85% cleaner than the EPA's 2007 marine engine emissions standards. In making this commitment, the WTA is following the recommendations of a 1999 study by the California Air Resources Board (CARB). In their study, CARB staff projected significant increases in overall emissions unless the engines in the ferry vessels were very low emitting.

A comprehensive examination by the WTA of potential emission control technologies concluded that several different mixes of engine and fuel types could achieve the very-low-emission goals adopted by the WTA. Rather than select a preferred approach to controlling the emissions from the future ferry vessels, the WTA proposes to set forth their emission goals in the design specifications for new ferries and leave selection of engines and fuel types to the boat building industry.

Regional Air Quality Impacts

In order to assess the potential impact on regional air quality, Air District staff assessed the potential net emissions of oxides of nitrogen (NOx), hydrocarbons (HC) and particulate matter (PM_{10}) for the following scenarios:

1) Existing ferry service (excluding recreational/tourist services);
2) IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards;
3) IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – with no ferry service provided.

Results of our analysis are shown in Table 2. For each scenario, Air District staff determined net emissions by estimating the emission reductions that will occur from reduced automobile travel by ferry passengers and then added back in the estimated emissions that will occur from the ferry vessels and from the transit and shuttle buses servicing the ferry terminals. A positive number in Table 2 indicates that emissions reductions achieved by removing vehicles from the roadways are exceeded by emissions from the vessels and/or buses. A negative number (shown in parentheses) indicates that the emissions reductions achieved by removing vehicles from the roadways are greater than the emissions from the vessels and buses.

TABLE 2
ESTIMATED EXISTING AND 2025 EMISSIONS (tons/day)

Scenario	NOx	HC	PM_{10}*	$PM_{2.5}$*
Existing ferry service (excluding recreational/tourist services)	2.32	(0.02)	0.12	0.12
IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards	1.04	(0.42)	0.02	0.02
IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – no ferry service.	0.29	0.07	0.02	0.02

* PM emissions will be fine particulate < 2.5 micrometer, so $PM_{10} = PM_{2.5}$

Current weekday ferry service contributes 2.32 tons per day (t/d) of NOx and 0.12 t/d of PM_{10} emissions to the Bay Area, while providing a net reduction of 0.02 t/d of HC. The WTA proposed expansion of ferry service would decrease the amount of NOx and PM_{10} that ferry service contributes to the region, and further reduce hydrocarbon emissions. If the same number of ferry passengers as projected by the WTA instead used automobiles (either alone or as carpools) or rode on transit buses, BART and Caltrain, then regional emissions of NOx and PM10 would be further reduced, but HC emissions would increase.

While Air District staff has generally used data on ridership, service frequency and vessel characteristics provided by the WTA, there are differences in several assumptions between Air District staff's analysis and the analysis in the DEIR:

1) Air District staff used only weekday travel and hours of operation; the DEIR included weekend service.
2) Air District staff used lower daily ridership numbers, as provided by the WTA, and less frequent headways than those used in the DEIR analysis.
3) Air District staff assumed longer idling times for some routes, because the WTA's DEIR contained idling times on these routes of less than five minutes.
4) Air District assumed that the future engines would be 85% cleaner than future EPA standards, while the DEIR assumed the engines would be approximately 90% cleaner.

Despite the differences in these assumptions, the results of Air District staff's analysis show the same relative conclusions as the analysis in the WTA's DEIR and CARB's 1999 study: the deployment of very-low-emitting ferry vessels would result in a reduction of the current regional emissions attributable to passenger ferry service.

Localized Air Quality Impacts

In addition to examining the regional impacts of the WTA's IOP, Air District staff analyzed the potential for increases in localized concentrations of three pollutants – carbon monoxide (CO), NO_2 and particulate matter (both PM_{10} and $PM_{2.5}$) – at the proposed ferry terminals. A review of the proposed ferry service indicated that only the San Francisco terminal would have sufficient numbers of vessel operations to warrant additional consideration. Air District staff used currently available data and computer models to predict pollutant concentrations under three scenarios: existing conditions, one that assumed idling times consistent with the

regional analysis of the IOP discussed above and another that limited dock-side idling under the IOP proposal to five minutes per vessel operation.

Methodology

The computer model chosen to predict the localized impact is an EPA Guideline Model, the Industrial Source Complex Version 3 Model. This is a Gaussian air quality model routinely used to model impacts from a variety of sources.

Two meteorological data sets were considered for use in modeling the impacts at the terminal: data from the San Francisco International Airport (SFO) and data from the Oakland International Airport (OAK). Meteorological data from other Bay Area monitoring stations were analyzed and determined not to be representative of the area around the ferry Terminal. Modeling was performed using both data sets: the latest three years available from SFO (1989-1991) and from OAK (1981-1983). Receptors were placed on all of the gates and other locations around the terminal, inland to a distance of 0.8 miles, to model exposure to passengers and others that would frequent the areas around the San Francisco terminal. Receptors were not placed over San Francisco Bay.

The Air District maintains and operates regional air monitoring stations around the Bay Area. The closest monitoring station, San Francisco - Arkansas Street, is located just 2 miles south of the Terminal. As a regional monitoring station, it is believed that the Arkansas Street monitoring station provides a good representation of the background concentrations around the San Francisco terminal area. Background PM_{10}, $PM_{2.5}$, CO and NO_2 data were available for the last three years (1999-2001). To represent a worst-case situation, background concentrations were assumed to remain constant into the future.

It is important to point out that this analysis of localized impacts, while complete, is only a preliminary analysis. As such it may reflect an overestimation of future pollutant concentrations. With the dedication of more resources and more site-specific information regarding meteorological and ambient air quality conditions, vessel characteristics, and terminal layout, the analysis could be refined to provide better estimates of the potential impacts.

Existing Conditions

For the analysis of the existing situation, we used the current physical layout of the San Francisco terminal and the current vessel fleet. The current fleet consists of a mix of vessel designs – single hull and catamarans – and most significantly for our analysis, varying locations of exhaust pipes. Some of the single hull vessels have exhaust pipes located mid-vessel 24 feet or higher above the water, while others have exhaust pipes located at the rear of the vessels, at about six to eight feet above the water. The catamaran vessels have their exhaust pipes either in the rear, approximately three feet above the water line, or vent exhaust into the space between the two vessel hulls. As discussed below, localized pollutant concentrations are sensitive to the location of the engine exhaust pipes: venting emissions higher above the water tends to lessen concentrations of pollutants at dockside. Emission rates for the current engines were derived from test data published by engine manufacturers and the WTA. Emission rates take into account the benefits achieved through recent engine replacements on a number of current ferry vessels via funding from the Air District's Carl Moyer Program.

Table 3 shows the predicted maximum air quality impacts for the existing fleet of vessels at the existing San Francisco Ferry terminal. Currently, concentrations of particulate matter exceed the California 24-hour and annual PM_{10} standards and the California annual $PM_{2.5}$ standard.

TABLE 3
MAXIMUM EXISTING CONCENTRATIONS
AT SAN FRANCISCO FERRY TERMINAL ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	306.1	6,111	6,417	23,000	40,000
8-hour	87.3	4,090	4,177	10,000	10,000
NO_2					
1-hour	127.2	193.6	321	470	-
annual	6.3	39.5	46	-	100
PM_{10}					
24-hour	2.0	77.9	**80**	50	150
annual	0.37	26	**26**	20 [2]	50
$PM_{2.5}$					
24-hour	2.0	45.1	47	-	65
annual	0.37	12.6	**13**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Future Conditions – WTA IOP

For the two IOP idling scenarios, the future physical layout of the San Francisco terminal was based on a figure in the Draft IOP, published in September 2002. This layout, while very conceptual, reflects the configuration of two recently constructed gates at the terminal. Ferry vessels were modeled as point sources adjacent to each side of six gates (two ferry vessels per gate). Hourly emission rates were calculated based on the estimated number of ferry vessels per hour that would dock to load and unload passengers at each gate.

For the purposes of our analysis, we have assumed that all existing vessel would have been retired from service. Ferry vessels in 2025 would use diesel engines that are compliant with EPA's 2007 emission standards, in conjunction with selective catalytic reduction (SCR) devices and diesel particulate filters (DPF). The use of the SCR and DPF control devices would reduce NOx and PM_{10} from engine exhaust by at least 85%. We selected these control devices to be consistent with the DEIR and the IOP. It should be noted that by assuming the use of diesel engines, we are modeling a reasonable worst-case scenario in terms of exposure to diesel particulate. The use of other engine types and/or cleaner fuels might show different results.

Vessel characteristics were based on conceptual designs published by the WTA in the technical appendix to the IOP. The newest ferries operating on the Bay have exhaust points located approximately three feet above the water. This design was incorporated into the modeling analysis for future local impacts.

Tables 4 and 5 show the predicted maximum air quality impacts for the two future idling scenarios. Table 4 shows that for the regional analysis idling scenario the federal 24-hour and annual $PM_{2.5}$ standards and four California ambient air quality standards could be exceeded -- the one-hour NO_2 standard, the 24-hour and annual PM_{10} standards, and the annual $PM_{2.5}$ standard. Table 5 shows that if the idling for each ferry is limited to a maximum of five minutes at each of the gates, the California 24-hour and annual PM_{10} standards, and California annual $PM_{2.5}$ standard could be exceeded; and the margins would be much smaller.

TABLE 4
MAXIMUM CONCENTRATIONS FROM IOP
IDLING SCENARIO – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	2,970.1	6,111	9,081	23,000	40,000
8-hour	1016.3	4,090	5,106	10,000	10,000
NO_2					
1-hour	430.6	193.6	**624**	470	-
annual	33.8	39.5	73	-	100
PM_{10}					
24-hour	24.3	77.9	**102.2**	50	150
annual	6.7	26	**33**	20 [2]	50
$PM_{2.5}$					
24-hour	24.3	45.1	**69**	-	65
annual	6.7	12.6	**19**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

TABLE 5
MAXIMUM CONCENTRATIONS FROM IOP IDLING SCENARIO, WITH IDLING TIME LIMITED TO 5 MINUTES – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	927.6	6,111	7,039	23,000	40,000
8-hour	338.8	4,090	4,429	10,000	10,000
NO_2					
1-hour	192.1	193.6	386	470	-
Annual	18.1	39.5	58	-	100
PM_{10}					
24-hour	7.9	77.9	**86**	50	150
Annual	2.3	26	**28**	20 [2]	50
$PM_{2.5}$					
24-hour	7.9	45.1	53	-	65
Annual	2.3	12.6	**15**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Health Risk Screening

A health risk screening -- consisting of a screening cancer risk analysis[1] and a chronic health risk analysis[2] -- was also conducted for the existing ferry service and terminal configuration, the IOP scenario, and the IOP scenario with idling limited to five minutes. Under the Air District's *CEQA Guidelines,* a project is acceptable if the associated incremental cancer risk is equal to or less than ten in a million. Additionally, a chronic hazard index of 1.0 or above is considered significant. Table 6 shows the incremental cancer risk and chronic hazard index associated with the existing conditions and the two future IOP idling scenarios.

The estimated existing incremental cancer risk from ferry operations at the San Francisco terminal currently exceeds the Air District's threshold for risk from exposure to diesel particulate matter. Incremental cancer risk is estimated to increase significantly in the future under both IOP idling scenarios because of the increase in ferry operations that is proposed by the WTA. It is estimated that there is not currently nor under the IOP scenarios significant risk for non-cancer health problems due to exposure to diesel particulate matter.

TABLE 6
SUMMARY OF HEALTH RISK ASSESSMENT RESULTS

	Existing idling scenario	IOP idling scenario low exhaust height	IOP scenario with idling limited to 5 minutes low exhaust height
Incremental Cancer Risk	3 in a million	58 in a million	20 in a million
Chronic Hazard Index	0.003	0.059	0.020

As noted above, the results of the health risk assessment were sensitive to the height of the exhaust pipes above the waterline. The higher location of the exhaust pipes on some of the existing vessels, as compared to the assumed height of three feet for future vessels, explains why potential cancer risk under the IOP scenarios is higher than under existing conditions. Since we estimated that future emissions would be less than under existing conditions, we would expect future cancer risk due to exposure to diesel particulate matter to also be lower than under existing conditions.

To test the assumption that the height of the exhaust pipes influenced the Incremental Cancer Risk results shown in Table 6, we conducted a separate health assessment wherein we assumed that for all three scenarios exhaust pipes were located 20 feet above the water. As can be seen from the results shown in Table 7, assuming higher exhaust heights significantly reduces the estimated Incremental Cancer Risk. It should also be noted that higher exhaust locations also should result in lower concentrations in PM_{10} and $PM_{2.5}$.

Although the WTA has already committed to very-low-emission engines in future vessels, the health risk assessment suggests that additional actions and emissions controls to reduce diesel particulate may be warranted.

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[1] A screening risk analysis estimates the maximum offsite cancer risk from exposure to toxic air pollutants.

[2] A chronic health risk analysis is used to estimate the risk of the development of long-term non-cancer health issues, such as asthma, emphysema, high blood pressure, etc. The result of this analysis is expressed in terms of a risk index to allow comparisons between different scenarios and projects.

TABLE 7
SENSITIVITY MODELING OF HEALTH RISK ASSESSMENT
(WITH EXHAUST STACKS AT 20 FEET ABOVE THE WATER)

	Existing idling scenario	IOP idling scenario	IOP scenario with idling limited to 5 minutes
Incremental Cancer Risk	3 in a million	2.6 in a million	1.3 in a million

CONCLUSIONS

The implementation of the WTA's IOP, including the deployment of low emitting ferry vessels, should result in a reduction of current emissions attributable to passenger ferry service. It is recommended that the WTA examine the potential for further reductions in NOx and particulate matter emissions from the ferry vessels by scaling back non-peak service on some routes and through the use of alternative diesel fuels, such as water emulsion fuels and biodiesel.

There is a potential for localized increases of concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) above applicable state and federal ambient air quality standards at the San Francisco terminal. Boat design, pier design, and system operations should be carefully planned to minimize local exposure and associated cancer risk.

The WTA should specifically examine the feasibility of reducing local impacts through the use of alternative fuels and through the location of exhaust points on future ferry vessels. It is also recommended that a more thorough examination of localized impacts be conducted once the WTA's operational plans, ferry vessel design and gate layout for the San Francisco terminal are finalized.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Staff resources were drawn from Program 605 – Mobile Source Measures, using General Fund revenues. Subsequent work, if any, will draw upon the same resource. State law required the Air District to perform this analysis, but our requests for state funding of the work were not successful.

Respectfully submitted,

Thomas Perardi
Director of Planning

Prepared by: Michael Murphy and Glen Long

Forwarded _____

EIR 1009

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DELIVERY BY MAIL, FAX, AND E-MAIL

May 14, 2003

Attn.: Revised Recirculated
Draft Program EIR Comments
Water Transit Authority
120 Broadway
San Francisco, CA 94111

RE: Comments on Revised Recirculated Ferry Service Expansion Programmatic DEIR.

Dear Sir/Madam,

This comment letter supplements the comment letter submitted on October 31, 2001 on the initial DPEIR on behalf of my clients, The Sierra Club, San Francisco Bay Chapter ("Sierra Club") and Golden Gate Audubon Society, Inc. ("Audubon", and collectively, "Clients"), regarding the above-referenced DEIR. My clients greatly appreciate the WTA's decision to revise and recirculate the DPEIR. They also appreciate the many revisions that have been to the DPEIR to address comments submitted by themselves and others. The revised DPEIR is, as a result, far superior to the original document. However, there still remain significant issues in the revised DPEIR ("RDPEIR") which need to be addressed before the document can be considered an adequate disclosure and discussion of this project's significant environmental impacts. These issues will be addressed sequentially below. 1

1. PROJECT PURPOSE AND NEED

The RDPEIR states that at the present time both transbay BART and bridges are at capacity. However, as is pointed out in the attached comment letter from transportation consultant Kenneth Ryan[1], which comment letter is incorporated herein in its entirety by this reference, the RDPEIR itself acknowledges that BART is expected to have adequate transbay service until 2025. The EIR should be revised accordingly. After revision, the EIR should reconsider the need for this project, especially in light of the RDPEIR's conclusion that the project will provide only a negligible benefit to the regional congestion problem. 2

2. INADEQUATE AND INACCURATE PROJECT DESCRIPTION

The description of the proposed project is confusing and inconsistent. The RDPEIR states that the proposed project is the December 2002 IOP. However, the proposed project as analyzed in the RDPEIR differs in several significant respects from the 3

[1] A copy of Mr. Ryan's professional resumé is also attached and incorporated herein by reference.

December 2001 IOP. Most notable is that the December 2002 IOP includes ferry service to Port Sonoma and possible ferry service to an "unspecified" Berkeley terminal (i.e., including sites other than the University Ave. terminal identified in the proposed project). The RDPEIR acknowledges that these sites would be likely to have significant parking, wetlands, and or recreational impacts and are therefore likely to be infeasible. The final EIR should expressly acknowledge that these sites are not part of the alternative studied, and that this programmatic EIR may not be relied upon in considering impacts related to those possible terminal sites. 3

Another significant difference is that the proposed project, as opposed to the December 2002 IOP, specifically identifies that the project will utilize "clean vessels" only, that is, vessels exceeding USEPA 2007 Tier II air quality standards by 85%. The clients applaud this commitment, but also note that, again, a project not meeting this commitment could not rely on this programmatic EIR, at the very least insofar as air quality impacts are concerned. Again, the EIR should acknowledge this. 4

While the RDPEIR acknowledges that the project will require significant expansion of connecting land transit services, this expansion has apparently not been included in the project, nor have its impacts been included in the discussion of project impacts. Given that the expansion of connecting land transit services is necessary for the full implementation of the project, it should be included in the project description, and its impacts (and costs) included in the discussion of project impacts. 5

Finally, the RDPEIR asserts that the proposed project includes all of the terminals and routes included in Table 2.1. However, several of these routes, notably those from Vallejo and from Larkspur and Tiburon, have existing service from a public entity. It is the clients' understanding that neither of these public entities have agreed to allow the WTA to take over their provision of service. The EIR should discuss this situation, and should include in its analyses of impacts and economic feasibility a project that does not include these terminals and routes, based on the very likely eventuality that these terminals and routes will not be part of the WTA ferry system. 6

The clients would point out in this regard that, while CEQA does not require that an EIR include any economic analysis, if an economic analysis is included, it must be full and fair.

3. ALTERNATIVES ANALYSIS

In response to the clients' previous comment letter, the WTA has now added some discussion of non-ferry project alternatives. However, rather than include a full and fair comparison of alternatives, the RDPEIR, in conclusory manner, dismisses all of the non-ferry alternatives as infeasible and refuses to provide an analysis of their comparative impacts. This decision is also discussed in Mr. Ryan's attached letter. As his letter makes clear, the RDPEIR's decision to dismiss the non-ferry alternatives as infeasible is not supported by substantial evidence. In fact, many if not all of the non-ferry alternatives 7

are eminently feasible and deserve a full analysis in the EIR. Mr. Ryan's comments on this topic are, again, incorporated herein by reference.

As to the express bus alternative, the clients specifically object to the RDPEIR's formulation of this alternative. The RDPEIR sets up the alternative so that the routes generally arrive/leave from the ferry terminals or their vicinity. This creates a "straw man" that does not give a fair picture of the viability of an express bus alternative. Rather, the alternative should be based on a more accurate assessment of where express bus providers could most efficiently add or improve service. After all, it was an analogous process that led the WTA to select the routes and terminal locations for the proposed ferry project. Locations for ferry terminals are, by their very definition, restricted to the borders of the Bay. This is not necessarily the most efficient place to put terminal for express bus routes. At the very least, the EIR should analyze the express bus alternative considered in the MTC Bay Crossings study. 8

Further, the express bus alternative, to operate efficiently, should also include expansion of HOV lanes to provide the maximum benefit from the express buses' use of freeways. In particular, the express bus alternative should include extending carpool lanes on I-880 the entire distance from the junction of I-980 in Oakland to the Dumbarton Bridge. It should also include installation of HOV lanes on all Bay Area toll bridges. While Caltrans may currently be opposed to the latter, that does not, per se, make it infeasible or excuse its exclusion from the analyzed project alternatives. 9

As to the "Express bus, HOV and operational improvements alternative", it seems clear that a major portion of this project's capital cost is the acquisition of three-door BART cars to implement the proposed increase in BART scheduling. Given that the transbay BART is not currently at capacity, the wisdom of including this part of the alternative is questionable at best. At the very least, the increases in transbay BART service, and their associated capital costs, should be factored out and listed separately, preferably as an additional alternative. Only in this way can the relative costs and benefits of the remainder of the alternatives be accurately assessed. 10

4. AIR QUALITY IMPACTS

The RDPEIR's analysis of air quality impacts in unclear in discussing the impacts from the proposed project. Specifically, the analysis fails to indicate clearly whether it includes trips from residences to and from ferry terminals, and impacts from feeder buses going to/from ferry terminals. This needs to be clarified. If car/bus trips were not included, they need to be added, and the revised analysis should then be recirculated, because overall project emissions would be significantly increased. 11

If car/bus trips to/from the ferry terminals were included, the RDPEIR should include discussion of a mitigation measure requiring all feeder shuttle buses to be equipped with zero 12

emission or ultra-low emission engines. The EIR should also discuss the possibility of having the WTA operate electric or LNG engine equipped passenger-driven carpool vans to/from terminals. 13

5. ENERGY IMPACTS

While the RDPEIR acknowledges the proposed project's increase in overall energy consumption per vehicle mile traveled, it asserts that increase is insignificant. (Impact E-1.) However, the RDPEIR fails to include an overall cumulative perspective on energy use for transportation, and its impact on potential local, regional, national, and international impacts. There is no question that the use of fossil fuels for transportation is a major contributor to the United States' overall use of energy, and that, in turn, is a major contributor to global warming. The EIR needs to acknowledge and quantify both these facts and discuss the extent to which the project's admitted increase in energy use will contribute to a cumulatively significant increase in impacts related to energy use. If this cumulative impact is found significant, mitigation measures to reduce the project's energy use should be discussed, including phasing the project so that major expansion of the ferry system is deferred until more energy-efficient ferries are available. 14

The RDPEIR also acknowledges that the ferries are relatively energy inefficient even when compared to other current transit mode. (Of course Table 3.13.1 does not even include human-propelled transit modes (e.g., walking, bicycles) which consume essentially zero energy!) Even the comparison to automobile use is distorted by the EIR's assumption of only 1.17 passengers per auto trip. While that may be consistent with current ridership figures, one would hope that increasing incentives for HOV use will, over time, result in a rise in the efficiency of auto transit. Further, the increasing use of hybrid gas/electric vehicles can also be expected to increase the efficiency of the auto mode of transit. Table 3.13.1 should be revised accordingly. 15

Thank you for the opportunity to comment on the RDPEIR. We look forward to receiving a copy of a further revised document once reanalysis is complete. Please keep us informed of future events related to this project.

Most sincerely,

Stuart M. Flashman

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Stuart M. Flashman
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Re: Consultant's conclusion in the Revised Draft Program Environmental Impact Report (RDPEIR) - Expansion of Ferry Transit Service in the San Francisco Bay Area (April, 2003) - for the Water Transit Authority (WTA) that none of the Metropolitan Transportation Commission (MTC) alternatives for improving area and transbay travel go forward for further evaluation.

Dear Sir,

I am submitting these comments on behalf of my client, the Sierra Club, San Francisco Bay Chapter regarding the above referenced matter.

The RDPEIR states "The CEQA Guidelines require an EIR to analyze a reasonable range of feasible alternatives to the project or the location of the project that would "avoid or substantially lessen any of the significant effects of the project" (Section 15126.6)." (Section 2.2.2.1). However, RDPEIR Section 2.5 eliminates 6 non-ferry alternatives from further evaluation. On the face of it, any, or some of these alternatives acting together, can be expected to "avoid or substantially lessen (all) of the significant effects of the project." 16

More specifically, each of the rejected alternatives contains the statement "This alternative would not meet the basic project objectives described in Section 1 of this DEIR." Section 1.2 says "The primary purpose of the WTA Implementation & Operations Plan (IOP) is to increase Bay Area regional mobility and transportation options by providing new and expanded water transit services and related ground transportation terminal access in the San Francisco Bay Area." The IOP statement is fine and good. However, the function of an EIR is to evaluate a project against "a reasonable range of feasible alternatives." This does not mean an IOP for a new mode of service can be used to rule out fully evaluating competing projects with the similar goal of "increasing Bay Area regional mobility and transportation options." 17

At least 4 of the rejected alternatives have direct impacts on the IOP and should be fully studied.

1) "With an imbalance in the number of new jobs compared to the number of new housing units," more people, mostly in single passenger vehicles, are commuting long distances. (1.3.1) This potentially could be resolved by implementation of the Smart Growth Alternative (2.5.6) rejected for further study per the above reason and "... implementation efforts under the leadership of ABAG are voluntary rather then mandatory ...." The consultants are totally

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silent on efforts by the Inter Regional Partnership members to aggressively correct imbalances in jobs and housing in their 5 county, East Bay/San Joaquin Valley Region. 17

2) "Transbay BART and Bridges Are at Capacity." (1.3.2) This is a stretch since the EIR continues by saying, "... the BART system will be able to handle demand between now and 2025

...." It further states "capacity of (BART) ... San Francisco stations will be of concern in the future." This is curious because no such comment is made about future capacity concerns at the one point destination of all proposed ferry routes, the San Francisco Ferry Terminal. This is particularly important since BART currently distributes passengers to stations throughout central and southwestern San Francisco while ferry passengers debarking at the one available location must transfer to another transportation mode to reach inland destinations. 18

Finally, Section 1.3.2 talks about "vehicles crossing the Bay Bridge" rather then people crossing the bridge. This issue can be addressed by implementation of the Transportation System Management Alternative (2.5.5) rejected for further study per the above reason and "Full implementation of this alternative would ... require further coordination, and approval by, the various affected jurisdictions and stakeholders in the transportation community." In short, it is too hard to do. However, it is not impossible to do. Plus the consultants neglect to mention that establishing ferry terminals surrounded by smart growth centers served by frequent, reliable transit and appropriate parking structures will also take cooperation by many stakeholders. By the logic of "it is too hard to do," the consultants should cease further study of establishing new ferry routes. 19

3 & 4) "The Proposed Project ... Provides expanded ferry service and associated land side transit ...." (2.2.1) The IOP devotes 10 pages to a discussion of "The Connections" (Pages 26 - 35) wherein the WTA presents what is essentially a smart growth picture. While the RDPEIR discusses general impacts at the several terminals and both the RDPEIR and IOP mention on land transit connections, the EIR is silent about the extensive transit improvements needed to support this plan. They are equally vague about parking structure and highway access needs. They also fail to discuss who will own the land and lead development efforts around the ferry terminals. All of this should be included in major supplements to 4 of the eliminated alternatives; buses (2.5.1 & 2.5.2), TSM (2.5.5), and Smart Growth (2.5.6) since large capacity, smart growth oriented ferry terminals are proposed for locations vastly different then the destinations considered in said alternatives. We must have these revisions to judge whether an expanded network of ferries will indeed be cost effective improvements to San Francisco Bay Area communities. One key question is, will an expanded ferry network result in equivalent reductions in the need for service expansions already identified in various MTC studies? We do not know unless the impacts on the land transit networks, need for TSM, and revised thinking on Smart Growth have been analyzed by WTA in response to their proposed ferry system. 20

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Finally the numbers, Table 2.2:

The ferry proposal is expensive and its costs are ongoing. Once established, this is another transportation system competing for scarce transit dollars. In reading this table we must keep in mind the focus of the proposed ferry routes is the San Francisco Ferry Terminal. The goal is to bring more people to downtown San Francisco for the least cost. Therefore Table 2.2 frames the presentation in terms of costs/benefits to increase passenger transportation to and from San Francisco.

In attempting to do this, Table 2.2 compares peaches, apples, grapes, and plums. For just the ferry related numbers: Capital Cost should include terminal costs plus the cost of redevelopment of existing land uses into smart growth centers. Annual Operating Subsidy and Operating Subsidy per Rider should be compared with known subsidies of existing services. Annual Ridership numbers are projections and have a very low reliability factor, as do all numbers projected for any new highway or transit service. The one benefit the table quantifies is Change in daily VMT. However, this is meaningless since it is .08% of anticipated VMT, both numbers subject to high margins of statistical error. 21

This leads the reader to compare a set of projected ferry numbers with sets of projected numbers for the alternatives eliminated from further consideration. The only directly competitive alternative would be an additional BART crossing which is shown as substantially more expensive then the proposed ferry project because the ferry estimate does not include complete assumptions as to the land side costs. The bus, TSM, and smart growth alternatives are regional in nature and their impacts on the Bay Bridge Corridor have not been isolated. Dumbarton Rail is not a factor since it is primarily an east bay/south bay corridor.

Nothing in the numbers presented in Table 2.2 can be used to justify proceeding with or abandoning the Proposed Project (IOP Alternative) because the estimates are incomplete, not validated, unexplained, meaningless, or too general for direct comparison.

Table 2.2 should be revised as follows before any attempt is made to use it for meaningful judgments:

1) Revise Capital Cost to include complete estimates of land side costs.
2 Validate the Estimated Annual Operating Subsidy by comparisons to currently known subsidies. 22
3) Explain the calculation of the Estimated Annual Ridership
4) Eliminate Change in VMT from the discussion as it is meaningless.
5) Refine the analysis of bus, TSM, and Smart Growth for their potential impacts on the Bay Bridge Corridor before using any numbers from these proposals.

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Conclusion: Refusal by the WTA to continue consideration of Alternatives 2.5.1 Express Bus Alternative, 2.5.2 Express Bus, HOV, and Operational Improvements Alternative (ideally merged into 1 study directly related to the Bay Bridge), 2.5.5 Transportation System Management (TSM) Alternative, and 2.5.6 Smart Growth Alternative is unjustified both in relation to California CEQA Law and the advancement of their own cause. 23

Sincerely,

K D Ryan

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Education	**Degree/Date**
University of Illinois, Chicago	BS/1983
University of California, Berkeley	
City and Regional Planning	MCP/1989
Transportation Engineering	MS/1989

Key Qualifications

Mr. Ryan has over 35 years experience in transportation operations and marketing, both as an employee within the industry and as a consultant/planner outside the industry. He has a solid knowledge of current transportation and land use laws, practices, and patterns. He has planned and implemented private and public sector transportation service improvements. Kenneth has represented the Sierra Club on regional and statewide policy boards developing changes in transportation planning and performance measurement procedures since 1989. These activities have brought him together with many different interest groups and local leaders. Most of these efforts have used consensus process decision making and have achieved some impressive results.

Relevant Project Experience

Developed the criteria which are the basis for Union City's Business/Residential/MultiModal Center Development Plan and serve as Citizen Representative of the City of Union City Planning Commission on the Action Team for Implementation. - Criteria:
Mixed Use - housing, retail, and offices all walkable and focused on a BART station, bus center, and intercity/commuter passenger rail station - Minimum Parking Facilities; paid where established

Developed the criteria for environmental groups that worked with business and government leaders to negotiate, write and pass Alameda County's recent measure to extend the local sales tax for transportation improvements

Developed the criteria which are the basis for the Metropolitan Transportation Commission's Transportation For Liveable Cities Program

Researched, commented on, and lobbied for the Intermodal Surface Transportation Efficiency Act and its reauthorization.

Revitalized the Northern California Land Trust which has provided affordable housing opportunities for over 25 years. Served as Board President/Executive Director for four years, Board Member for five years thereafter. Organized and facilitated workshops on NCLT development, community development, low income housing, and transportation expansion for NCLT Board Members, neighborhood residents, NCLT residents, and environmental activists.

Secured the transfer of the Eureka Southern Railroad from probable abandonment and liquidation due to bankruptcy to public ownership and successful operation by the North Coast Rail Authority, thereby preserving railroad service for shippers in three isolated Northwestern California counties

Kenneth David Ryan
Transportation & Land Use Consultant
254 Molokai Circle
Union City, CA 94587-4210

Phone 510-487-8230
Fax 707-313-1521
Email

Worked for four years with forty-five interest groups charged with developing California's California Transportation Directions: Mobility for 2010 which became the basis of California's support for ISTEA and evolved into the ISTEA mandated Transportation Plan for California. The group also recommended Statewide strategies for growth management which encouraged regional decision making on the provision of infrastructure. The group was disbanded in 1993.

Developed the San Joaquin County Rail/Feeder Bus Program and assisted the county's first project manager in securing resolutions of support from the County Board of Supervisors and four city councils which lead to passage of the County's Sales Tax Initiative for Transportation that funds the ACE Commuter Train Service and expanded bus services.

Worked for three years after the 1989 Loma Prieta Earthquake to secure a political consensus to route I880 around the West Oakland, California neighborhood rather then through it, thereby stimulating the neighborhood's redevelopment.

Evaluated economic development issues for the nine county region of Northwestern California. This included identifying reasons why several counties are not experiencing rapid economic growth even though they have a theoretically ideal transportation infrastructure. The evaluation included developing a package of local programs designed to stimulate business growth

Managed a team of persons who worked on behalf of the railroads with major shippers to devise methods of securing cargo that eliminated damage in transit

Coordinated and audited the activities of several small shipment receiving centers, including container transfers from railroads and to piers, for a major steamship line
Panelist at two Caltrans employee training sessions in Fairfield, CA discussing the preparation of Environmental Impact Reports.

Served as a technical liaison and resource person for clients seeking to effect proposals by state and local transportation agencies, railroads, and railroad customers or neighboring property owners Provided cost/revenue estimates for physical plant purchases and/or improvements and projections of traffic through either individual centers or along a corridor

Taught citizen groups how to devise and secure environmentally positive transportation infrastructure expansions by entering the process at the scopeing sessions, developing and advocating community friendly alternatives for solving identified problems, then reviewing and questioning environmental impact reports that do not seem to fully explain the impacts of the studied projects on neighboring communities.

Wrote and presented over 25 papers on transportation and economic development issues
Most recently, produced issue papers on the development potential that can result from new intercity rail passenger services in Alameda and Sonoma Counties These papers included discussions of the opportunities for Commuter Rail and multimodal center development

From 1981 to 1996 I ran my own consulting businesses and managed a range of land use planning, housing development, and/or transportation expansion projects for Ryan & Associates, NHA Inc., Calrail, and the Northern California Land Trust Inc. This provided me with extensive experience coordinating, budgeting, and managing projects in both private industry and the public sector.

EIR 1010

GOLDEN GATE BRIDGE
HIGHWAY & TRANSPORTATION DISTRICT

By Facsimile: (415) 291-3388

May 15, 2003

Mr. Thomas G. Bertken
Chief Executive Officer
Water Transit Authority, EIR Comments
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

Re: **Re-circulated Draft Environmental Impact Report (DEIR), Expansion of Ferry Transit Service in the San Francisco Bay Area**

Golden Gate Bridge, Highway and Transportation District (District) offers the following comments on the above-referenced document as it pertains to existing and future ferry trips along the Golden Gate Corridor. District understands this document to be a programmatic Environmental Impact Report and, as such, localized effects of expanded ferry transit service will be developed and evaluated as new ferry routes are implemented at a future time. District also understands the Re-circulated DEIR includes the Initial Operating Plan Alternative, referred to as the "Proposed Project" in this report. Finally, District understands Water Transit Authority (WTA) will address comments on both the Re-circulated DEIR and the Initial Draft EIR in the Final EIR.

As requested by WTA, this letter only provides comments on new and revised information provided in the Re-circulated DEIR and does not repeat comments previously offered. Hence, this letter is a follow-up to District letters to you dated August 16, 2002 (signed by Alan Zahradnik, Planning Director), October 15, 2002 (signed by David Clark, Deputy General Manager/Ferry Division), and December 12, 2002 (signed by Alan Zahradnik, Planning Director).

General Comment

Re-circulated DEIR does not discuss a potential ferry terminal at San Quentin as mentioned in previous documents produced by the WTA. Re-circulated DEIR only makes reference to the existing Larkspur Ferry Terminal (LFT). Since no specific reference is made to a ferry terminal at San Quentin, it is not clear whether a facility at this location, with associated issues (e.g., dredging, access, and land use), is still under consideration by WTA. 1

EIR Comments

Purpose and Objectives

Table on the bottom of page 1-4 cites "2001 bridge concern" as an event that has disrupted 2

transbay travel, thereby resulting in increased ferry patronage. District recommends this event be explicitly described, such as "2001: Events Related to Terrorist Threats in the Bay Area." 2

Navigation

Re-circulated DEIR correctly references LFT as a terminal located close to a launch site for windsurfers. The report suggests two measures to mitigate potential conflicts between ferry vessels and windsurfers. Since LFT is also located close to the Marin Rowing Facility, are the two mitigating measures mentioned adequate to address potential conflicts between ferry operations and all recreational activities near LFT? 3

Air Quality

- In Section 3, Impact Assessment Methodology does not cite rail as a mode of access. This suggests rail was not assumed to be a mode of travel to and from ferry terminals in Larkspur, San Quentin, or elsewhere in the Bay Area. If access to ferry terminals by rail had been included in this report, would the air quality findings be significantly different than those presented? 4

- Appendices in the Re-circulated DEIR pertain to the air quality analysis for this report. Table 1 (Base-Peak) indicates travel times between Larkspur and San Francisco ferry terminals at approximately 48 minutes (northbound) and 40 minutes (southbound). Similarly, Table 2 (Proposed Project-Peak) indicates 44 minutes (north and southbound) for this route. Both tables apparently use travel times for Golden Gate Ferry's conventional mono-hull vessels deployed on this route. Since Golden Gate Ferry does operate catamaran service on weekdays, as acknowledged elsewhere in this report, are the reported travel times appropriate for the DEIR's air quality analysis? 5

Land Use

Table 3.7.1 summarizes potential issues pertaining to land uses at various ferry terminal sites. According to Pertinent Visual/Aesthetic Policies for Larkspur, the report cites there are no identified policies (by the Larkspur Planning Department) for LFT (and surrounding land uses). Based on past issues pertaining to this terminal, District staff has been reminded by City of Larkspur staff that there are visual and aesthetic issues at this location. Re-circulated DEIR should confirm this understanding. 6

Transportation

- Table 3.12.1 presents the change in Vehicle Miles Traveled (VMT) between 1998 and 2025. Unfortunately, the data for Bus VMT is not divided by county, as presented for auto and truck trips. Is a classification of Bus VMT available for Marin and Sonoma counties? Is a distinction between bus and rail available? 7

• Table 3.12.5 presents forecasts of daily (weekday) ridership to and from ferry terminals for the Proposed Project. For Larkspur, it estimates a mode split for walkers (10.5 percent), drive access (74.3 percent) and transit access (15.1 percent). Although these modal splits are highly desirable, and assuming "walkers" is the equivalent of LFT access by foot and bicycle, approximately 1000 persons (or 10.5 percent) accessing LFT on a daily weekday basis appears high. Based on a July 2000 District survey, approximately 8.0 percent of LFT ferry customers access this terminal by foot and bicycle. Similarly, estimated transit access by nearly 400 persons (or 7.7 percent) to the Sausalito Ferry Terminal appears to be high. The Re-circulated DEIR should present the source(s) and assumptions used by the travel forecasting model developed for this report. 8

• Table 3.12.6 presents Potential Parking Availability for the Proposed Project in 2025 for various ferry terminals. Specifically for LFT, it presents a parking demand at 72 percent of the existing facility for the Proposed Project. This is inconsistent with past experience at LFT where demand has exceeded 100 percent of spaces. The Re-circulated DEIR should present the source(s) and assumptions used by the parking model. 9

District staff appreciates the opportunity to comment on the Re-circulated DEIR for this project. Please call Principal Planner Maurice Palumbo at (415) 925-0160 if you have questions.

Very truly yours,

Maurice Palumbo for

Alan R. Zahradnik
Planning Director

c: Celia G. Kupersmith
Teri W. Mantony
Rebecca Wessling
Maurice P. Palumbo
Lillian Hames, Sonoma-Marin Area Rail Transit
a:f:\AA\ferry\WTARevised DEIR.053.doc

EIR 97-106

IOP Public Hearing
San Francisco County
October 10, 2002

Submitted Comment Sheets
&
Speaker Cards

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

EIR 97

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: BOB HOCKER Date: 10 OCT 02

Affiliation (if applicable): LENNAR/BVHP, ENGINEER, FORMER NAVY REGIONAL ENGINEER

Address: #4 EMBARCADERO CENTER, SUITE 1700, SF, CA 94111
(415) 774-2990 RHOCKER@SHEPPARDMULLIN.COM

Topic: THE NEW, RESIDENTIAL/COMMERCIAL COMMUNITY AT HUNTERS

Comment: POINT SHIPYARD (HPS), WITH ALL THE TO/FROM POTENTIAL RIDERSHIP, WAS APPARENTLY GROSSLY UNDERESTIMATED/UNDERREPORTED IN STEVE CASTLEBERRY'S STUDY. THE BVHP COMMUNITY ADJOINING THE SHIPYARD IS LARGELY AFRICAN-AMERICAN AND HAS BEEN THE "VICTIM" OF SOCIAL AND ENVIRONMENTAL JUSTICE FOR DECADES. HPS FERRY SERVICE WOULD PROVIDE DAILY, AS WELL AS, EMERGENCY RESPONSE/ACCESS, FOR THAT COMMUNITY AND OFFER A SITE FOR ~~CONSTRUCTION/MAINTENANCE~~

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Please continue on back side.

Comments should be submitted by **October 31, 2002**

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 98

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: GOPAL SARIN

Topic: ~~Public Comments~~

Comment: 1. Fuel used should be gas, fuel cell or Batteries 1

2. A team should go to New Zealand, Delhi INDIA (~~and maybe~~) to see gas operated engines on cars etc. Russia has got a lot of water transport also 2

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 99

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Roy Willis

Topic: Hunters Pt. Shipyard

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

EIR 97-106

EIR 100

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Tom Wilson

Topic: Reduce Traffic Improve Air More Jobs

Comment:

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Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

4/22/03 cm \28066519 WTA\comment letters\EIR-097-106.cdr

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 104

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: JENNIFER-CLARY

Topic: DRAFT IMPLEMENTATION & OPERATIONAL PLAN

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 102

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: DENIS HOWARD

Topic: FERRIES AS TOURIST ENHANCEMENT

Comment: I HOLD A 1 LICENSE TO OPERATE FERRIES (CAPTAIN). I AM IN THESE UNIONS IBU, SUP, & MEBA. AS A TOURIST IN CANADA & IRELAND ON A BICYCLE TAKING FERRIES ENHANCED MY EXPERIENCE 100 FOLD. THANK YOU — Denis D. Howard 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 103

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jari Share, Bluewater

Topic: DEIR/EIR Network

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

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WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 104

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: STEPHEN T. MARTIN

Topic: FERRY

Comment: INCREASE FERRY SERVICE Reduce TRAFFIC Become leader in NATION ALTERNATIVE TRANSPORTATION & Fuels 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR ~~105~~ 96

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: PAUL MENAKER

Topic: HUNTERS POINT SHIPYARD #2

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 106

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: LEE BLITCH

Topic: SUPPORT OF WATER TRANSIT

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

Paul Menaker - Korve Engineering



Hunters Point Shipyard should be a High Priority Terminal in the San Francisco Bay Area Water Transit Authority's Implementation and Operations Plan

October 10, 2002

Summary

After many years, San Francisco and the Bayview-Hunters Point (BVHP) residents are well on their way to creating a vibrant new community at the former Hunters Point Shipyard (Shipyard). When completed, **the new Shipyard will house 5000 residents, employ 10000 workers**, provide retail services including a unique African Festival Marketplace and contain extensive parks and open space, all along the edge of the Bay. To meet these goals, **the community will need to have good transportation connections to overcome its geographical isolation and limited roadway access**. **Water transit is a key element of the new Shipyard**. The Shipyard Plan anticipates a new ferry terminal which will serve this need. Through this dock, residents could travel to work along San Francisco's waterfront and to East Bay points and workers and tourists from around the Bay could easily get to the Shipyard and the surrounding community. 1

From a planning point of view, **the Shipyard is part of the Bay Area's "smart growth" initiative** - in-fill development in an existing urban area. It goes without saying that **the BVHP community has been economically disadvantaged**. Thus, an initiative to provide water transit service to the Shipyard would help the Water Transit Authority (WTA) conform to the US Department of Transportation's"**Environmental Justice"** policies. 2 Further, **the Shipyard provides an ideal facility to address disaster preparedness, as well as providing a potential Park-N-Ride facility**. 3 4 Finally, as a former Navy shipyard containing extensive serviceable shipbuilding and repair equipment, the WTA should **encourage the construction and repair of new ferry boats at the Shipyard**. 5

Introduction

San Francisco has been the hub of Bay ferry service for the last 150 years. It's commitment to continuing and enhanced ferry service is evidenced by the complete rehabilitation of the Ferry Building and expansion of its ferry docks and the installation of a success ferry terminal at PacBell Park. Ferry Service is integral to the redevelopment of Treasure Island. We would submit that **ferry service is a key ingredient to the redevelopment of the Shipyard**. 6

The Shipyard is central to the Bay Area and is located on the southeast San Francisco waterfront **surrounded on three sides by waters of the San Francisco Bay**. The Shipyard is physically, economically, socially, and historically connected to the City of San Francisco as part of the BVHP Community. As Primary developers for the Shipyard, the Lennar/BVHP Team now sits at the table with the City and community representatives in an effort to meet the following redevelopment objectives:

- Create jobs for economic vitality
- Support existing businesses
- Create an appropriate mix of new businesses

- Provide multi-modal transportation alternatives
- Balance development and environmental conservation
- Facilitate appropriate immediate access
- Integrate land uses with the BVHP community
- Acknowledge the history and maritime tradition of the Shipyard

Hunters Point will be a new neighborhood with over 5000 residents and 10,000 jobs

The Shipyard project will be a new neighborhood with huge potential and poor access. The City is actively involved in turning the Shipyard into a new city neighborhood. The current EIR for the Shipyard analyzes a development with more than 1,800 residential units and more than 3 million square feet of commercial development. Further refinements to the redevelopment plan may encourage more housing and commercial development. The Shipyard site is central to the San Francisco Bay, but is isolated from the region's activity centers. Access is crucial to developing the land to its highest potential and to integrating the development with the lower income communities that surround the site. As a former military base on the water, the Shipyard deserves special recognition from regional funding sources to support its new, in-fill uses and its contribution to relieving the region's housing shortage.

Hunter's Point Shipyard, Treasure Island, Transbay Terminal and Mission Bay illustrate that San Francisco's commitment to "smart growth" and housing production is unmatched in the region.

The current Plan does not meet the requirements for Environmental Justice

Several neighborhoods along San Francisco's Southern Waterfront continue to be economically marginalized. It is extremely disappointing that the WTA does not adequately address both the development opportunities inherent at the Shipyard, and the BVHP community, as well as on-going environmental justice concerns.

Other transportation providers are actively programming projects to enhance access to the BVHP community and address environmental justice considerations. For example, the City and Caltrain are working together to develop a new station at Oakdale Avenue to directly serve the BVHP. When the Transbay Terminal project/Caltrain extension is completed, BVHP residents will have excellent access to downtown San Francisco. Muni is building a light rail line to serve the community. These agencies understand the importance of meeting the needs of low-income and transit dependent neighborhoods. It appears that the WTA has not met the mandates of environmental justice as part of its project.

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According to the U.S. Department of Transportation, there are three fundamental environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

US DOT also notes that "environmental justice is more than a set of legal and regulatory obligations. Properly implemented, environmental justice principles and procedures improve all levels of transportation decision making." The WTA has not fulfilled these procedures. In other locations it partnered with public and private programs to leverage transportation agency resources to achieve a common vision for communities. The WTA has not fully sought out local community representatives for their input and participation, nor has it sought out the City's designated developer for the Shipyard for input in achieving a common vision for this community's economic and social development. This lack of cooperation may result in adverse impacts on minority and low-income populations.

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Ridership estimates understate the Shipyard potential

We understand that patronage estimates resulted in "low" ridership levels for a Hunter's Point Shipyard ferry. We need to understand what service plan was assumed, how the service connected with other ferry routes, where the service was assumed to originate, and how often it would run. Aside from the issues of service design, we are concerned that land use assumptions, which form the basis of patronage forecasts, were incorrect. This resulted in a WTA process that underestimated the size of the transportation market. The draft environment document, for the Shipyard redevelopment project, identified about three million square feet of commercial development and 1,800 residential units. It is our understanding that this level of development was not included in the land use assumptions that produced the WTA patronage estimates. Indeed, the ABAG land use forecasts that form the basis of the WTA patronage forecasts identify only 1300 new households and the equivalent of less than 1 million square feet of new commercial development. This is clearly of concern.

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Equity and Merit needs to exist within the Plan

Access is a paramount issue for any reuse of the Shipyard and the WTA's failure to include any terminal facility, with or without operating subsidy, is not acceptable from a community development standpoint. It is especially troubling to observe that the Shipyard is not recommended for inclusion in the WTA system, while other less developed areas are. The Shipyard project has more potential development, more opportunities for walk access, and substantially more residences than several of the other recommended terminals. The selection of other locations over Hunter's Point Shipyard can only reinforce questions of equity and merit.

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Further, the City and Shipyard developer are assessing options that may increase the level and density of development on the site. Such an increase is consistent with regional and state plans, and should be encouraged by state authorities. By failing to assist the Shipyard project to achieve these activity increases through the provision of a water transit system, the WTA has ignored important state planning principles.

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The Plan needs to consider Disaster Preparedness and Park-N-Ride potential

Even if the WTA patronage projections are accepted, it is still unacceptable that the Shipyard was not recommended as an emergency response terminal. San Francisco is on a Peninsula, and providing multiple ferry slips, including the Shipyard, is inexpensive insurance. The WTA's own Implementation and Operating Plan includes a detailed discussion of ferry activity during the World Trade Center disaster, but does not include pro-active recommendations on how the Bay Area can learn and prepare. A detailed list of emergency terminals should have been included, and the list should include the Shipyard. This and many more facilities will eventually be needed during a disaster.

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Disaster preparedness is the baseline justification for these facilities, but they would also be used, or could possibly be used, for special events or perhaps regular service. For example, the WTA's standardized terminal design would provide excellent access to 49ers games at Candlestick Park. Or perhaps the city could work with the WTA to provide park-n-ride facilities at the Shipyard for ferry service to downtown or the East Bay. 12

Construction and maintenance opportunities exist at Hunter's Point Shipyard

Within the Plan, the WTA needs to discuss the location of vessel construction and maintenance facilities. Given the historic nature of the Shipyard in the building and maintenance of seaworthy vessels, and a portion of the shipyard being reserved for maritime industrial land uses, this location should receive serious and active consideration for both construction and maintenance activities. The need to acknowledge the shipyard history, and potential to create jobs in an economically challenged area, should be a major consideration in the Plan. 13

Conclusion

San Francisco has a strong commitment to smart growth, housing and to transit oriented development. San Francisco will be one of the few Bay Area cities to meet ABAG's housing mandates. The City has taken a lead role in making Transit Oriented Development viable – the Shipyard is a good example. However, it will require excellent transit access. The City and County will require the participation of the WTA in meeting the goals at the Shipyard.

The WTA plan calls for an increase of about 40 boats on San Francisco Bay, but the benefit of that service does not extend to low-income communities. 14
The Implementation and Operating Plan does not adequately address emergency preparedness, 15
nor does it specifically detail additional facilities at the Ferry Building to provide for water taxi service, or new facilities at the Shipyard. These must be included. 16
In addition, Hunter's Point Shipyard must be identified as a terminal location, even if their initial designation is "emergency response." 17

WATER TRANSIT AUTHORITY

PUBLIC HEARING

October 10, 2002

AUDI-X REPORTING

52 Longwood Drive, San Rafael, California 94901/ (415) 457-4417

OCTOBER 10, 2002 4:07 P.M.

P R O C E E D I N G S

---o0o---

Ms. Haught Johnson - I have been given some cards. I will call people in order that I have been given the cards. We would like you to focus your comments on either the plan or the environmental document. I am going to try to limit the speaking to three minutes per person if at all possible. And we are not going to engage in a dialogue today about the plan. Everything you say about the plan or the environmental impact report will be taken down by Adrian and it will be addressed in our final plan. So the first person is Gopal Sarin. 98

Mr. Sarin - I thought I would be the last one.

Ms. Haught Johnson - Did I get your name right?

Mr. Sarin - Yeah, Gopal Sarin, G-O-P-A-L, S-A-R-I-N. I am a new consultant. I am studying in a Masters EIR at the State University, Fresno, and I am working on the EIR Water Transit Authority. I bring, of course, a new experience, but if I make a fool of myself, forgive me. I consult with WTA and URS and others who are preparers and

contributors to IOP and EIR. There is no time to go through entirely the total reports, cite the reports and read that. My impression is 1) URS has addressed the EIR from a angle which does not take into account all the community concerns; 2) a non-profit corporation needs to make a supplemental report in accordance with the CEQA provisions to address all the community concerns, and WTA should be able to fund them; 3) CMG has been effectively used in New Zealand, where a majority of cars are driven by CMG and recently in Balig, India. The Supreme Court had ordered CMG's to be used on all the vehicles in the City and that has improved the pollution level -- that means the air level -- much much better. We need to utilize that knowledge. I have seen one of the nonprofit organizations, Bluewater, and there are a number of points which need to be addressed and URS has not been able to address. And my impression is that they will not be able to address because their approach is different. I will send my detailed comments later. But one more thing is that I am not able to understand how the DWDA is a leader in the agency of CEQA, but who is the responsible agency to approve their findings? Who is the responsible agency? Maybe that is the Board of the WTA may be the responsible

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agency, but I do not know. Probably this new specification because this thing may come up in the law later on. I suggest also that they should go to New Zealand, maybe to see how the gas engines have used the idea, and collect the data, and use it. Thank you very much.

Ms. Haught Johnson - Thank you, Mr. Sarin. Roy Willis? Excuse me for a moment, Mr. Willis. I want to remind everybody that would like to submit anything in writing, please do so. And anything after today's meeting, if you cannot get everything in in your words, then you can submit it in writing.

99

Mr. Willis - Thank you very much. Good afternoon. I am Roy Willis. I represent Lumarra (phon) Lennar BVHP Partners. We are the developers for the Hunters Point Ship Yard Development. First of all, I would like to commend the WTA for all the hard work that you have done in preparing this plan. And I would like to suggest that, for the last three years or so, we have been working with the City and County of San Francisco and the Bayview-Hunters Point community to develop the 550 acres of land that is called the Hunters Point Shipyard Development. It is a major development. We

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have been negotiating very hard with the City and we are making real progress both with the City and with the Navy, and, when completed, this major mixed use development will be a major job center, create some 10,000 new jobs, and will house about 5,000 residents, and will be a major new center for open space parks. We are looking at a very unique African festival marketplace that will feature gospel, jazz and blues concerts on the Bay on an ongoing basis. So we will be a major attraction on the Bay just to the north of your South San Francisco terminal center. So we would like to enter into the record and hopefully make the case at your next meeting that this plan could be improved by including the Hunters Point Shipyard as one of the new high priority terminals as a part of your Implementation and Operating Plan. We did have conversations with your staff some time ago and we are very excited about being a part of this plan. I would say -- a couple points -- we see the Shipyard as being a major Smart Growth initiative, which is one of the criteria mentioned here that you are looking at. We think we would certainly qualify for that. We also think that, from an environmental and a socially and economical standpoint for a community that has been greatly

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disadvantaged, that from an environmental standpoint, that this plan could certainly be improved by having a terminal there that would contribute to the economic development of that community. We will have maritime industrial jobs and light industrial jobs, retail jobs, and so forth. And, as I said, we will come back -- we would like to come back soon to make a more detailed case on October 24th. I understand that is when your next board meeting is. Mr. Paul Menaker will go into some other details on his three minutes. But we think you have done a great job. We think we could improve it with the Hunters Point Shipyard. Thank you for listening to me. 2

Ms. Haught Johnson - Thank you, Mr. Willis. Mr. Menaker?

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Mr. Menaker - For the record, my name is Dr. Paul Menaker. I am a principal with ~~Copi~~ Korve (phon) Engineering and working on the Hunters Point Naval Shipyard project. As indicated by Roy Willis, ferry service is the key ingredient to the redevelopment of the Shipyard. The Shipyard is essential to the Bay and is located on the southeast San 1

Francisco Waterfront, surrounded on three sides by waters of the San Francisco Bay. The Shipyard is physically, economically, socially, and historically connected to the Bayview-Hunters Point Community. The current EIR for the Shipyard analyzes the development with more than 1,800 residential units and 3-million-square-feet of commercial development. Further refinements to the Redevelopment Plan may encourage more housing and commercial development. Access is crucial to developing the land to its highest potential and integrating the development with lower income communities that surround the site. We believe that the current plan does not meet the requirements for environmental justice as set forth by the U.S. Department of Transportation principles. These principles include to avoid, minimize, and mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on minority populations and low income populations, to ensure the full and fair participation of all potentially affected communities in the transportation decision making process, and to prevent the denial of reduction in, or significant delay in, the receipt of benefits by minority and low income populations.

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Further, we believe that the current ridership estimates under estimate the Shipyard potential. Aside from the issues of service design, we are concerned that the lane assumptions, which form the basis of patronage forecasts, were incorrect. This resulted in the WTA process that under estimated the size of the transportation market in this place. It is especially troubling to observe that the Shipyard is not recommended for inclusion in the WTA system, while other less developed areas are. The Shipyard project has more potential development, more opportunities for Walk and Park and Ride access, and substantially more residences than several of the other recommended terminals. Even if the WTA patronage productions are anticipated, it is still unacceptable that the Shipyard was not recommended as an emergency response terminal. Its central location to the Bay makes it an ideal location for this purpose. Finally, given the historic nature of the Shipyard in building and maintaining seaworthy vessels, and a portion of the Shipyard being reserved for maritime industrial lane uses, this location should receive serious and active consideration for both construction and maintenance activities of ferry vessels. We strongly request that the WTA consider the

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Hunters Point Shipyard site as it moves forward with its plans.

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Ms. Haught Johnson - Lee Blitch.

Ms. Blitch - I just -- I am the President of the Chamber of Commerce here in San Francisco. We had a very detailed explanation of the plan to our Transportation Committee. I am just here today to report that we thought it was a great piece of work and effort, and we are supportive. Anything that gets people out of the one person driving a car across the bridge and puts hundreds on a ferry boat has got to help the environment. We think it is a no-brainer -- "Just go do it." However, we realize you have got to do the EIR and so forth. But we have this great Bay and we should use it better than we do now. And we saw the studies, you proved it financially. You have not targeted the tent people away from BART, you have really just targeted it to get people out of their cars and that was a good piece of work that has been done on this. And we commend everyone here for the efforts and we are here to support you when you go forward. Thank you.

Ms. Haught Johnson - Thank you, Mr. Blitch. Teri Shore ~~Share~~.

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Teri Shore

Ms. Share - Hi, good afternoon, Terry Share, Bluewater Network. Bluewater Network is solidly behind the proposed low-emissions ferry standard of 85 percent below EPA Tier 2 - 2007). And we plan to support the ferry expansion on this basis. The WTA's work on ferry expansion is clearly ground breaking and setting a model for the nation and the world. We are pleased to have been a part of this planning effort and we believe that the IOP does a good job of summarizing the WTA's work. But having said that, we do have a number of questions and concerns that we believe have not been fully addressed in the IOP and the EIR. I will summarize some of them here and I will also be providing extensive comments on the EIR. Almost done.

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One, on the Low-emissions mandate, in order to ensure that this mandate happens down the road, long after the current staff and your current applicants are around, we believe that the emission standards should be everywhere. It is in the IOP, it needs to be in the EIR as a mandate, it is not right now. It also needs to be in the authorizing legislation and in the bridge toll legislation, not only for the WTA's benefit, but for the benefit of other ferry projects that might come forward, particularly on the bridge

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toll front. We also believe that in the IOP, a more detailed plan for achieving the mandate is needed. Currently, the entire plan consists of issuing an RFP for the vessels through the vessels specifications, but there is no back-up plan in detail for the possibility that no one way bid on the project for these vessels. So we would like to see a recommendation in the IOP for the early construction of a pilot fleet boat or boats to ensure the Low-emissions standard. That way, you have some time to order on the vessel; if it does not work, you can change technologies without jeopardizing service. There are a couple of things that are not in the IOP and the EIR that I believe should be. One was mentioned by the previous speakers, environmental justice and how ferries will serve diverse ridership. I did not see that that was addressed except in the land use section of the EIR where it talks about building terminals in communities. I think we need to look at air emissions standards and also how a diverse ridership will be served. A couple of other -- I just want to list a couple of other things that I would like to see in the IOP and EIR -- waste water and gray water impacts from vessels in terminals. I would like to see the continuation

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of the TAC, the CAC, and the clean marine. I have not seen that spelled out anywhere. Maybe it is assumed that those are very very effective. Details on bike and pedestrian access, and greenhouse gases. 8 9

Ms. Haught Johnson - Thank you, Ms. Share. Stephen Steven Martin? 104

Mr. Martin - Hi, good evening. I am a big fan of the ferry service. I have taken it since I was a kid and I know that California was the leader in urban transportation prior to -- not in the nation, but they had a great system here until World War II and the internal combustion engine took over and everyone wanted to get in their own car and drive around. So anything we can do to get people out of their cars and back into ferry boats is a good thing, especially here. We have such a beautiful area in a limited space, and this is a perfect Bay and historically it has served the people very well. We are also the custodians of a great maritime heritage here that I think should be utilized. Thank you. 1

Ms. Haught Johnson - Thank you, Mr. Martin. 101 Jennifer Clary?

Ms. Clary - Congratulations. Maybe we will be able to get home for the game. My name is Jennifer Clary. I am President of San Francisco Tomorrow. And I have my transportation chair here today, so he can correct everything I say. We already did some public comments on the EIR and we will submit more in writing. On the IOP, I just have a few questions. First, I am a little confused about governance. You talk about expanding existing routes and I am wondering, do you have plans to maybe assume management or a partnership role with the existing ferry routes? Is that something you are in negotiations with? And by the same token, when you are talking about your relationship with land side transit and you are setting aside a budget for that, what are you envisioning? Are you going to extend existing lines? Are you going to fund new lines? Are you going to be doing a shuttle service that only serves the ferry? Are you going to do Park and Ride? And is this subsidy just for capital or operating, or both? Also, on the zero emission ferries, I do not know how many of you have heard Howard Strasser (phon) from the Sierra Club who has done an analysis of the ridership increase you are projecting vs. those riders if they use single occupancy

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vehicles. And he showed that there was no real energy savings in the ferry service as you envision it in your EIR. So I guess my question is 1) what are you doing to increase ridership, for instance, a marketing plan for reverse ridership for the empty ferries that are going in the other direction, and this makes the zero-emission ferries even more important because if you are not saving energy, at least you hopefully will be using cleaner energy. And part of the problem, of course, is that ferries, even though diesel, are not as clean as cars. Also, the new funding mechanism -- I am a little confused by that because when I was at MTC watching this presentation a few weeks ago, they seemed to actually be very concerned about competition for operating income, and I am wondering how much of the new funding you have identified has already been identified by MTC and other agencies for other needs. Also, on page 10 on your list of major projects and their capital operating costs, I know you mention Caltrans and I know it does not serve the same ridership, but if you are comparing costs, Caltrans extension is much less expensive than BART and maybe it would give people a good idea about a real comparison. And by the same token, when you are doing

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comparisons on page 15 about operating subsidies for different transit systems, when you say SFMUNI, could you specify that you are talking about the rail system? Because 114,000, of course, is only the rail and not the whole system. Thank you. 4

Ms. Haught Johnson - Thank you. That is the last card I have. Is there anyone else who wants to say anything? We have got one person.

Mr. Howard - Can you hear me? That is close enough, okay.

Ms. Haught Johnson - And we would like you to fill a card out with your name on it afterwards, okay?

Mr. Howard - Oh, okay. My name is Dennis Howard. 102 I am in the Inland Boatmans Union, Sailors Union of the Pacific, and I also get some work out of the Marine Engineers Union, both the IBU and the MEBA represent people who work the ferries. I won't talk about "because it is my job, I want this to happen." I have traveled in other countries. I have traveled in particularly Canada and Ireland as tourist and as a bicyclist, and worked -- and being able to take ferry transportation enhanced my experience as a tourist in those countries 100 percent. It 1

was just another wonderful experience. And I would say that when you are looking at this and you are weighing it, you are also weighing tourism. You are just not weighing the people that live here. Thank you. 2

Ms. Haught Johnson - Thank you, Mr. Howard. Anyone else like to make a comment? 100

Mr. Wilson - My name is Tom Wilson and I am in the IBU. I have also been in the Sailors Union for 35 years. Most everything has been covered. One thing I noticed that was not mentioned would be stress. I think getting off these freeways, I mean, I travel over the Bay Bridge all the time and it is really -- the stress is terrible. And I have worked on the ferries and I have watched people and they are very relaxed, they read books, you know, it would be a lot better for people, plus jobs and reducing traffic and everything else. Thank you very much. 1 2

Ms. Haught Johnson - Thank you. Anybody else?

Mr. Castleberry - Just a couple of points of information. I am certainly not intending to answer all the questions, but I think some clarifications about the process may be in order. There was a question about the Environmental Impact Report, and who is the lead agency, who

is the responsible agency? For clarification, the Water Transit Authority is the lead responsible agency and they will be the agency that approves the final EIR. Questions about how it is going to operate in the future, it is sort of a non-answer. The question about who is going to operate the routes, are you going to operate existing routes, are you going to operate the new routes? The Legislation does not give us the authority to take over existing routes. It is something that we would work with the locals. You know, if they wanted us to, fine. If they did not, that is fine too. And the question about running transit, I mean, it is an open question. The kinds of transit, the ferry terminal, the terminal where some places it has the shuttle buses and some places it will be extensions of existing lines. It really varies. And for that reason, the operations will likely vary too. It certainly has not been determined at this point.

Ms. Haught Johnson - And 25 percent of our estimates have ---

Mr. Castleberry - And we intended to budget for it no matter who is actually spending that money.

Ms. Haught Johnson - Wait one second, okay? I

want to say to the Hunters Point people that we look forward to having you at our meeting and doing your presentation, but we certainly are not excluding Hunters Point from our plan. Did you have a question, sir?

98 cont.

Mr. Sarin - About the lead agency and responsible agency, I was only meaning that one who prepares the plan -- it goes to a second authority for approving it. Perhaps it is not in the thickness of things that one who prepares the plans, he hands it directly to the Legislator for approval. In between probably the WTA Board of Directors, maybe, but then Board of Directors will be -- should be having some tools at their command, some resources at their command to scrutinize it and to see. And 2) I am very particular just Mr. Steve pointed out that one that almost $500 Million when you are going to spend, the planning has to be very thorough and it involves a lot of money. Usually what my experience has been, about five to six percent of the total money is spent on planning -- detailed planning, total. Just like a project report or just like an IOP and Water Plan. So that needs you need about $25 Million, and you have got already $12 Million, probably at least $13 Million more you will go to ask the Legislature next time. So the

money should be got and thorough planning work should be done, and that is why --- I mentioned about the supplemental EIR from the community side that is a nonprofit. Thank you.

Ms. Haught Johnson - Is there anything else anyone would like to add? This meeting is adjourned. Thank you.

[Adjourned.]

IOP Public Hearing
Alameda County
October 3, 2002

EIR 86-94

Submitted Comment Sheets
&
Speaker Cards

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

EIR 86

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: ZIGMOND COLLINS Date: 10-03-02

Affiliation (If applicable): Inland Boatmen's Union

Address: 37 MOSS AVE #11 OAKLAND, CALIFORNIA 94610

Topic: Reduce Traffic Congestion and Improve Air Quality

Comment: I think it's the best thing for the people. Because I will be less Cars on the Road And I think It's A Safe way to go. 1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 87

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: JOHN LANDERS

Topic: EXPANDED TIME LINE

Comment:

WHEN DO YOU PROJECT THE FIRST NEW PORT WOULD BE TAKING PASSENGERS. 1

COST & MAINLY LOCAL 2

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 88

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Sue Markland Day

Topic: direct route from E.Bay to Mission Bay & Peninsula 1

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

EIR 89

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Art Day ART Day

Topic: "Good Connections"

Comment: The "Water Transit Update" - page 3 states "The WTA will recommend locating ferry terminals near NEW residential, employment, commercial and tourist centers to encourage..." I'm puzzled by the choice of "new". Shouldn't service support existing areas? 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

EIR 90

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: MICHAEL KATZ

Topic: DRAFT I.O.P.

Comment: SOURCE OF RIDERSHIP & COST / RIDER ESTIMATES? 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

SPEAKER CARD

EIR 91

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: PAUL PARISI

Topic: EXTENDED FERRY HOURS ON WEEKENDS

Comment: EXTENDED FERRY HOURS ON FRI & SAT NIGHT MAY RELIEVE AUTO TRAFFIC GOING TO & FROM S.F. FOR ENTERTAINMENT 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 92

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Seleta Reynolds

Topic: Ferry Service Expansion

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 93

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: McBride, Bruce W.

Topic: Docking Facilities

Comment: Facilities need to be moveable. [1]

It would behoove the WTA to stock the MTC library. [2]

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 94

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: DAVID O. EVANS

Topic: Bicycles on Ferry's

Comment: Good Idea [1]

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

EIR 93

MR. McBRIDE: Hello, I'm Bruce McBride, I'm a graduate student at San Jose State with planning management, and I just want to mention I'm really impressed what the WTA has accomplished so far, especially that a strong marketing program will be entered into in the future. I think it's very important to the idea of variable transportation, Water Transit has tremendous opportunity here in the Bay Area, it's something that I think is exciting to think about what used to be like in the 1930s and prior. I know in a lot of senior citizens have a great mindset towards traveling to the City on the ferry boat, I'd like to see that mindset duplicated in the minds of young people. When the 2025 statistics are cited it has to be remembered a lot of those people are not even teens yet. Not even in some cases alive that will be driving at that time so having a marketing campaign oriented towards kids to get them involved a lot of transit agencies ave paper models and besides and things WTA would do well to have promotional materials for both children and seniors. 1

I think, also, that it might be a good idea to have facilities that could be relocated. The Transit facility in Richmond is tremendous, it's a wonderful ferryboat dock, but it's not being used. Too bad it couldn't be relocated to 2 3

Gateway Alameda or one of the other facilities that might really benefit, Benicia for instance so I'd like to see the opportunity for when spending a million dollars on a dock may

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be it could be one that could be relocated if indeed the community doesn't make full use of it one that could be relocated economically.

In Panama there are tremendous T-shirts available of all T-shirts that are going trough there's a lot of ways to get people interested in ferry boat transportation.

I hope that I can be involved in my small part in influencing my sphere of person that I talk to. So I'd like to thank the group for letting me speak.

MS. JOHNSON: Thank you, Mr. McBride.

EIR 94

David Evans.

MR. EVANS: I'm David Evans. I thought perhaps it might be a good idea to -- I think bicycle racks on the ferries, if it's possible and I reside in Castro Valley. Thank you.

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MS. JOHNSON: Thank you, Mr. Evans.

Paul Parisi.

EIR91

MR. PARISI: Hello, my name is Paul Parisi, I live in Alameda and I take the ferry to San Francisco whenever possible. It's economic and easy and pleasurable. I've actually introduced people to the ferry. People have never ridden the ferry lived in Alameda for years, never ridden the ferry, I have recommended it to them, and they've taken the ferry and thanked me for it and insist that they'll take the ferry in the future.

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What I'd like to talk about is possibly expanding the hours of operation especially on weekends. I think a lot of people go into San Francisco for entertainment purposes Friday and Saturday nights and that would relieve some automobile traffic if the ferry could run a little later possibly as late as BART. That would -- I would take the ferry. In know on Friday, Saturday instead of being compelled to drive because I don't want to be stranded in the City. Perhaps in the future maybe some smaller specialized boats could be used for like late night runs where there would not be so many passengers maybe nimble agile Catamarans or something of that nature with a minimum crew and use minimum amount of

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fuel and take up a little bit of space, maybe they could be used for such purposes. That's all for now.

But thank you for letting me speak.

MS. JOHNSON: Thank you, Mr. Parisi.

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Salena Reynolds.

MS. REYNOLDS: Hello, my name is Salena Reynolds, I work for Farina Piers and I'm here on behalf of Alameda Point Community partners, the master developer for Alameda Point to express their continued support for ferry expanded ferry service to and from Alameda and I'm also here as a user. I myself don't own a car and for me one of the biggest disincentives currently to take the ferry at least from Oakland is the price, and I love Southwest Airlines and I live them

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because they are cheap, so I'm hoping that you bear that in mind and hopefully there's some economy of scale and you can pass some of that cost effectiveness onto the users. Thanks.

MS. JOHNSON: Thank you, Ms. Reynolds.

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Art Day.

MR. DAY: This is my first opportunity to really hear any information about the ferry system, I've always been a

fan of ferries for a grateful that people are thinking about this although I must admit I'm somewhat puzzled by a new system is needed if we can't beef up the systems we already have. Alameda County and Golden Gate, but the point or my question really is desire for you to elaborate on several points you've made in it that is indicated in this handout. The handout is the Water Transit update on page 3, statement is, "The WTA will recommend relocating ferry terminals new -- new -- residential employment commercial and tourism to encourage ferry use and support more liberal communities."

As much as that may be a wonderful idea, I'm puzzled by the word new is emphasized as opposed to existing places of residential development, employment, commercial or tourism.

Are we not intending to serve existing needs, is this what this statement means are these new developments green fields from the ground up, are they existing facilities you mentioned Jack London Square as one example. If these are

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brand new not yet in existing facilities. Are we providing

limousine services for new facilities and if so is -- who bears the cost for that? 3

EIR 90

MS. JOHNSON: Thank you, Mr. Day.

Michael Katz.

MR. KATZ: Two positions. First is my foot fell asleep on the way up here. All I have is a question.

I'm just curious about the ridership estimates and the cost per passenger estimates in the proceeding slide and I was hoping someone could either tell me later or point me to where I could find out more about the methodology by which those were developed. Because I find them interesting they are different from some of what we heard previously. 1

As far as the ridership, as the previous speaker said I suspect you know Bay crossing on the way if it, you know, are that the Blue and Gold ferry fails to discontinue Alameda ferry service and it goes to a talk about declining ridership and service which is turning downward spiral, so I'm curious about the assumption made ridership is going to go up. 2

MS. JOHNSON: Thank you. EIR 87

John Landers.

MR. LANDERS: Good evening, thanks for the presentation.

I haven't seen a whole lot of this in this news until I was -- I even put it on my calendar and I almost forgot

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it because I -- I'm sorry. It just isn't a pregnant subject. Anyway, thanks for having this and maybe I missed it when it went by, but is there a projected time when the first new terminal might be in operation? I mean given an average -- average time to work on the EIR and get approval and funding and so forth, is there a projected time. Seems like two or three years might be optimistic. I don't know. Capital costs being what they are. 1

Other thing I'm wondering about -- you mentioned -- it looked like local funding sources were the major source of both capital and operating revenue, and I just wonder how that would be obtained. You mentioned bridge tolls. I hate to -- I just hate to add taxes and tolls more than what people are paying now, but I notice that we have a -- we're going to have a integrated system and it's going to work to reduce the hassles and maybe it's worth it, but the first gentleman spoke you're going to have to sell that, I'm just wondering with the 2

sales tax or mainly sales tax, bridge tolls, have you broken that down, that kind of thing. Thank you.

MS. JOHNSON: Thank you, Mr. Landers.

EIR 88

Sue Marklin-Day.

MS. MARKLIN-DAY: I'm Sue Marklin-Day, we live in Berkeley, and when we lived in San Francisco I took the ferry every day to Jack London Square where I worked, so I've -- I live now in south -- I work now in South San Francisco and

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live in Berkeley. It takes me an hour and a half to get to work each day, each way, each day. And I would be very much a user of the new ferry system if the new ferry system went directly from here to the Peninsula and to Mission Bay and not through San Francisco. I think also a waste of time to go through San Francisco because no one works there that is in biotech, at least which is where I am, we all work in down in Peninsula and we work in Alameda and East Bay here, there's quite a large concentration of biotech companies in Richmond, that also could use direct service between -- one thing I would like to recommend on your operating and implementation plan include where you expect to see new industries rapidly grow

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certainly know that the biotech is going an average of 15 to 20 percent a year. We even know that 15 to 20 percent of our employees are those that have companies in the west -- in the Peninsula, 15 to 20 percent of their employees live in the East Bay, we know that Bay Area biotech in Berkeley is the largest private sector employer in Berkeley and certainly is active in the other transportation modes and would certainly should be included in a planning here.

We also have large concentrations of post docs and graduate students that go back and forth between companies and universities and we have had the Lawrence Berkeley laboratory in the hills of Berkeley that also go back and forth to the biotech companies and also to UCSF so in looking at

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these high concentrations of movement, I appreciate your adding a few direct routes to your operation plan. Thank you.

MR. JOHNSON: Thank you.

Is there anyone else who would like to make a comment?

EIR 86

MR. COLLINS: My name is Sigmund Collins. I just want to say I think it would be a good thing because it will take a lot of congestion off the freeways and there would not be so many cars on the road and the air quality would be more better you would not have that much more smog and stuff and I think it's a good idea. 1

Thank you.

MS. JOHNSON: Thank you, Mr. Collins.

MR. CASTLEBERRY: Let me take a stab at a couple of questions that came up, give it a shot.

The question or comment about are we just focused on new residential and, no, that's not the case. It was more a coincidence that a number of new terminal sites -- mean they are in areas where there could be development so that' -- you know, we weren't trying to slight places like Martinez who already has it albeit downtown, we will be serving those of us -- just to set that aside. I can go into the question about the cost per passenger and the methodology. It's -- there's detail that went into the -- both the forecast and we tried to be fairly consistent with MTC's models

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recognizing that their model isn't really a good tool for predicting ferry ridership for a number of reasons, but we generated the ridership from essentially an MT look a like model and then used the federal transit dimensions techniques for calculating new riders and can get into a lot more detail.

The one thing I would note and you mentioned that ferry ridership is going down, you know, so is MUNI, BART, AC Transit and if we use what's going on today for transit ridership, you know, we would be missing a bit for what's happening in the 2025. I mean we're looking out in the future, but you're right, I mean all the transit services are hurting these days.

The question about how long does it take to implement a terminal, our schedule, the scheduling that we've done shows that the biggest constraint is the money. That until we get the money for the terminals we really can't do much. If the funding was in place we could deliver some of the sites, some of the "easier" sites within a couple of years, and then "easier" sites would be Oyster Point, Treasure Island, but, again, without the money that's probably -- with two years, you know, it's for some of them.

And then the question about local funding. Most of the counties where the new terminals are going to be located will likely be renewing their half cent sales tax measure for transportation so that would be one place that local funding

25 can come from. But another would be developer funds. As I

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1 mentioned earlier, we're going to be locating these terminals
2 in areas of new development. And at least in a number of
3 different places these ferry terminals will provide we
believe
4 a ferry significant benefit to those developments and so we
5 would look to some public private partnerships to help get
6 those developed, just like you say, from the standpoint of
7 trying to touch on the question with an answer.
8 MS. JOHNSON: Thank you, Mr. Castleberry.
9 Mr. Katz could find out more about the
10 methodology of the ridership at --
11 MR. CASTLEBERRY: I could talk about it
offline
12 with you, too.
13 MS. JOHNSON: I guess that's it.
14 Anybody have any other comments they would
like
15 to make?
16 MR. McBRIDE: I'd like to ask a question.
17 Has anybody considered ferry runs to the new
18 cruse terminal? It's a real bottleneck trying to get from
the
19 old terminal when the cruise ship is in port.

EIR comment 93 cont'd

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MR. CASTLEBERRY: We've looked at it on a couple of routes. We've decided for example routes on the airports if you look at our plans we studied that, we actually looked at running it out of that cruise terminal so we could travel in, so we've taken a look at it. We've spoken to the Port of San Francisco about it, they are not quite to the point where we

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can -- well, neither are we -- where we can start drawing up plans, but it is a good consideration.

EIR 94.5

anonymous audience member question

MR. McBRIDE: Thank you.

MS. JOHNSON: Yes, sir.

AUDIENCE MEMBER: You had talked about feeder services to the ferry terminals analysis. Who would operate those, AC Transit, or local bus agencies? And, also, in your entire documents or brochures could you in further updates could you discuss what some of those routes may be or are they still vague at this point? 1 2

MR. CASTLEBERRY; To answer your first question, who would operate them could be anybody. Could be the AC Transit, could be BART, could be Joe's Bus Company. You know, in the EIR we just looked at the service and not the

institutional things that needed to be done to implement. We've worked with the individual transit agencies to identify what they thought would be the most likely transit routes. You've got to appreciate at this point we haven't even determined where some of the terminals are so figuring out what the bus service would be to a terminal where you don't even know where it's at is sort of cart before the horse. We're not there yet. But we do have to go into that level of planning, I can provide you with a ton of information I think on or would be site we've got fairly specific information how we came up with the cost and that would be we extend the freeway down to

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here -- I mean we went to that level of planning to develop costs.

MS. JOHNSON: If any other comments come up, and you would like to submit them, I guess the address and so forth and our e-mail address is up there.

Thank you very much for coming tonight.

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My Agency Name
(999) 999-9999
My Third Line

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

EIR 95

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: GOPAL SARIN Date: 10/16/02

Affiliation (if applicable): Envocare

Address: 754 MOULTRIE St
San Francisco CA 94110

Topic: IOP Presentation

Comment: I am new Consultant in the area, but I bring a new experience. But if I make a fool of myself forgive me. I congratulate WTA & URS and others who are preparers & contributors to IOP and ERI. There is no time to go through thoroughly. I recd report a week back. My impression is

1) URS has addressed the EIR from a different angle. It has deficiencies, as far as community concerns are there. 1

2) A non profit corporation needs to make a SUPPLENTAL Report, to address all community angles. WTA should allocate them funds – 2

Please continue on back side.

Comments should be submitted by **October 31, 2002**

3) CNG use has been done in New Zealand & recently 3

(5) WTA Can not be a lead agency & 15, I will send a detailed Comments

6. A team should go to New Zealand & Delhi-India [illegible]

7- Fund - Planning cost, cost [illegible]

IOP Public Hearing
Marin County
October 8, 2002

EIR 77-85

~~Submitted Comment Sheets~~
&
Speaker Cards

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jim Serrell

Topic: Increasing Ridership – Idea for corporate unsaddling of auto-addicted employees

Comment:

EIR 77

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 78

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Ellen L. Wright

Topic: Port Sonoma

Comment: I visited & inspected Port Sonoma & I believe it embodies a GREAT Transportation solution. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 79

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jeff Blanchfield

Topic: BCDC

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 80

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: DON WILHELM

Topic: TOP + PORT SONOMA

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 81

Speakers will have 3 minutes to speak,
Please provide a brief description of what you will be discussing today.

Name: Frances Barbour Hayden

Topic: Safe Routes to Transit/ Bicycle Parking issues

Comment:

On behalf of the Marin County Bicycle Coalition and the Ferry Passenger Advisory Committee I urge the WTA to ensure safe and convenient routes to water transit for cyclists and pedestrians. Ample/safe bicycle parking on board ferries and at ferry terminals is a Mc 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 82

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jim Harberson

Topic: Port Sonoma

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 83

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Karen Nygren

Topic: Port Sonoma

Comment: appropriate location of ferry terminal at this site. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 84

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Cynthia Murray

Topic:

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 85

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: FRANK TALLARIDA

Topic:

Comment: Pt SONOMA & SAN QUENTIN

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

EIR 77-85

WATER TRANSIT AUTHORITY

PUBLIC HEARING

October 8, 2002

Place: San Rafael Council Chambers

Reported by Adrian Edler

OCTOBER 8, 2002

PUBLIC COMMENT

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Mr. Serrell - Jim Serrell and I will identify. I live in Greenbrae right above Larkspur Landing, so I can watch the operation. But I also work in the Maritime Industry. I think I am the only one here tonight, which really upsets me, but that is alright. The question with funding -- it seems to me that there are two beneficiaries of this new system. One is the communities who are going to be sending their people to work in San Francisco, and they are the ones who are being asked to support these new facilities and expanded facilities, but we also have a city with a bunch of employers who are also a beneficiary of your efforts, and their employees are going to be living in a better environment. They will be working in a better environment because we have got cleaner air. Their employees probably will be less stressed out when they get to work. I mean, there are a whole array of benefits that are derived by the City of San Francisco. Is there anything being done to try to get the City of San Francisco to see how much they are benefiting and whether or not they might be also a source of the funding? And a thought I will leave with you, I was going to talk about this when I got up later, but I will talk about it now. You know, you have got a lot of employers there. Now if they had a head tax for all the employees they imported, and they were given a cut rate on that tax, for somebody who took a boat to work -- a thought. Just creative marketing. You know, a lot of the guys in my business are saying, "Geez, you know, everybody is encouraging us to go to these meetings and support the efforts because it is work for us," well, it is a lot more

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than just work for us. I mean, it is a better environment for all of us and less stress for all of us. I mean, one of the things I am going to work on is, instead of having a Union call where I have to physically go downtown every day and pay $5.00, I want to do that on the computer, on the Internet. You know, why should I go down there? I mean, that's crazy. So, I mean, we all have things we can do to make our environments better and use cars less, but I think part of the job that you might want to consider is, you know, with Alameda, you know, what is going on? There is not enough ridership? And yet I hear tonight one thing -- I am just saying that there are mixed signals from what you are trying to accomplish and what sometimes we see in the news. And I think that something needs to be done to encourage corporate responsibility. I am sure there are corporations now that provide free parking for their employees. What does that do? That encourages people to drive to work. Now I am not sure how many employers do it, but there have got to be benefits like that for commuters -- at some companies that are working at counter-purposes to what we are all trying to accomplish for our transportation and our environment. And so maybe looking at some of those things and trying to get corporate responsibility in San Francisco to get behind the effort to use water transportation. Hi, Marina. You got here. I am not alone. Thank you. 2

Mr. Bertken - I think the points are very good and we certainly will be looking at those and seeing how that might work out. One of the things that you mentioned, though, I think that is currently an issue and, as a matter of fact, I think I had about four or five of my friends over the weekend either call me up or approach me on the fact, "Are they going to quit the Alameda-Oakland Ferry

Service because it is not," you know? And the basic answer there is all transit is falling off right now because of the economic. It has not got anything to do with ferries. It is all transit. BART is hurting very badly. AC Transit is hurting very badly. It is the economy, whatever they said -- "Stupid." I did not want to say it because you were standing right there! But, no. And so the whole situation as to what we are trying to do vs. what is happening today in the ferry business is no different than what is happening today in the whole transit business. The whole transit business, I mean, is very much hurting because of patronage because of the economy. Thank you very much.

Mr. Serrell - Thank you.

Ms. Haught Johnson - Thanks, Mr. Serrell. If anybody wants to speak, you have to fill out one of these cards, okay? So Don in the back has them -- because I do not have very many cards, and I am sort of surprised. I am not going to time the speaking because there is not that many people here, but if you drag on too long, we will get out the hook. And we would like you to have your comments focus either on the Implementation and Operations Plan or on the Environmental document. And, as I said earlier, you can submit comments in writing if you would prefer. I think there is a form that you can use, or you can reach us at any of those addresses that are up on the screen. Okay, the first speaker I have is Mr. Jeff Blanchfield.

Mr. Blanchfield - Thank you, Madam President and Members of the Authority. I am Jeff Blanchfield, Chief Planner of the San Francisco Bay Conservation and Development Commission. BCDC has closely followed the work of the Water Transit Authority since its creation in 1999, and then its funding

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in 2000 and, as you know, has participated on the WTA's Technical Advisory Committee and its Ad Hoc Environmental Working Group. BCDC will be forwarding detailed written comments on the draft implementation and operation plan to the WTA shortly. This evening, I just wanted to touch on a few of the major initiatives of the draft plan that we think BCDC is clearly interested in and supports. From BCDC's perspective, ferry travel on the San Francisco Bay is an important component of a regional transportation strategy designed to relieve congestion on many of the Bay Area's roads and reduce pressure for additional fill for freeways and bridges to accommodate increased region traffic demand. In 1965, when BCDC was created, there were plans to excavate part of Mt. San Bruno in San Mateo County and use that material to construct a freeway offshore in the Peninsula, linking San Francisco to San Jose. This was to relieve traffic congestion on Highway 101 on the Peninsula. Closer to home in the early 1960's, a freeway on a series of bridges stretching from San Francisco to Angel Island to Tiburon, and along the Tiburon Peninsula to Highway 101 was proposed as a means to relieve traffic congestion across the Golden Gate Bridge. Fortunately, these proposals were never implemented. BCDC has long supported increased ferry travel on San Francisco Bay as an alternative to the automobile because reliance on the automobile means, from BCDC's standpoint, further pressure to use the Bay as route for additional freeways and bridges. 1

While the private automobile will still be needed and used for many types of travel, the regional goal should be to develop new systems of transportation such as the Regional Ferry Transportation System proposed by the WTA that can move large volumes of people and goods without damaging the Bay Area 2

environment. Another area that I think the Water Transit Authority does not get the credit that it is due is the significant research it has carried out on the effects of ferry service on the Bay Area's air quality -- Tom Bertken referred to that earlier -- and the effect of ferry weights on tidal marshes and wildlife. This new information is a welcome addition to those agencies and organizations that have a stewardship responsibility for the Bay such as BCDC. And we welcome that additional information and that new information to understand how the Bay operates. Air pollution has been a major concern of many regarding ferries. The WTA's research has shown that existing Bay ferries do not contribute as much air pollution as previously thought. Moreover, the WTA has determined that there are feasible alternative operating systems that will allow new ferries to run ten times cleaner than the existing ferries. BCDC supports the WTA's current research efforts and its proposal to continue to study the use of alternative fuels in order to achieve one day zero emission ferries. 3

The WTA Plan also commits the planning and implementing of good connections with other transit types, which is bus and rail, and to acquire ridership from those who currently drive automobiles to work rather than pulling the riders from other transit modes. Although these commitments will make the development of the ferry system more challenging and initially more expensive, the proposed ferry system should reduce automobile traffic across the Bay. 4

BCDC strongly supports the concept of Water Transit oriented community development in urban areas. Development of Water Transit Ferry Terminals as proposed in the Plan would not only increase ferry patronage, but contribute to a livelier urban-Bay shoreline, attracting more people to enjoy the Bay and the spectacular setting that we share in this region. 5

BCDC has been an active partner in the Regional Smart Growth Project and believes that Water Transit Services at key urban areas, Water Transit villages, if you will, will help carry out one of the tenets of Smart Growth -- guiding urban growth to existing urban areas and furthering the opportunity to provide a mix of housing, commercial, and job opportunities near Water Transit terminals. 5

New ferry terminals can provide the opportunity for the public to gain increased access to the Bay. In developing the implementation and operations plan, the WTA staff and its consultants met on a number of occasions with BCDC staff and is clear to BCDC that the WTA shares with BCDC the goal of enhancing the shoreline at ferry terminals with appropriate access for both ferry passengers and the general public. 6

In closing, I would like to commend the WTA for the excellent work it has done in such a short period of time. We all recognize that additional, more detailed study is needed for each of the proposed ferry terminals in the proposed regional ferry system. However, the draft Implementation and Operations Plan provides an excellent direction and framework for those studies. Thank you. 7

Ms. Haught Johnson - Thank you very much. I would like to introduce Marina Seccitano, who is also on our Board of Directors and arrived a little bit late tonight. Thanks for coming, Marina. Ellen Wright?

Ms. Wright - Good evening. My name is Ellen Wright and I live in San Anselmo. I want to compliment Tom Bertken on his excellent presentation. I understood it and I am very new to the subject matter from your point of view. I am very old to the subject matter from the Smart Train Project, which I do not exactly agree with. I live in Marin County and I have noticed that the train is going to stop dead in San Rafael. There is no connection to the Larkspur Ferry, 78 1

which is the flaw of major dimensions. So, in my usual fashion, which is I do not know anything until I know everything, I jumped in my car -- apologies -- to drive north -- I drove north in the middle of the day up Highway 101, and I had my camera, and I crossed the San Antonio Creek, and I pulled up into -- I was looking for the Petaluma River, to be quite frank, because I did not know where it is -- well, not in Petaluma, anyway. So I found a truck stop and I hooked a ride, crossed a railroad track, and I basically came to the end of the bank and there sure was a river there, and there was a couple of men who were working next to a 120-foot pile of sand. And so we had a conversation and I said, "Who uses this river?" He said, "Well, a few sailboats, they don't have keels, and the barges. And the barges come up side by side. They are pretty wide barges. But, of course, they are shallow. They are there all the time, many times a week -- not many, not every day, but almost every other day -- and they are bringing up sand and construction materials from God knows where." So I took some photographs of the very large heap of sand and I took a photograph of the channel itself, and I thought, "Well, this looks like a viable ferry thing, depending upon how deep it is." I was not encouraged by looking at the sailboats because they were very small, which means that there is no Bay sailing or ocean sailing boats there with fixed keels. You know, they are going to bring up their spade keel and that is about it. So it did not seem like a real deep thing. So I realized I had some more homework to do. So I got on the road that goes under the freeway, down to Lakeville Highway, and there is a little piece of the river that I can remember there from a little restaurant, and that was not very promising, but it is for certain that the barges come up there. But it still did not seem very deep to me, so I got

all the way down to 37, turned towards Marin County, and I exited at Port Sonoma. Now here is where all my thoughts are focused now. Port Sonoma is where the sailing Bay meets the Clear Water River and, as a degree'd chemist, I know that that precipitates out a lot of crud. And I also know from the Internet that Dianne Feinstein got us, I think, $25 Million for the Corps of Engineers to get rid of the crud that precipitates out; in other words, they are dredging like crazy right where the Bay meets the river. Makes sense to me, but there were only about 20 sailboats there. In other words, there was nothing much there except a guy in a Bait Shop, and he did not think the idea of a terminal was very good. Here is my vision: Joe Nation's Train goes to Port Sonoma and it stops. There is a large area for parking, it is just flood plain, and that would be a parking lot. The dredging material should be put on the potential parking lot. Since it is saline, it is going to kill the weeds, so if you paved over, you will not have to pave it a lot because all the weeds will be killed because it is saline fill. Next thing you do is you put a pier sticking out into the Bay with a people mover on it, and maybe even umbrella, you know, something to better the Larkspur Ferry Terminal that never did keep the rain off my head. So, in any case, you get to the ferry and maybe it is going to be a hydrofoil, maybe it is not. I like hydrofoils, but they seem to not last. The one over the channel did not. So, in any case, I do not see a train in Marin County. The reason is that it was going to stop in San Rafael, and that does not take us anywhere, basically. So I hope that you quickly notice that Sonoma County is getting paved over with housing. There are a lot of people there. A lot of those people go down 101 and drive us all crazy here in Marin. So you guys are the answer. And I love you for it. That is my position.

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Thank you.

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Ms. Haught Johnson - Thank you, Ms. Wright. Francis Hayden?

Ms. Hayden - Good evening. I am Francis Barbour Hayden. And I happen to reside in Pt. San Quentin Village, repeatedly in the Ferry Boat Captain's House built in 1852. And I know all about ferry wakes, actually. But I am speaking on behalf of the Marin County Bicycle Coalition and also on behalf of the Ferry Passenger Advisory Committee for Golden Gate Transit. We just strongly urge the WTA be certain that safe and convenient routes for bicycles and pedestrians on both current and future ferry terminals be incorporated into the plan as part of the intermodal connectivity. What better environmental impact than getting people out of their cars entirely? That would be great. Furthermore, it is essential that the ferry terminals provide for ample bicycle parking and support on both all the ferries and all the terminals on board, the parking should be free from sea spray and easy to use, and that the terminal of the facility should be safer than just racks. And I urge the WTA to consult with the Marin County Bicycle Coalition, but better yet with the Bike Station Coalition in Long Beach for viable options. Thank you.

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Ms. Haught Johnson - Thank you. Don Wilhelm?

Mr. Wilhelm - Good evening, I am Don Wilhelm from Novato. I support the approach that WTA has had in proposing expanded ferry service in the Bay, particularly the emphasis on clean engines and fuel systems. I am, however, concerned about the proposed Port Sonoma Ferry site. I do not believe that the IOP does a clear job of describing why this particular terminal has special status as proposed in the IOP. What we see is that there is a $1

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Million study expenditure program for 2008, and it is the only such future study project that is in that budget. On page 22 of the IOP, it states that there is a significant interest by elected officials in business interests for this terminal site. What is not stated in the IOP is that during all of the North Bay Hearings, there was also a very persistent and consistent objection to this ferry site by environmentalists. Further in the EIR, Table 2.1, it states that there is community support for that ferry site. And again, I think this almost approaches an insult to the attendance and correspondence that have been generated by environmentalists who express concern about the Port Sonoma site. On page 45 of the IOP, it describes the 14 different studies that were conducted in the EIR. What I find to be disturbing is that, in the IOP, they have decided to drop some of those subjects, particularly transportation and growth inducement, and these are two subjects which are particularly significant and pertain to the Port Sonoma site. I think that it is unlikely that the Legislature or people in the Legislature will be studying the EIR in detail, but will hopefully read the IOP. I think it would be very important for the IOP to include the subjects and the findings that were discussed, in particular, the growth inducement section of the EIR. Lastly, the ridership studies give some numbers for the Port of Sonoma, but as best as we can determine, those projections do not include the impact that will result from the San Rafael gap closure, as well as the Marin-Sonoma Narrows closure, and it also does not take into account the proposed Smart extension to Larkspur or San Quentin, nor does it include the results of the CMA, the Marin Congestion Management Agency transportation vision where they propose expanded bus services. So all of these studies which are currently going on are going to have a

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major impact on the demand that will be placed on potential ridership going into Port Sonoma in lieu of the services that will be more readily available to Larkspur. Thank you. 4

Ms. Haught Johnson - Thank you, Mr. Wilhelm. Karen Nygren? 83

Ms. Nygren - Hello, Karen Nygren. Thank you for all the work you have been doing. I think it is well appreciated. I have attended many of the -- Lisa is smiling -- many of the previous scoping and review meetings, so I am quite familiar with the project that is being considered, particularly the Port Sonoma side. And I personally feel that the Water Transit Authority's plan for most of the Bay Area is an outstanding program. 1

But I have to come back to say and reflect on Port Sonoma for Marin County and in Sonoma. I am speaking, I guess you could say, for the Sierra Club Marin Group, as well as from the Executive Committee, as well as for many of the environmental communities within Marin, as well as some in Sonoma, that there is considerable concern about a ferry site at Port Sonoma. 2

And I guess the bottom line would be that the EIR would delete the reference, or in the IPO, would delete the reference to say "further study is required for Port Sonoma," because of the great environmental concerns that the environmental community has for this particular location. I know you are going to get a lot of political pressure to the Water Transit Authority to have this site move forward, but I am hoping that you do listen carefully to the Marin and some environmental community. 3

Port Sonoma is basically an inappropriate location for a ferry terminal. You need to look carefully at the land side impacts that would be created at that particular site. It is an isolated site, it is not an in-fill site. If you look at Alameda, Redwood City, Benicia, many of the 4

other ones you have mentioned, they are all already -- would be serving sites that are already developed. I believe the Port Sonoma site is the only site in this whole program that has no development, other than this one little fishing village, or the Bait Shop, at its location. And by creating a terminal at a site in a very, if you will go through, it has endangered species, it has wetlands, it requires extensive dredging, it is not close to any area, it would have great growth inducement pushing on an area that already has -- is a very sensitive environmental site. There is no rail right there. It is possible that there might be a spur rail line, but the major rail line does not, or would not -- the Smart rail line itself as planned does not run by this site. The only way that it would be served by a rail would be a spur, which financially would be quite substantial. There is no bus that regularly runs through or by this site, so you would have to have a totally separate bus site that would have to work on a schedule that would work with that, with the ferry terminal and the ferry landings, and that would be very expensive and very extremely hard to regulate. I know, and you are probably aware, of how the Golden Gate Bridge District has tried to have bus feeder service to their ferry terminal and that has not been working quite well. That has not been working. So what ends up happening is that you have an auto-dependent ferry site in an isolated location, which would drive a need for a large parking lot in a very environmentally sensitive area, with autos right up against the Bay, with all this dredge filling right on top of clapper rails and the wetlands. And thus, I do not believe -- and I am almost done. So I would suggest that this is not smart land use to place a transit oriented development into an area that would be growth inducing. In addition, you know, once again, it has the multitude

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of endangered species and extensive adjacent wetlands. There would be a very high cost to maintaining this site because of the excessive amount of dredging that would ongoing be needed. And the cost per rider would be quite a bit higher, I believe, when you came to the end of the study, for that particular site than many of the other sites that are already have built-in walkability for people to get to the site, or already built-in transit to that particular site. So it would be a very poor investment for this particular location for the transit district. So, once again, I am strongly speaking for the Sierra Club Marin group and many of the other environmental organizations both in Marin and Sonoma to hopefully say that you would reconsider the Port Sonoma as a ferry terminal site. Thank you very much. 6

Ms. Haught Johnson - Thank you. Jim Harberson?

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Mr. Harberson - Thank you, President Johnson. I had not planned to say anything, but Karen sort of got my interest going. A couple of things have to be corrected. Karen knows, and I think everybody who knows anything about Port Sonoma or has looked at that nose, that the NWPRA railroad tracks go right through the Port Sonoma site. It is probably the only site in the Bay Area where you have the possibility for having a rail ferry connection. The Smart group is included in the EIR, the running of the commute trains to Port Sonoma, and I think it really operates the one possibility for a seamless transit system to get people out of their cars. And, as we were saying, that is the key to this whole thing. A couple of things just again about Port Sonoma that the growth inducing arguments have always been there, and they always be there, and quite frankly I think it good to discuss because that is very important to Sonoma County; but 1

this is also the only site that has 1,000+ acres surrounding it that has it tied up with easements that will never ever every be developed, unless the Sonoma Land Trust decides to develop housing, which I do not think is going to happen. The other thing is there is a little more than the bait shop there. There is a wonderful sign there that says "Bait, fuel and beer." You know, the real essentials of life. And I urge you, if you ever need any of those, they are there. With all our Marin County friends, we are going to change it to "Sushi, Fuel and Beer." But that is a good southern thing. But there is an existing marina there, there is considerable amount of water-oriented development there, there is partial -- it is not part of Port Sonoma, but right in the area -- there is a construction company there, there is the land use -- the original plan allowed a restaurant there, which is still not there. There is a lot that is there, so it is not this pristine area. If indeed it were undeveloped at all, I do not think you would find any of the stuff I was talking about. But the simple fact remains that there is an existing marina there that is right at the mouth of the Petaluma River, as Ms. Wright, I believe her name was, said. There is no way you are going to bring ferry service up the Petaluma River. It is too shallow. But this is the first place you could get any sort of ferry service there with a minimum amount of impact and hopefully hook it up with the train. I would urge you to keep Port Sonoma in the plan and keep studying it because there is a lot of things that have to be studied. Thank you very much. 2 3

Ms. Haught Johnson - Thank you, Mr. Harberson. Frank Tallarita?

Mr. Tallarita - Right. 85

Ms. Haught Johnson - Did I pronounce it right?

Mr. Tallarita - You did fine. Frank Tallarita and I am from Novato. I am prompted to speak because of the comments Karen made. I guess that was the previous speaker. I am appreciative of the fact that you have taken it under consideration, things like the '89 earthquake and other potential disasters in your planning. Very often when I am on the freeway and going across the bridges, I often think that it only takes a minor accident to shut the Golden Gate down, and a fire on a truck to shut the Richmond-San Rafael Bridge down, and if someone decided to do all that at one time, we would be in real trouble, and the potential is there that that kind of stuff can happen. I have to state at the outset that I am not too sympathetic to Clapper Rail and Salt Marsh Harvest Mouse and all that sort of thing. I think we are the endangered species -- we, the residents of Marin County and Sonoma County. When we get on those freeways, they are congested and transportation is obviously a serious concern. And I want to go back to Karen's comment about how desolate Pt. Sonoma is. I believe that should be looked at seriously. I can remember Larkspur Landing, when the only structure that was there was that building that was beginning to fall down. Those of you who were here can remember that. And you look at what is out there right now. It is quite a difference. And it is a major ferry terminal today. And that can also happen up there. The reason Sonoma is so desirable, as the gentleman put it well, it is a seamless system. People will get there and they go directly with the fast ferry to the City. When you come out of Larkspur and you have to go slower than a turtle, that is a little frustrating. Now we have got the high speed ferries. But high speed ferries at that Sonoma location could take off like a bat out of Haddes and really do a service for transportation. That is it.

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Ms. Haught Johnson - Thank you. Supervisor Murray?

Supervisor Murray - Good evening. Thank you so much for giving up a night out of your busy lives to come to Marin and let us tell you what is on our minds. And I too am speaking because of Karen. I think for many of us congestion has far greater impacts on our lives than for others, and certainly in Novato, we are the most afflicted of probably any place in the County with horrible congestion in the morning and horrible congestion in the afternoon. And we are very very excited about the opportunity to have some congestion relief in the form of Port Sonoma. Your ridership studies have shown that possibly the biggest area of ridership would be from my city, Novato, and that this could be something that could really make a difference. The second area of ridership was coming down via the Express Buses from Southern Sonoma. So we could really take the traffic off the freeway from before Novato and stop it from going further south, and do it in a much more environmentally friendly way, and certainly a higher quality of life way. I am also the Director of Emergency Preparedness for the County of Marin, and having a redundancy in our ability to move people and materials around is extremely important to this County. We are a peninsula and we could be isolated very very easily, both in our access to services and our ability to help the people who live here. We also could be a resource for San Francisco in getting people out of that city and getting them away from any kind of danger they may be in, and we need to have other mechanisms than just the bridges that exist right now. Marin County is committed to multi-modalism. We are doing a transportation vision plan right now that realizes there is no one mode of transportation that is going to solve our problem, or even begin to relieve

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our congestion. We need each and every mode we can get. And the ferry is a very important component in Southern Marin. Northern Marin is where the growth is, it is where we need more help, and it is in Northern Marin and Southern Sonoma. And so we very much want to have the opportunity to have a ferry, 1) for the people who want to go into San Francisco, that we could use shuttle buses to get to, and 2) as really a lynch pin* to getting our rail system off because we have a great opportunity of getting Port Sonoma on line before we could ever get something like San Quentin on line. As much as Port Sonoma seems to have hair on it, San Quentin has a lot more hair. So I would be betting on Port Sonoma first. So we really think Port Sonoma is very viable. It is an Army Corps designated channel to be dredged. There is traffic going up and down that river and in that area every day. We think that with the new technologies and vessels, we can have a vessel that does not need a lot of depth, so it is not going to require as much dredging as vessels in the past might require. We know there are vessels that have lower wakes and we certainly know there are vessels that have lower pollution, so that we can please both the environmental concerns and the commuter concerns, and also tourism. That is another big area. We could get tourists coming from San Francisco to Port Sonoma, onto an extended wine train or buses up into the wine country, and never have them come through Marin and block up our freeways. So we think that is another important area of concern. We do not envision a transit oriented development of Port Sonoma, we envision it being a transit hub, but not having a lot of other development around it. We do not see it as being something that is going to have a lot of housing or commercial development with it. It is a mystery

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to me why people are afraid to get the facts. We have had people throwing out, "It is not going to do this," or, "It is going to do that." I would like to have the studies. I think we have to have the information so we know, as informed decision makers, what is real and what is not real. Let's not be afraid to study anything. My only thing is let's not wait until 2008. But we really appreciate your putting it in the plan. We appreciate your putting in the study. And if there is anything we can do to help speed it along, we are here to help. Thank you. 5 6

Ms. Haught Johnson - Thank you, Supervisor. Does anybody else want to speak? A rebuttal? This will be a vicious cycle, but go ahead.

Ms. Nygren - I am only requesting rebuttal since three people have mentioned me. I feel that since I have spurred on comments, I should be able to respond. 1) I want to make sure that you understand that the environmental community is not opposed to the ferry service. We feel that ferry within the Bay can, in the appropriate locations, be an outstanding addition. The thought of San Quentin being a new site for the ferry terminal would be an outstanding location. Larkspur, Sausalito, and the existing sites' expansion are something that I believe most of us would support. So I want to make sure you do not walk away with the feeling that we, the environmental communities, are opposed to this. I think that also I want to correct the idea that the rail line -- and once again, I want to reiterate -- that the Smart Rail line is, if you are not familiar with the line itself, runs from Cloverdale down to San Rafael. It is a spur line. It would be another rail with a separate train that would be running to the Port Sonoma site. So it is not on the normal run. So it would have to be an additional line, which would be an additional cost if in fact somebody was going to do that. A bus would certainly 83 cont. 7 8

serve much better than even considering the rail at that point. But I guess part of it, once again, is that I believe that in order to accommodate the people that go from Sonoma mostly to Marin, there is not as many riders like if you go through the studies that go from Sonoma to San Francisco, that it would be much better to fund a bus system through the HOV lanes, through the Narrows gap, or the Sierra Club supports a rail line, or to get the rail to go through that way. But once again, I want to reiterate that the environmental community has serious concerns about Port Sonoma. Thank you. 9 10

Ms. Haught Johnson - Thank you. Equal time, Mr. Harberson? Anybody else like to speak -- no, I am only kidding -- anybody else like to speak on the Environmental Impact Report or our Implementation and Operations Plan?

Ms. Wright - I did not make myself clear, I think, about how the ferry would approach the shore at Port Sonoma. It is my thought that because of the siltation that the ferry should not be right close to the shore. I am concerned about Clapper Rails and Harvest Mouse, you know, that is fine, but that is not a burden or an insurmountable hurdle, no, indeed. You just put a nice jetty* wait out and it has got a people mover on it and the ferry does not really come close to the shore. It could be 350-feet long. And you may want to have it wind protected or rain protected, but that is about it. And if I were going to design it, I would have the people mover going right through the parking lot. So you park, you go down, and you stand there and you read the paper, and you find yourself jumping on the ferry. And that's it. Spare the mouse, spare the birds. Thank you. 78 cont. 3

Ms. Haught Johnson - Thank you. Well, one last chance. This

meeting is adjourned. Thank you very much, everyone.

[Adjourned.]

Tristan Bettencourt

From: Steve Morrison [morrison@watertransit.org]
Sent: Wednesday, October 09, 2002 3:47 PM
To: Tristan Bettencourt
Subject: FW: PORT SONOMA, A FERRY TERMINAL AND A WETLAND

Please log this as an EIR comment.
-----Original Message-----
From: Tom Bertken [mailto:bertken@watertransit.org]
Sent: Wednesday, October 09, 2002 1:36 PM
To: Veronica Sanchez; Steve Morrison; Heidi Machen; Lisa Klairmont; Steve Castleberry; Tristan Bettencourt
Subject: Fw: PORT SONOMA, A FERRY TERMINAL AND A WETLAND

Comment from Wes.
----- Original Message -----
From: Wes Starratt
To: Tom Bertken WTA ; Michael DiGiorgio NOVATO ; MARIN, Murray
Sent: Wednesday, October 09, 2002 12:57 PM
Subject: Fw: PORT SONOMA, A FERRY TERMINAL AND A WETLAND

EIR 71

RECEIVED
OCT 10 2002
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

----- Original Message -----
From: Wes Starratt
To: IJ Ltrs
Sent: Wednesday, October 09, 2002 12:55 PM
Subject: PORT SONOMA, A FERRY TERMINAL AND A WETLAND

As a writer for several maritime publications, as well as an engineer, I have examined Port Sonoma and am impressed that, because of its geography, it is the only logical location for a ferry terminal in the North Bay. It has rail, highway, and even bike connections, and is located on the federally maintained channel from Petaluma, down the Petaluma River, and out into the deeper waters of San Pablo Bay.

I completely disagree with Barbara Salzman of the Audubon Society that "Port Sonoma is a terrible idea" as reported by Mark Prado in the October 8 issue of the IJ. Quite the contrary, Port Sonoma has it all, both land-based access and water-based access, as well as an opportunity to extend local wetlands. 1

For one thing, Salzman is completely wrong about dredging. The terminal could be located directly on the federally dredged channel and require no additional dredging at all. Furthermore, the terminal, even with a parking area, should require less land than is already devoted to the marina. Actually, the marina, which was so poorly designed off the ship channel that it created siltation, should be abandoned and that land returned to a wildlife habitat. 2

A ferry terminal at Port Sonoma could be a win-win situation for commuters as well as bird lovers. I would suggest that the Audubon Society work with, not against, the Water Transit Authority to create additional wetlands as well as a ferry terminal at Port Sonoma. The site is so unique that there is something there for everyone.

Wes Starratt, P.E.
San Rafael
wesstar@ix.netcom.com
415/459-5101

Tristan Bettencourt

From: Elaferty@aol.com
Sent: Wednesday, October 09, 2002 10:53
To: email@watertransit.org
Subject: Port Sonoma

EIR 72

I concur with Supervisor Cynthia Murray's position that Port Sonoma is a brilliant plan. I urge you to SWAP the priority assigned to San Quentin with the future priority assigned to Port Sonoma. Why?

SMART train, a VERY costly & useless burden for Marin County, will take away dollars from a project that is needed TEN YEARS AGO. Hwy 101 is choking, with no relief EXCEPT for rail to Port Sonoma & a swell ferry to San Francisco. 1

No other proposal has the immediacy, the simplicity or the elegance of a Port Sonoma ferry. Please move it to the head of the line.

Congratulations to you all for your ferry-convictions.



State of California - The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

Flex your POWER

GRAY DAVIS, *Governor*

October 7, 2002

RECEIVED
OCT 10 2002
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

EIR 73

Mr. Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Castleberry:

Expansion of Water Transit Service
San Francisco Bay Area
Draft Program Environmental Impact Report
SCH # 2001112048

Department of Fish and Game (DFG) personnel have reviewed the Draft Program Environmental Impact Report (EIR) for the Expansion of Water Transit Service in the San Francisco Bay Area. The Draft Program EIR addresses the San Francisco Water Transit Authority's plan to improve and expand water transit service. The Draft Program EIR analyzes the potential impacts from four project alternatives including the no-project alternative and three variations proposing expanded water transit service on the San Francisco Bay that includes up to 44 existing and potential terminal sites and routes. It is DFG's understanding that subsequent environmental review, pursuant to the California Environmental Quality Act (CEQA), would be required for individual ferry service and improvements, such as a new or expanded terminal or route, if the subsequent activity would have the potential for effects that are not within the scope of the Program EIR. DFG provides the following comments.

Section 3.3.1.2 and 3.3.2.4. DFG recognizes the breeding season for California clapper rail as February 1 through August 31. This period includes courtship, nesting, and renesting activities. 1

Mitigation WW-3.1 states that habitat surveys for California clapper rail should be conducted along a proposed ferry route to determine if nesting sites exist. Any future studies for clapper rail or other biological resources that are conducted for the purposes of evaluating the potential for adverse impacts to occur, should be submitted to DFG for review. 2

Mitigation WW-3.5. DFG should be consulted prior to implementing Mitigation WW-3.2, 3.3, or 3.4 to determine if they would be feasible on a site-specific basis, or if avoidance as proposed in Mitigation WW-3.5 would be necessary. The Decision 3

Tree (Figure 3.3-5) indicates whether significant impacts would be anticipated and should be used for future ferry terminal and route planning purposes, but should not be intended as a substitute for site-specific environmental review or consultation with DFG or other resource agencies. 3

Section 3.5.1.5 Regulatory Setting. Fully protected species are designated in sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code. Fully protected species that may potentially be affected by this project include salt marsh harvest mouse, California clapper rail, and California black rail. DFG can authorize take of fully protected species only for necessary scientific research. DFG cannot issue an "incidental take" permit for fully protected species. DFG recommends that future ferry terminal or route projects should be designed or located to avoid take of fully protected species. 4

General comments. Future ferry terminal projects may result in impacts to sensitive biological resources due to increased lighting at the terminal and associated vehicle parking areas. Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from project facilities. Mitigation measures should be proposed that direct lighting on intended project areas and avoids surrounding wildlife habitat. 5

If you have any questions regarding our comments, please contact Eric Tattersall, Environmental Scientist, at (707) 944-5546; or Scott Wilson, Habitat Conservation Supervisor, at (707) 944-5584.

Sincerely,

for Robert W. Floerke
Regional Manager
Central Coast Region

cc: State Clearinghouse
Post Office Box 3044
Sacramento, CA 95812-3044

California
Special Districts
Association

Alameda County
Chapter

P.O. Box 5381
Oakland, CA 94605-0381

EIR 74

October 7, 2002

Thomas Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

On behalf of the Alameda County Chapter of the California Special Districts Association, I wish to thank you for your informative presentation at the September 11 meeting. Your overview of the Water Transit Authority and its Implementation Plan helps our members become more aware of the major efforts the Authority and other public officials are making to provide alternative transportation. As providers of infrastructure, special districts are familiar with the challenge of a growing population and insufficient resources to address the demands for service. A comprehensive ferry system is a creative response to a distressful Bay Area transportation problem. 1

We look forward to the progress of the implementation plan and thank you for participating in our commemorative 9/11 meeting.

Sincerely,

Doug Siden

Doug Siden

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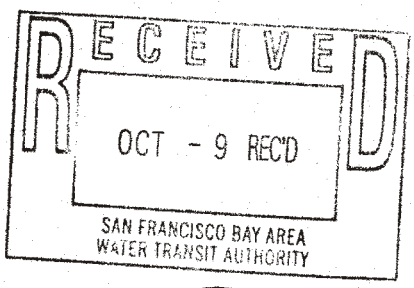
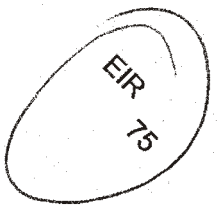
510/523-8157

John Snyder
Vice Chair
510/537-0757

Ro Aguilar
Secretary
510/544-2006

WaterKeepers





October 7, 2002

Thomas G. Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

Re: Draft EIR: Expansion of Ferry Transit Service in the SF Bay Area

Dear Mr. Bertken:

We applaud the WTA's efforts to come up with an alternative to the Bay Area's congested freeways and polluted air. However, we have a few comments on the draft EIR as it pertains to water quality in the Bay, which we hope will be fully addressed in the final document. We submit the following comments on behalf of the San Francisco BayKeeper, a project of WaterKeepers Northern California.

Section 3.1 Dredging; Section 3.5 Biology

Potential dredge locations need to be sampled and tested for contamination. 1
No dredging should be performed near known toxic hot spots to avoid exposing and resuspending contaminated sediments. 2
No maintenance dredging or dredging of new access channels (Impacts D-4 and 5) that will impact jurisdictional wetlands should be allowed, as this could cause significant impacts both to water quality and to endangered, threatened, and/or protected species that use the wetlands. 3
The mitigation measures described in Sections 3.1 and 3.5 do not ensure that water quality or wildlife will be protected, nor do they reduce potential impacts to less than significant. 4

Section 3.3 Wake Analysis

We are concerned generally about the potential impacts that increased wave energy caused by additional ferries and routes could have on parts of the Bay shoreline, which could in turn impact water quality and habitat values in the Bay. Wake impacts should be analyzed on a site- and route-specific basis for each proposed new route or each route proposed to have additional and/or faster ferry service. 5

Section 3.4 Water Resources

Bay Protection and Toxic Cleanup Program

Figure 3.4.2 does not show existing toxic hot spots identified by the Bay Protection and Toxic Cleanup Program; it merely shows candidate toxic hot spots. The EIR needs to identify existing toxic hot spots and clearly indicate their proximity to existing and proposed ferry terminals. 6

Section 3.4.2.2 Impacts and Mitigation

Construction and Operation

We strongly agree with the recommendation that the WTA include BMPs in the Implementation and Operations Plan. 7 Ferry terminals should not be constructed in the 100-year floodplain, to avoid flooding and associated water quality impacts. If they are so built, they should be designed using the best, most recent floodproofing technologies available. New terminals should be designed to contain and treat stormwater runoff to the maximum extent practicable. 8 9

Operation

Impact W-3
Ferry fuel spills and water quality degradation

Alternatives 1, 2, and 3 involve expansion of existing ferry services, which carries an increased risk that a potentially significant fuel spill could occur. Mitigation measures should be developed that will reduce this potential impact to less-than-significant. 10 We urge the WTA to require that the design of all new vessels incorporates the best fuel-spill prevention technology available and that all new vessels carry adequate pollution response equipment on board. 11

Table 3.4-1 summarizes pollution incidents that have been reported. The EIR should not assume that all spills have been reported or that less than one percent of transits resulted in a pollution incident. 12

Other

We are concerned that the proposed new system of mixing exhaust with turbulent water in the tunnel between the hulls of the newer, high-speed catamarans could result in the 13

deposition of exhaust pollutants, including hydrocarbons, dioxins, particulate matter, SOXs, and NOXs into the Bay. This potentially significant impact on water quality is not analyzed in Section 3.4. 13

We appreciate your consideration of our concerns.

Sincerely,

Lisa Viani
Program Associate

cc: Leo O'Brien
Teri Shore, Bluewater Network

anta Clara Valley
ater District

5750 ALMADEN EXPWY
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CHIEF EXECUTIVE OFFICER
LAUREN L. KELLER
CLERK OF THE BOARD

October 1, 2002

EIR 76

Board of Directors
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Subject: South Bay Ferry Terminal Site Study

Dear Chair and Board of Directors:

In response to a letter dated July 25, 2002, to Santa Clara Valley Water District (District) Director Richard P. Santos, from Mr. Michael Cunningham, the District Board hereby requests the Water Transit Authority to please reconsider locating a water transit ferry system site in the Alviso area in light of new construction planned on the Guadalupe River adjacent to the Santa Clara County Alviso Marina. 1

On July 9, 2002, the District Board of Directors committed to a significant investment in the Alviso and North San Jose region by approving a $60 million Guadalupe River flood protection project. The project will provide the following features:

1. Removal of vegetation and sediment build-up in the river.
2. Construction of flood walls and levee raising/rehabilitation.
3. Construction of depressed maintenance roads with ramps.
4. Reconstruction of State Route 237 eastbound bridge over the Guadalupe River.
5. Provide for healthy creek and bay ecosystems.
6. Revegetation to provide continuous riparian corridors.
7. Increase recreational opportunities by providing opportunity for construction of river trails.
8. Increase wildlife habitat.
9. Improve water quality.

In addition, the County of Santa Clara is planning to start construction on improvements to the Santa Clara County Alviso Marina in 2004.

From 1849 to approximately the 1890's, the Port of Alviso was the gateway to Santa Clara County via boat transportation. In 1852, the passenger steamer, Boston, plied the Bay regularly. The fare was $35 each way from San Francisco to the Port of Alviso. This boat transportation provided a much needed option of travel in addition to reducing sediment build-up in the River.

Once again, there is an opportunity to consider the Alviso site as a means of travel to the Golden Triangle of Silicon Valley. As a transit system site, it could reduce highway congestion, air pollution and fuel consumption, and provide economic opportunities for both North and South Bay cities. Along with the substantial amount of infrastructure being constructed by the District to provide flood protection, recreational opportunities and natural wildlife habitat, the construction of an Alviso bay transit port could further enhance this region of Silicon Valley.

I appreciate your consideration of this request. Attached are some letters of support as well as informational letters relative to our request.

Sincerely,

Rosemary C. Kamei
Chair/Board of Directors

Attachments
cc: Honorable Chuck Reed, Council Member, City of San Jose
Honorable Pete McHugh, Board of Supervisors
Board of Directors (7)
ps:mg:mf
1004a-l.doc

BAY AREA COUNCIL

July 25, 2002

TO: Richard Santos (fax / 408-262-0848)

FROM: Michael Cunningham

SUBJECT: **Water Transit Authority, South Bay Terminal Study**

The Bay Area Council "Water Transit Task Force" recommended that an expanded water transit system should include terminals at Moffett Field and Alviso in order to provide crucial connections to the South Bay.

The Bay Area Water Transit Authority (WTA), which now has the responsibility and authority to plan and implement an expanded water transit system, has prepared a draft 10 year Implementation and Operations Plan. The WTA will submit this plan to the Legislature for approval in December 2002. This plan lists 12 new routes for implementation, the southernmost of which is Redwood City. The WTA has decided that it is not an appropriate time to pursue a terminal at either Moffett Field or Alviso, but has indicated that it is willing to consider such a terminal in the future.

The Bay Area Council remains convinced that water transit connections to the South Bay are essential, and has shared this view with the WTA. Your letter of support and encouragement to the WTA will improve the prospects for South Bay water transit service. A resolution of the Santa Clara Valley Water District in support would also be extremely effective.

You should write to:

Mr. Thomas Bertken, Chief Executive Officer
Ms. Charlene Johnson, President
Water Transit Authority
120 Broadway Street
San Francisco, CA 94111
Phone / 415-291-3377
Fax / 415-291-3388

• 200 Pine Street #300 • San Francisco, CA 94104 •
• Phone: 415-981-6600 • Fax: 415-981-6408 •

RUSSELL H. ROBINSON
10825 W. ESTATES DR.
CUPERTINO, CA 95014

408/253-2529
408/732-0320 PH. & FAX
russ1011@ix.netcom.com

29 March, 2001

Mr. Tom Bertken, CEO
San Francisco Bay Area
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Tom,

It was nice to talk shortly with you today about my appointment to the Technical Advisory Committee. I represent two of the major boating organizations here in Northern California. The Pacific Inter-Club Yacht Association and Recreational Boaters of California. I am presently Vice President-North for RBOC. Both of these organizations met last year and by action of their Boards of Directors nominated me to represent them if a position on the WTA Technical Advisory Committee was offered. Letters to that effect were sent to the WTA addressed to Charlene Johnson in June and July last year. I have enclosed copies for your reference. I am a long time recreational boater on the bay and understand the needs and concerns of the boater.

I have worked for some time to help achieve an enhanced regional ferry system here in the San Francisco Bay, first in testimony before the Blue Ribbon Committee of the Bay Area Council and lately as a member of the Board of Directors of Friends of a Regional Ferry System. I am presently assisting in a study for the Santa Clara Valley Water District to provide a new flood control channel for the Guadalupe River near Alviso. If this is constructed, a direct channel to the southern part of the bay can be achieved and high-speed ferries to the San Jose area could become a reality.

I look forward to assisting the WTA as a representative of recreational boaters here on the bay and in the delta.

Sincerely,

Russ Robinson
Vice President-North
Recreational Boaters of California

Cc: RBOC letter dated 7/26/00 and PICYA letter dated 6/6/00

Attachment 2

SUNNYVALE CITY COUNCIL
29 JANUARY, 2002

RUSS ROBINSON
10825 W. ESTATES DR..
CUPERTINO, CA 95014 408/253-2529

GOOD EVENING MEMBERS OF THE COUNCIL. FOR THE RECORD MY NAME IS RUSS ROBINSON AND I RESIDE IN CUPERTINO. I AM HERE TONIGHT TO SAY A FEW WORDS IN SUPPORT OF A REGIONAL WATER TRANSIT SYSTEM. I AM A MEMBER OF THE WATER TRANSIT AUTHORITY, TECHNICAL ADVISORY COMMITTEE. AND I ALSO SERVE ON THE SANTA CLARA VALLEY WATER DISTRICT'S FLOOD ADVISORY COMMITTEE.

WATER TRRANSPORTATION SYSTEMS USED TO BE ONE OF THE BEST METHODS OF MOVING PEOPLE AND MATERIAL AROUND THE BAY AND TO SAN FRANCISCO. ALVISO, YOUR NEIBORING COMMUNITY WHICH IS NOW A PART OF SAN JOSE USED TO BE CALLED SAN JOSE'S FRONT DOOR. STEAMERS RAN EVERYDAY AND BARGES AND SAILING VESSELS TRANSPORTED MANY OF THE GOODS GOING TO THE NORTH OUT OF THAT PORT. WATER TRANSIT WAS USED BECAUSE THE ROADS WERE OF SUCH BAD SHAPE THAT IT WAS QUICKER AND MUCH MORE ECONOMOICAL TO USE THE NATURAL WATERWAY.

WITH OUR EXPANDING POPULATION AND THE EXTREMELY HIGH COST OF BUILDING NEW ROAD AND RAIL INFRASTRUCTURE, IT AGAIN MAKE THE SAME ECONOMIC SENSE IT DID OVER A HUNDRED YEARS AGO TO USE THE NATURAL WATER WAY. THE BLUE RIBBION COMMITTEE STUDIED SITES IN THE SOUTH BAY AND MOFFITT FIELD WAS IDENTIFIED AS A POSSIBLE LOCATION. IT STILL IS A VERY VIABLE LOCATION AND PLANNING EFFORT SHOULD CONTINUE TOWARD DEVELOPMENT OF THE MOFFIT SITE. I WOULD LIKE ALSO BRING TO YOUR ATTENTION ANOTHER POSSIBLE SITE THAT IS NOW UNDER STUDY IN ALVISO. THE SCVWD IS IN THE FINAL DRAFT EIR STAGE FOR A FLOOD CONTROL PROJECT ON THE LOWER GUADALUPE RIVER.

THAT PROJECT IS SCHEDULED TO START IN JUNE OF THIS YEAR. ONE OPTION THAT SURFACED DURING THE PRELIMINARY STUDIES FOR IMPROVING THE FLOOD CARRIENG CAPACITY OF THE RIVER WAS TO CUT A NEW CHANNEL STRAIGHT THROUGH THE SALT PONDS. THIS WOULD GIVE THE RIVER A STRAIGHT RUN TO THE BAY AND IMPROVE THE FLOW AND POSSIBLY REDUCE THE HEAVY SILTATION THAT IS NOW OCCURING IN THE LOWER GUADALUPE.

THE PRESENT FLOOD CONTROL PROJECT WILL PROCEED WITHOUT THIS NEW CHANNEL, BUT THE PROPOSAL WILL BE STUDIED FURTHER. A POTENTIAL EXISTS IF THIS CHANNEL IS BUILT TO BRING FERRIES DIRECTLY INTO THE ALVISO AREA IN A WAY THAT DOES NOT ADD UNDUE DISTURBANCE TO THE WILDLIFE IN THE AREA WHICH WAS A BIG CONCERN IN THE BLUE RIBBION STUDIES. THE SITE AT THE END OF THE CHANNEL HAS MANY TRANSPORTATION POSSIBILITIES. IT IS ON THE AMTRAC LINE AND A STATION STOP COULD BE ADDED. IT IS JUST OFF OF HIGHWAY 237, ON AN EXISTING VALLEY TRANSIT BUS LINE AND ONLY ABOUT A HALF A MILE FROM THE LIGHT RAIL ON TASMAN. IT THEREFORE OFFERS MANY DEVELOPMENT POTENTIALS. THE ISSUE BEFORE YOU TONIGHT IS A RESOLUTION SUPPORTING THE DEVELOPMENT OF A WATER TRANSIT SYSTEM INTO SANTA CLARA COUNTY. THE NEED FOR ALTERNATIVE TRANSIT IS BECOMING MORE CRITICAL EACH DAY AND ESPECIALLY AFTER THE EVENTS OF LAST SEPTEMBER 11TH. YOUR SUPPORT WILL HELP ESTABLISH A LINK TO THE WTA SYSTEM HERE IN THE COUNTY. I URGE YOU TO GIVE YOUR CONTINUING SUPPORT TO THE DEVELOPMENT OF THIS SYSTEM.

09-27

Santa Clara Valley Water District

ROBERT W. GROSS, Ph.D.
DIRECTOR DISTRICT 3

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

DRAFT CONCEPT
& PROPOSAL
November 1998

TO: United States Army Corps of Engineers
United States Fish & Wildlife Service
Santa Clara County Board of Supervisors
City of San Jose City Council
Santa Clara Valley Water District Board of Directors

From: Robert W. Gross Ph.D.

RE: Draft *revision* for the establishment of a Alviso Port Authority

BASIS FOR THIS PROPOSAL:

A. Future flood control projects-including environmental enhancements and mitigation-Santa Clara Valley Water District
B. Bay Area Water Transit Action Plan Executive Summary-Bay Area Council/ Bay Area Economic Forum, September 1998
C. Economic and public transportation needs

PROBLEMS:

- How to move mass numbers of individuals, business, and commerce around the San Francisco Bay Area by the development of the existing waterways as a key form of transportation.
- How to move high volumes of water from the southern watersheds down the valley floor to the San Francisco Bay protecting life and property.
- How to develop a project which will protect and be sensitive to the environment by the development of new wetlands.

APPLICATION OF THE PROBLEM-WHO WILL BENEFIT:

- Flood control-allow Santa Clara Valley Water District to complete upstream developments
- Economic base for the County and Silicon Valley
- Decrease vehicular traffic, improve air quality, and reduce congestion
- Connection to other forms of mass transit
- Connection to other counties in the Bay Area via water transport
- Create new environmental wetlands, protected areas for endangered species, and wildlife enhancement

recycled paper

- Increase the much needed tidal action in the South Bay cross connection between Calabazas Creek and the Guadalupe River
- Create a new economic base for the County
- Recreational-tours, boat dinning etc. (this would give school children, older and handicap persons the opportunity to view the refuge)
- Close to large public entertainment facilities, industry, hotels, and business centers in the heart of the County
- Create water transportation for commerce

WHAT IS THE PROJECT:

A Joint Powers Agreement between governmental agencies to develop a Santa Clara County/City of San Jose/Santa Clara Valley Water District Port Authority.

WHEN:

Time is of the essence. A blue ribbon committee is presently reviewing the feasibility of high speed water transportation between the nine Bay Area counties, and there is an opportunity for Santa Clara County to help reduce traffic congestion.

WHERE:

The location of the Santa Clara County Port Authority would be in North San Jose (the Alviso District in North San Jose). This location is in the Golden triangle of the industrial and business market. From an historic view, Alviso was a major shipping point in the development of Santa Clara Valley. At the present time transportation at the site includes bus and rail service. Highway 237 is at the site and, within a short distance, light rail service is available. Water is the cheapest form of transportation, and products can be shipped to San Francisco or Oakland for Bay Area and overseas export.

WHY:

It is unusual that more than one governmental agency can benefit from a project. In this particular development, there would be a reduction in the need for more road construction, costly land acquisitions, auto and truck traffic, and air pollution. Needed flood protection could be provided in the industrial, commercial, and residential areas in the northerly section of San Jose and Santa Clara, and environmental enhancements could be included.

HOW:

This project would take the efforts of many governmental agencies, the environmental community, business, and commerce, however, the opportunity to achieve such beneficial project may never come before the public again.

CONCLUSION:

The County Board of Supervisors, the City of San Jose, and the Santa Clara Valley Water District should immediately establish a Port commission to start the procedural evaluation for the feasibility of the project.

The County Board of Supervisors, the City of San Jose, and the Santa Clara Valley Water District should consider the investment of time to examine how to acquire and dredge a large channel that would support flood control yet provide volume for water commerce.

The Port Authority should work closely with the City of Santa Clara and the industrial and business community to evaluate how this project could develop and economic opportunity to the Valley and provide the community with a whole new industry which is environmentally beneficial to all of the resources.

The above concept is the personal opinion of the author and includes supportive thoughts of other community leaders. The concept is generic in nature, and the actual planning and design work would be necessary.

Robert W. Gross Ph.D.

DRAFT REVISION NOVEMBER 1998

Criteria for the selection of this site:

INGRESS/EGRESS TO THE PORT:

- Highway 237 Interchanges
- Existing rail service adjoins the site for both passenger and freight service
- Santa Clara County light rail passenger service is a short distance from the site
- Industrial and commercial demands for the need to enhance existing ground and surface transportation
- Santa Clara County Bus Transportation is at the site
- Service roads with ingress/egress into the industrial Golden Triangle in Santa Clara County to the Port Authority location
- Port Authority would make water transportation available to all Bay Area Counties

ENVIRONMENTAL BENEFITS:

- Expand existing wetlands and wildlife habitat areas
- Avoid the disturbance of potential contaminants in the Guadualupe River and Calabazas Creek for future flood control projects
- Protect existing wildlife habitat in the Guadalupe River and Calabazas Creek by creating a new flood control and water transport channel
- By opening the Southern end of the San Francisco Bay to historic tidal action- this would restore wildlife habitat and help reduce silt and future

00 274

dredging if needed in Guadalupe River and Calabazas Creek
- Insure the new wetlands are protected and potentially become part of the Don Edwards Wildlife Refuge in the areas between the Calabazas Creek and the new channel and the Guadalupe River and the new channel allowing historic tidal action into those areas which are now restricted by levees
- This new channel would increase stream enhancement for allowing endangered fish and wildlife to return to historic tidal areas which have been blocked off for decades

ECONOMIC TRANSPORTATION:

- Using water transport for goods and services from the business and industrial community to other areas in the Bay Area and for overseas shipments to Oakland and San Francisco
- Potential passenger service to Oakland and San Francisco International airports from this location, thus reducing vehicular traffic and air pollution

FLOOD CONTROL:

- Santa Clara Valley in conjunction with the United States Corps of Engineers recognize that existing Calabazas Creek and the Guadalupe River need to be expanded for the increased flood flows from the Southern watersheds and by the creation of a new high flow channel would open the area to not only historic tidal action, it would protect the environment, and give additional flood protection to Santa Clara and San Jose

NOTES:_____

Santa Clara Valley Water District

ROBERT W. GROSS, Ph.D.
DIRECTOR DISTRICT 3

5750 ALMADEN EXPRESSWAY
SAN JOSE, CALIFORNIA 95118
TELEPHONE (408) 265-2600

DRAFT CONCEPT
October 1998

TO: United States Army Corps of Engineers
United States Fish and Wildlife Service
Bay Area Council/Bay Area Economic Forum
Santa Clara County Board of Supervisors
City of San Jose–Mayor and City Council
Santa Clara Valley Water District Board of Directors

FROM: Robert W. Gross, Ph.D.

RE: Consideration of a proposal to develop the Santa Clara County/City of San Jose/Santa Clara Valley Water District Port Authority in North San Jose (Alviso District)

BASIS FOR THIS PROPOSAL

A. Future flood control projects–including environmental enhancements and mitigation–Santa Clara Valley Water District

B. Bay Area Water Transit Action Plan Executive Summary–Bay Area Council/Bay Area Economic Forum, September 1998

C. Economic and public transportation needs

PROBLEMS

- How to move mass numbers of individuals, business, and commerce around the San Francisco Bay Area by the development of the existing waterways as a key form of transportation.
- How to move high volumes of water from the southern watersheds down the valley floor to the San Francisco Bay protecting life and property.
- How to develop a project which will protect and be sensitive to the environment by development wetlands.

recycled paper

Attachment 4

00 269

APPLICATION OF THE PROBLEM–WHO WILL BENEFIT:

- Flood control–allow Santa Clara Valley Water District to complete upstream developments
- Economic base for County and Silicon Valley
- Decrease vehicular traffic and reduce congestion
- Connection to other forms of mass transit
- Connection to other nine counties in the Bay Area
- Create environmental wetlands, protected areas for endangered species, and wildlife enhancement
- Increase the tidal action in the South Bay cross connection between Calabazas Creek and the Guadalupe River
- Create a new economic base for the County
- Recreational–tours, dining, etc.
- Close to large public entertainment facilities, industry, hotels, and business centers
- Create water transportation for commerce

WHAT IS THE PROJECT:

A Joint Powers Agreement between governmental agencies to develop a Santa Clara County/City of San Jose/Santa Clara Valley Water District Port Authority.

WHEN:

Time is of the essence. A blue ribbon committee is presently reviewing the feasibility of high speed water transportation between the nine Bay Area counties, and there is an opportunity for Santa Clara County to help reduce traffic congestion.

WHERE:

The location of the Santa Clara County Port Authority would be in North San Jose (Alviso District). This location is in the Golden Triangle of the industrial market. From an historic view, Alviso was a major shipping point in the development of Santa Clara Valley. At the present time transportation at the site includes bus and rail service. Highway 237 is at the site and, within a short distance, light rail service is available. Water is the cheapest form of transportation, and products can be shipped to San Francisco or Oakland for Bay Area and overseas export.

WHY:

It is unusual that more than one governmental agency can benefit from a project. In this particular development, there would be a reduction in the need for more road construction, costly land acquisitions, auto and truck traffic, and air pollution. Needed flood protection could be provided in the industrial, commercial, and residential areas in the northerly section of San Jose and Santa Clara; and environmental enhancements could be included.

00270

HOW:

This project would take the efforts of many governmental agencies, the environmental community, business, and commerce; however, the opportunity to achieve such a beneficial project may never come before the public again.

CONCLUSION:

The County Board of Supervisors, the City of San Jose, and the Santa Clara Valley Water District should immediately establish a Port Commission to start the procedural evaluation for the feasibility of the project.

The County Board of Supervisors, the City of San Jose, and the Santa Clara Valley Water District should consider the investment of time to examine how to acquire and dredge a large channel that would support flood control yet provide volume for water commerce.

The Port Authority should work closely with the City of Santa Clara and the industrial and business community to evaluate how this project could develop an economic opportunity to the Valley and provide the community with a whole new industry which is environmentally beneficial to all of the resources.

The above concept is the personal opinion of the author and includes supportive thoughts of other community leaders. The concept is generic in nature, and actual planning and design work would be necessary.

Santa Clara Valley Water District

MEMORANDUM

TO: Board of Directors

FROM: Susan Fitts
Chief of Public Affairs
Ext. 2910

SUBJECT: South San Francisco Bay

DATE: July 31, 2002

The following is per Mia O'Connell:

"On July 24th, as a result of Congressman Honda's efforts on our behalf, the House Transportation and Infrastructure Committee approved the Corps of Engineers' Study Resolution we prepared for the Congressman. This is a big step for us, especially in light of the Cargill deal. What this means is that the Corps of Engineers now has the authority to study the South San Francisco Bay Shoreline for tidal flood damage reduction, environmental restoration and other matters. No further legislative action, including WRDA, is required in terms of securing authority.

What we have to accomplish now is to have Congress appropriate funding to study this area. In this current budget cycle, both the House and the Senate have shown a significant reluctance to start new study efforts along with new construction efforts. While we have and will continue to ask for new start study money this year, I think a more productive tack will be to meet with the new San Francisco District Commander, whom I know from Washington, and impress on him the importance of budgeting new start funding in the FY '04 budget for the South San Francisco Bay Shoreline Study and also for the San Francisquito and Coyote Creek Watershed studies (our other new studies), as well."

Attached is a copy of the approved Committee Resolution on South San Francisco Bay Shoreline Study.

Susan Fitts
Chief of Public Affairs

cc: Stan Williams
Walt Wadlow

JUL 30 '02 03:32PM NO. 2527 P.2/2

U.S. House of Representatives
Committee on Transportation and Infrastructure
Washington, DC 20515

Don Young
Chairman

Lloyd A. Jones, Chief of Staff
Elizabeth Megginson, Chief Counsel

James L. Oberstar
Ranking Democratic Member

David Heymsfeld, Democratic Chief of Staff

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, D.C.

RESOLUTION

Docket 2697

South San Francisco Bay Shoreline, California

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That the Secretary of the Army is requested to review the Final Letter Report for the San Francisco Bay Shoreline Study, California, dated July 1992, and all related interims and other pertinent reports to determine whether modifications to the recommendations contained therein are advisable at the present time in the interest of tidal and fluvial flood damage reduction, environmental restoration and protection, and related purposes along the South San Francisco Bay shoreline for the counties of San Mateo, Santa Clara and Alameda, California.

Adopted: July 24, 2002

ATTEST: Don Young
DON YOUNG
CHAIRMAN

Mbabrams1@aol.com; MelissaB@abag.ca.gov; mcunningham@bayareacouncil.org; mfajans@attbi.com; mgiari@redwoodcityport.com; pcmtdc@msn.com; katzjam@earthlink.net; pmw-aqm@pacbell.net; mike.daley@sierraclub.org; michael_j_savidge@nps.gov; minji_kim@URScorp.com; ncma-gr@attbi.com; sshonk@csum.edu; nfay@oaklandnet.com; nicks@bcdc.ca.gov; noshinsky@ci.antioch.ca.us; nixon.lam@flysfo.com; norman.fassler-katz@asm.ca.gov; nlaforce@ix.netcom.com; pbelchamber@ci.vallejo.ca.us; psoumoy@goldengate.org; patwebb@redwoodcity.org; pa@ci.sausalito.ca.us; pbhbm@pacbell.net; peggye@abag.ca.gov; harbordistrict@smharbor.com; portagent@sfbarpilots.com; sanfranlit@aol.com; phil_arms@csum.edu; psmith@moffattnichol.com; pollyosmith@msn.com; rdavis@ci.san-leandro.ca.us; rfaravelli@aol.com; rrentschler@mtc.ca.gov; rrentschler@mtc.ca.gov; randy.rogers@marad.dot.gov; rallard@goldengate.org; rreisman@interlandusa.com; Richard.Lolich@marad.dot.gov; Richard_Mitchell@ci.richmond.ca.us; rpsantos@scvwd.dst.ca.us; rtilles@presidiotrust.gov; rkarfiol@aol.com; pinderz@aol.com; ron@blueandgoldfleet.com; Rosemary_Corbin@ci.richmond.ca.us; ross.nakasone@sen.ca.gov; rsargent@d11.uscg.mil; nnuckols@jellybelly.com; rhancock@stanford.edu; rlong@bluewaternetwork.org; russ1011@ix.netcom.com; gravanis@earthlink.net; smelendez@actransit.org; sam_lauter@bmwandpartners.com; elles@i-cafe.net; sstuart@hornblower.com; threlfall@pacbell.net; stadtfeld_sandy@bah.com; snoble@nobleconsultants.com; peters_scott@bah.com; sean@bayeconfor.org; sohare@oaklandnet.com; MayorYoung@council.ci.san-leandro.ca.us; sgremmel@ci.novato.ca.us; sloanbailey@earthlink.net; sschilling@herbert.com; staylor@nossaman.com; wilson-goure_stephanie@bah.com; citydogs@hotmail.com; smorton@ch2m.com; nywb@aol.com; sbaker@commutercheck.com; SummerB@CI.SAN-PABLO.CA.US; scau1321@aol.com; swilford@sonoma-county.org; tkgurnee@rmmdesign.com; kwatson@goldengate.org; tyoshita@portoakland.com; tshore@bluewaternetwork.org; tmacrae@hornblower.com; tescher@redandwhite.com; tomgraff@environmentaldefense.org; tpassanisi@redwoodcity.org; tom.schmidt@ual.com; tomdavids@aol.com; hinmantt@yahoo.com; orgkendall@aol.com; tsantos@council.ci.san-leandro.ca.us; VictoriaE@abag.ca.gov; gonzales_walter@bah.com; wesstar@ix.netcom.com; wkempton@s-k-w.com; wihurley@glosten.com; william.jenkins@doj.ca.gov; Yadira.taylor@flysfo.com

Cc: Thomas G. Bertken

Subject: Notice of WTA Public Meetings: Board on 8/8/02; TAC on 8/12/02; CAC on 8/14/02

August 1, 2002

Greetings:

The attached documents are the agenda for the WTA Board of Directors Board meeting, scheduled for next Thursday, August 8, 2002 from 1:30 pm to 4:30 pm at the Port of San Francisco Building, Pier 1, Bayside Conference Room, at the foot of Washington Street, San Francisco. The directions to the meeting by public transportation are included as well.

In addition, there are meeting notices attached in this letter for two other public meetings that are taking place:

The WTA Technical Advisory Committee (TAC) meeting scheduled to take place on Monday, August 12, 2002 from 1:30 pm to 4:00 pm at the MetroCenter, 101 Eighth Street, Oakland

The WTA Community Advisory Committee (CAC) meeting scheduled to take place on Wednesday, August 14, 2002 from 10:00 am to 12:00 pm at the Downtown

Center – San Francisco State University, 425 Market Street, 26th Floor,
Rooms 2601 – 2602, Fremont and Market Streets, San Francisco

Please call or email if you need any further information or assistance!

Lisa Klairmont
WATER TRANSIT AUTHORITY
Executive Manager,
and Secretary of the Authority
120 Broadway
San Francisco, CA 94111
p:(415) 291-3377
f:(415) 291-3388
email:



Agenda 08.8.02 (electronic).doc



DIRECTIONS.doc



CAC Agenda 8.14.02 (electronic).doc

TAC Agenda 08.12.02 (electronic).doc

Dr Adams
247-4640

243-2700
Dr Lewis

920-5899
Dem Might
Pat Dando

WATER TRANSIT AUTHORITY

WTA

Directions to:
WTA Board of Directors
Board Meeting
August 8, 2002
2:00 pm

PORT OF SAN FRANCISCO
PIER 1
Bayside Conference Room

On the Embarcadero, at the foot of Washington Street

Easy Access Via Public Transportation
The Port of San Francisco is served by most Bay Area transit systems:

★ The Embarcadero BART/MUNI station is the closest BART and MUNI Metro stop, located below Market Street at Drumm & Spear Streets. The nearest F-Line streetcar stop is on the Embarcadero at Washington Street. MUNI bus lines serving the Pier 1 area are the 9, 31, 32, and 71.

★ AC Transit serves the Transbay Terminal, at Mission Street between First and Fremont.

★ Golden Gate Transit stops nearby.

★ Golden Gate Ferry Terminal is behind the SF Ferry building.

120 Broadway, San Francisco, CA 94111 Phone: (415) 291-3377 Fax: (415) 291-3388

TESTIMONY OF GREG ZLOTNICK
BOARD OF DIRECTORS
SANTA CLARA VALLEY WATER DISTRICT
BEFORE THE PUBLIC HEARING OF THE
SENATE SELECT COMMITTEE ON BAY LANDS ACQUISITION

JULY 12, 2002

Mr. Chairman Sher, Senator Burton, Senator Figueroa, Senator McPherson, Senator Speier, and Senator Vasconcellos, I am Greg Zlotnick, of the Board of Directors of the Santa Clara Valley Water District. Thank you very much for the opportunity to express the District's views regarding the Framework Agreement for Acquisition of Cargill Salt Ponds.

The Santa Clara Valley Water District is the primary water resources agency for Santa Clara County. The enabling legislation of the District recently changed to include watershed stewardship, along with our more traditional functions of flood protection and water supply. As part of the same legislative change, the scope of our flood management activities enlarged, and now includes those related to tidal flooding, as well as flooding from streams and creeks.

The District supports Senator Feinstein's efforts to provide federal funding for the public/private purchase of approximately 16,000 acres of salt ponds from Cargill Salt Company. We are pleased that the framework agreement for the purchase of these ponds has been completed. The District also supports the proposed ecological restoration of the salt ponds to provide wetlands habitat, both intertidal marsh and open ponds. From our viewpoint, this large wetlands restoration project requires an integrated, regional approach, supported by science and analysis of the current (and future) conditions. This restoration effort and the District's own Clean Safe Creeks program will provide mutual reinforcement of positive environmental effects throughout the fresh and intertidal wetlands of the South San Francisco Bay.

Attachment 7

The District sees an intricate link between the proposed restoration of the salt ponds and tidal flood protection. Intertidal marshes have substantial beneficial effects on water quality, as well as providing habitat. In this area, the restoration of intertidal marshland will involve breaching at least some of the levees that separate the ponds from the Bay, which will have implications for the flood protection levees that line the interface between the proposed restoration areas and the human-inhabited upland areas. Restoration is therefore dependent upon the maintenance, fortification and, in some cases, replacement of existing flood protection levees. Many of these levees were not engineered and so their stability is uncertain.

The draft 1981 U.S. Army Corps of Engineers Reconnaissance Study of the San Francisco Bay Shoreline estimated that $34.5 million (1981 dollars) in flood damage to homes and businesses would result from a 1% high tide, affecting an estimated 7,400 structures and significant urban infrastructure features, such as roads, airports, parks and sewage treatment plants and pump stations, that lie within the floodplain area of Santa Clara County. Since then, there has been considerable development within the floodplain, including the addition of several high tech industrial installations. At the time of the study, the levees protecting these areas were maintained by various agencies and private concerns.

The best approach to this facet of the restoration is to evaluate existing and projected conditions, in light of restoration goals and the condition of the levees, so as to accurately prioritize levee projects. In particular, the 1981 Corps study, which assumed that there would be no changes in land use and levee maintenance, provides a good starting point for the prioritization of this work.

We understand that Cargill will continue to maintain the flood protection levees after sale of the ponds until the waters have been drained from the ponds. During restoration and subsequently, the entity or entities responsible for the flood control levees will face considerable expenses, as construction of new levees will be required for considerable distances at $15 per linear foot, and

$10 to $27 (2001 dollars) per linear foot of levee maintenance funding will be required annually in perpetuity. Annual total costs, required in perpetuity for levee-related expenses, are estimated at $20 to $54 per acre (2001 dollars).

Congressman Michael Honda and Senators Diane Feinstein and Barbara Boxer are now working to include an authorization request in the Water Resources Development Act (WRDA) of 2002 that would authorize involvement by the Corps of Engineers in assessing the potential for tidal flooding in this area. The authorization request of course provides no direct funding for the study, although it may increase the prioritization ranking of the issue.

The District would welcome the opportunity to actively participate in the planning and implementation of this exciting regional restoration effort. Due to the enormity of the restoration/flood management project at hand, we propose a pilot project to provide a model for regional planning efforts. The District has already acquired a salt pond, Pond A4, from Cargill Salt Company, with the goal of restoring wetlands habitat. We believe that our Pond A4 Tidal Wetlands Restoration Project can serve as the pilot project for the regional effort to restore wetlands habitat for all of the salt pond property involved in the current sale.

In closing, I would like to underscore that the District enthusiastically supports the proposed wetlands restoration project. The success of this project is ultimately and inextricably linked to the flood protection levees adjacent to the salt ponds, and we support the involvement of the U.S. Army Corps of Engineers in the assessment of tidal flooding potential in this area. Finally, the District is prepared to be a willing partner throughout the planning and implementation phases of this project.

Thank you very much the opportunity to speak with you today on this matter.

09/10/02 IOP Meeting
Raw transcript, speaker cards, comment sheets:

NAME	COMMENT #
Jennifer Jackson	25

09/17/02 IOP Meeting
Raw transcript, speaker cards:

NAME	COMMENT #
Teri Shore	56
Will Travis	57
Geoff Potter	58
Mike Savidge	59
Sue Markland Day	60
Paul Kamen	61
Jennifer Clary	62
Alicia Mariscal	63
Brooke Cole	64
Howard Strassner	65
Gopol Sarin	66
Michael Jones	67
Michael Katz	68
Sue Markland Day	69
Geoff Potter	70

EIR Public Hearing
September 10 & 17

Submitted Comment Sheets
&
Speaker Cards

EIR Hearings
Sept 10 Oakland
Sept 17 San Francisco

WATER TRANSIT AUTHORITY EIR

SPEAKER CARD

EIR 25

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jennifer Jackson

Topic: Sustainability factors

Comment:
I've noticed that energy consumption per passenger mile travelled will increase with all three alternatives. As growth increases in the Bay Area this would mean ever-increasing energy consumption in the Bay Area, and therefore air quality issues. I'd like to express my encouragement for pursuing fuel cell technology & also for encouraging bike ~~use~~ to ferry routes. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

EIR (1)

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR ~~55~~ 56

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Teri Shore, Bluewater Network

Topic: EIR

Comment:

Comment sheets are available at the sign-in table for written comments and can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY (2) EIR

SPEAKER CARD

EIR 57

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Will Travis, BCDC

Topic: EIR

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

(3) EIR

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 58

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Geoff Potter

Topic: EIR

Comment: General

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 59

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Mike Savidge

Topic: Support for WTA plan + vac fancy access

Comment: above

1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 60

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: SUE M DAY

Topic: need to include in EIR direct routes from EBay to Mission Bay, SSF, Foster City & Redwood City

1

Comment: see above

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

SPEAKER CARD

EIR 61

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Paul Kamen

Topic: Details of WTA PROGRAMATIC EIR

Comment:

WTA needs to Reconcile conflicting goals between EIR and LOP (Congestion/air quality V. mobility/transportation options) 1

also - needs to include consideration of Berkeley Pier as East Bay terminal location 2

also - needs to look at "future technologies" more closely (low speed, slender hulls) for emission + wake reduction. 3

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 62

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: JENNIFER CLARY

Topic: WTA EIR (SF to Marina)

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 63

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Alicia Mariscal EBBC

Topic: Wetlands, Non-native species, Noise, Bicycles

Comment: Comments on each of these areas to protect wetlands and species, remove non-natives, and provide bicycle-friendly access and fares. [1] [2] [3]

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 64

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Brooke Cole

Topic: Wetland areas

Comment: I would request that the EIR also be concerned with recovering, threatened, declining and future potential wetland + tidal marsh restoration efforts [1]

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 65

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: HOWARD STRASSNER Sierra Club

Topic: _____

Comment: HIGH ENERGY CONSUMPTION 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 66

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: GOPOL SARIN

Topic: _____

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

Comment Sheet

Comment sheets may be deposited in the comment box or mailed to:

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

EIR 67

Fax Comments to: 415/291-3388
Attn: WTA EIR Comments

Email Comments to: email@watertransit.org

Visit WTA's Web site at www.watertransit.org

Name: MICHAEL JONES Date: 9/17/02

Address: 601 JEAN ST. #205
OAKLAND CA 94610

Topic: LAND USE IMPLICATIONS

Comment: The presentation mentioned local transport + land use implications but not their regional ones. More transportation, in any mode, will affect growth rates and location. Ferries do not serve local transportation needs. 2 1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

WATER TRANSIT AUTHORITY

Comment Sheet

Comment sheets may be deposited in the comment box or mailed to;

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

EIR 68

Fax Comments to: 415/291-3388
Attn: WTA EIR Comments

Email Comments to: email@watertransit.org

Visit WTA's Web site at www.watertransit.org

Name: MICHAEL KATZ Date: 9/17/2002

Address: 2835 BUENA VISTA WAY, BERKELEY, CA 94708

Topic: PLEASE ADOPT ALTERNATIVE 4 (NO PROJECT).

Comment: I WOULD RANK THE E.I.R. ALTERNATIVES AS FOLLOWS:
ALTERNATIVE 4 (NO PROJECT) = MOST DESIRABLE; ALTERNATIVE 3 (ENHANCED EXISTING SYSTEM); ALT. 2 (EXPANDED SYSTEM); ALT. 1 (COMPREHENSIVE SYSTEM) = LEAST DESIRABLE.
OF THESE, I STRONGLY URGE THE W.T.A. TO ADOPT ALTERNATIVE 4 (NO PROJECT), AND TO APPLY ITS CONSIDERABLE ENERGY & ENTHUSIASM TO EXPANDING THE CAPACITY, & REDUCING THE FAREBOX COST, OF OTHER TRANSBAY TRANSIT MODES.
SPECIFICALLY, RAIL & BUSES OFFER LOWER DIRECT ENVIRONMENTAL IMPACTS (IN AREAS LIKE AIR QUALITY, WILDLIFE HABITAT, BIOLOGY, WATER RESOURCES, WAKE, ENERGY USAGE, AND INDUCED "COLD STARTS"). 1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

(2) (CONT'D.) 2

RAIL & BUSES ALSO OFFER LOWER INDIRECT ENVIRONMENTAL IMPACTS, BECAUSE THEY CAN TRANSPORT COMMUTERS AT SIGNIFICANTLY LOWER COST PER TRIP. BECAUSE FUNDING FOR NEW TRANSIT IS SEVERELY CONSTRAINED, THIS TRANSLATES INTO MOVING MORE COMMUTERS, AND INTO ATTRACTING MORE NET NEW TRANSIT RIDERS FROM AMONG (CURRENT AND POTENTIAL) AUTOMOBILE COMMUTERS.

FERRIES ARE A VALID AND PLEASANT TRANSPORTATION MODE (ALTHOUGH NOT A VERY ENVIRONMENTALLY BENIGN OR ECONOMICALLY EFFICIENT ONE, COMPARED TO RAIL AND BUS). SHOULD FERRY DEMAND ULTIMATELY REBOUND FROM ITS RECENT DIP, I DO NOT BEGRUDGE FERRY STAKEHOLDERS A MODEST EXPANSION OF CURRENT OPERATIONS ALONG THE SCALE OF ALTERNATIVE 3 OR PERHAPS EVEN SELECTED ELEMENTS OF ALTERNATIVE 2 (THOSE THAT MOST DEMONSTRABLY REDUCE ROAD CONGESTION, ATTRACT NET NEW TRANSIT RIDERS, AND MINIMIZE ENVIRONMENTAL IMPACTS). 1

BUT THERE SHOULD BE ZERO PUBLIC SUBSIDIES FOR SUCH EXPANSION, FROM BRIDGE TOLLS OR ANY OTHER SOURCE. ANY NEW FERRY SERVICE SHOULD BE 100% FAREBOX - SUPPORTED. SCARCE PUBLIC SUBSIDIES SHOULD BE RESERVED FOR MORE ENVIRONMENTALLY BENIGN AND ECONOMICALLY EFFICIENT TRANSIT MODES - SPECIFICALLY, RAIL AND BUSES. 2

THANK YOU FOR CONSIDERING THESE COMMENTS.

BAY AREA BIOSCIENCE CENTER

EIR 69

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September 17, 2002

RE: WTA's **draft Programmatic Environmental Impact Report (EIR)** released August 26, 2002

Board of Directors
San Francisco Bay Water Transit Authority
120 Broadway
San Francisco, CA 94111

To Whom It May Concern:

The Bay Area Bioscience Center (BayBio) serves the bioscience community of Northern California. Our constituent institutions are located in clusters scattered throughout the region with most in sight of San Francisco Bay. Those who work at bioscience companies and relevant research facilities live throughout the region with a large number concentrated in the East Bay. Our industrial sector employs more than 85,000 persons directly, with total (direct and indirect) San Francisco Bay area employment of more than 250,000 residents.

BayBio offers the following comments on the WTA's draft Programmatic Environmental Impact Report (EIR).

Make no mistake, the Bay Area bioscience community supports new ferry service. An additional way to lessen dependence on cars and increase the use of public transit deserves our support. Yet, the expense of new and expanded ferry routes and service can not be ignored and planning trips exclusively between the East Bay and the San Francisco ferry terminal is not, in our opinion, a sound way to spend our limited transportation funds. **It is the distribution of employees' homes in relation to their employer's location that is the reason I come here before you today.** 1

No longer is San Francisco the only employment destination in our region. Since the demise of the high tech industry, the bioscience industry has taken its rightful place as a major employer in the Bay Area. For that reason, BayBio urges the WTA to plan transportation needs and the necessary EIR for our region's future (with subregional bioscience clusters ringing the Bay), not its past (with most employers in the City).

My purpose today is to ask WTA's inclusion in its final EIR of additional ferry routes that directly connect the East Bay [e.g. Richmond, Berkeley/Albany, Alameda, Jack London Square, Harbor Isle (Alameda)] and points to the West (e.g. Mission Bay, South San Francisco, Foster City and Redwood City). BayBio and our members request that the final EIR should include these new routes in sufficient detail to comply with the report's stated purpose. 2

Sue Markland Day
President

Director emeritus
Ronald E. Cape, Ph.D.
Biotechnology Investor

Director emeritus
Edward E. Penhoet, Ph.D.
Director, Science and Higher Education Programs
Gordon and Betty Moore Foundation

WATER TRANSIT AUTHORITY

Comment Sheet

Comment sheets may be deposited in the comment box or mailed to:

Water Transit Authority
EIR Comments
120 Broadway
San Francisco, CA 94111

EIR 70

Fax Comments to: 415/291-3388
Attn: WTA EIR Comments

Email Comments to: email@watertransit.org

Visit WTA's Web site at www.watertransit.org

Name: Geoff Potter Date: 9/17/02

Address: ———

Topic: Mare Isl. LNG vs Ferries

Comment: Boston Hbr has a large conflict in this regard. Are we pursuing a review of this.

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Please continue on back side.

Comments should be submitted by **October 31, 2002**

WATER TRANSIT AUTHORITY

PUBLIC HEARING REGARDING THE

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT

CERTIFIED COPY

Port of San Francisco

Pier 1

Bayside Conference Room

San Francisco, California

TUESDAY, SEPTEMBER 17, 2002

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REPORTED BY: VALERIE E. JENSEN, CSR NO. 4401

FILE NO.: 9C053F7

PUBLIC COMMENTS

(On the record at 4:55 p.m.)

MR. STRUMWASSER: Teri Shore is first, and Will Travis will be next.

EIR 56

MS. SHORE: Hello. Teri Shore for the Bluewater Network.

I will have extensive comments on the EIR. So I'm just going to hit some of the highlights in the three minutes that is available today.

One of my major comments is that the IOP needs to be better integrated with the EIR and vice versa. One of my biggest concerns is that the Water Transit Authority and the IOP is promoting the expanded ferry system as a project that will improve air quality and reduce congestion. While Bluewater Network supports the low emissions ferry mandate proposed by the WTA and the IOP and we do appreciate the comprehensiveness of the EIR, we believe that the plan, as proposed, will not improve air quality and will not reduce traffic congestion. We believe that the IOP should be revised to reflect the EIR findings.

The EIR states clearly that air emissions will be significant or potentially significant even

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with the mitigations and the cleanest possible boats. Now, that doesn't mean that we would oppose the plan. We think the ferry plan still has merit and is providing commuters choice, putting the cleanest possible vessels on the water. Those we -- those goals we support very much. But if you go to the public and tell them that this will improve air quality and reduce traffic congestion, I don't think you're providing them with the full picture.

I will get into some more comments on air quality but, before I run out of time, I wanted to hit just a couple of points in the EIR that have to do with other sections.

Bluewater and some of our colleagues believe that the significance and the mitigations for Clapper Rail and diving ducks are not adequate.

We believe that the water quality impacts from ferry emissions, such as dioxins, on the water is not completely investigated.

The noise analysis seems inadequate and needs more study, we believe.

We're not sure if the dredging emissions were included in the overall emissions calculations. That's a question.

Our colleagues at the Sierra Club also pointed

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out some questions regarding energy use per passenger mile, and they did some calculations that we'd like to talk to you about. And the Sierra Club probably will as well. 11

On the ferry emissions, we see that PM and NOX are predicted to decrease compared to the existing system, but SOX, CO and ROG will increase. So, you know, it states right there that you're not going to get overall air quality improvements. And you may not reduce or make the air quality, you know, significantly worse either, but you're not going to improve it. 12

MR. STRUMWASSER: Teri, can I ask you just to wrap up? You have about three minutes.

MS. SHORE: How many minutes or seconds do I have?

MR. STRUMWASSER: You're at three. If you could just wrap up?

MS. SHORE: God. I mean, there are many -- a lot more comments.

I'll just make one last comment, which is on the vehicle miles travel are estimated to be 200 thousand, decrease at buildout at 2025. And while that is a benefit, it's not a significant benefit. The EIR has stated clearly that that is a minimal reduction of 0.001 percent. 13

Thank you.

MR. STRUMWASSER: Thanks, Teri.

I'll try to give you about a 15-second warning.

Will Travis and then Geoff Potter.

MR. TRAVIS: Hi. I am Will Travis, the executive director of the Bay Conservation and Development Commission. And, like Teri, we will be submitting detailed comments on the EIR.

EIR 57

Our comments are intended to be constructive. We want to help you make the EIR better. But after having prepared EIRs and written comments, I know that sometimes -- read comments -- I know that sometimes the tone of the comments, despite their intention, doesn't sound constructive.

I have an 11-year-old daughter. And she told me that she knows that my intention is to help her to grow up to be a good person, but she says, "Sometimes you could express your love in another way in reminding me to clean up my room."

So, with that admonition, I want to try to change the tone today.

I want to go on record today to mention just a few of the many things in the EIR which are really outstanding.

WTA's work on air quality -- particularly on alternative fuels -- is state of the art. The EIR incorporates the most extensive wake study ever undertaken in the bay. WTA has listened to the people with concerns about dredging, wetlands and other bay habitats, navigational safety, bay and shoreline recreation and local land use preferences. And WTA's planning has addressed these issues, and the concerns are addressed in the EIR. So, overall, we think the draft EIR is well done. 1 2 3 4

So, the commitments made by the WTA in the plan need to be incorporated into the EIR as mitigation measures. And some of the information in the EIR can be amplified and expanded. And as I said, we hope our detailed comments will help you in making the EIR even better. 5 6 7

We've tried to take the view, though, and urge everyone who is evaluating the EIR and comments on its details to not lose sight of the big picture. The environmental damage from increased auto traffic that will come about if we don't expand the bay ferry system will far exceed any environmental impacts caused by the operation of an expanded ferry system, especially one operated with a high level of environmental sensitivity demonstrated by the WTA in its planning. 8

So, I would like to thank you for this opportunity to comment. We look forward to continuing to work with and to support the WTA as both of us try to achieve what I think is our common and mutual goal of making San Francisco Bay better.

Thank you.

MR. STRUMWASSER: Thanks very much, Mr. Travis. I'm not sure if you practiced that, but you were right on the money.

EIR 58

Mr. Potter and Mike Savidge next.

MR. POTTER: Yeah. My name's Geoff Potter. I represent San Francisco Baykeeper and the San Francisco Bicycle Coalition. And we're absolutely -- did not have enough time to complete the review of the EIR, but we will be submitting quite detailed comments in that regard.

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There is a general feeling that the adequacy and accuracy in regard to water quality has not been treated well enough. An example, for example, is the increased engine pollutants that are falling into the water, which is greatly aggravated by the new system of mixing the exhaust with the extremely-turbulent water that's in the tunnel between the hulls of the new high-speed ferry designs that are presently in use on the bay.

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Another example is that the increased ferry trips just themselves -- up to 1500 percent, by your own numbers -- would result in a greatly-increased service turbulence affecting all small boaters, both when they're underway and in the marinas. And the height of the wake waves, as a result, would be increased due to wave interference and reinforcement.

This has not been mentioned at all.

I'm particularly concerned about -- there has not been adequate consideration been given to locating terminals on points of land even though, presently, those points of land may not be available. There is huge environmental savings and benefits to be gained by doing so, both in decreased ferry operating costs, less fuel use and on and on, less dredging, disturbance to wildlife and tremendous benefits.

So, I think these should be listed as possible sites so that, in the future, when you get into site-specific locations, we don't forget about looking at these points of land. For example, Point San Quentin, which right now may not be available. But five or 10 years from now we should do this.

The only other comment I have is -- well, one thing that we've got -- you know, let's look to the future here. We've got Segways in addition

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to bicycles. Let's face it. Segways are coming along. Let's not design this whole system and then say, "Oops. You know, we didn't plan on Segways."

MR. STRUMWASSER: Ten more seconds.

MR. POTTER: Okay.

The last thing is that we will be interested on bicyole aspect of reviewing the design for new ferries to make sure we don't get salt water damage to the bikes while they're underway.

Thank you.

MR. STRUMWASSER: Thank you very much, Mr. Potter.

EIR 59

Mike Savidge and then Sue Day.

MR. SAVIDGE: I'm Mike Savidge, representing the Golden Gate National Recreation Area, the National Park site that stretches from Tomales Bay to San Mateo. We have over 15 million visitors to our sites annually.

I would just like to congratulate the WTA on -- again, re-echoing Will Travis's comments -- the state-of-the art job you did on wake and wave erosion modeling, as well as the alternative fuel emissions protocols that were developed and incorporated as part of the emissions requirements here in the final EIR -- the draft EIR, rather.

I would also like to especially note

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and reinforce that the recreational service -- the integration of that is really important. Given congestion on the weekends, which reaches levels of service as bad as during commute periods, we feel -- and it's been identified previously in various studies that MTC has undertaken -- that some kind of an alternative access on the weekends and off-hours is equally important. 2

Twenty-five years ago Congress mandated a study that MTC undertook with all the transportation agencies that identified creating ferry access to the Golden Gate National Recreation Area -- specifically, Fort Mason, Fort Baker and the Presidio -- as priorities in the next five to 10 years.

We're here 25 years later, and we're really thankful the WTA has incorporated those sites and -- along with other sites that we've identified, like Berkeley and the Ferry Building, as important connections for lightings and boardings as part of our own ferry study that we've undertaken with over 4000 intercept surveys and 1200 telephone surveys and a specific recreational travel model that's really identified those areas -- high-demand areas -- with both visitors and residents in this area (sic). 3

So, we would just like to thank you the WTA 4

and want to work with you further on the Implementation and Operations Plan and just reinforce that we think it's really important.

We're looking forward as well to work with the state park system for the Eastshore State Park to see how an eastside connection can be developed as well, so that there is linkage in the off-hours and on weekends for recreational access as well to kind of be able to hook up these park sites for people in an alternative way. We're experiencing a tremendous crunch of cars in our resources from Muir Woods all the way through to Presidio and many other places. We're looking to get people out of their vehicles. We see this as one of the most viable ways to create access, in conjunction with intermodal connections as well as bike connections. 4

We're also looking for MTC to play a leadership role, in conjunction with the WTA and us, to help make intermodal connections a reality, because that's the way the system will work.

So, thank you very much.

MR. STRUMWASSER: Thank you very much, Mr. Savidge.

Sue Day and then Paul Kamen.

MS. DAY: Hello. My name is Sue Markland

EIR 60

Day. I'm the president of the Bay Area Bioscience Center. I'm following up on testimony that we made at your scoping session last December here in San Francisco.

The Bay Area Bioscience Center serves the bioscience community of Northern California. We number 85 thousand people directly employed and 250 thousand people indirectly and directly employed that have their businesses and their residences around the bay.

In the EIR that we are looking at today -- what we lack in that EIR is planning those routes to go between where people live and where people work. No longer is San Francisco Bay the only employment destination in our region. Since the demise of the high-tech industry and the dot coms, the bioscience center industry has taken its rightful place as a major employer in the Bay Area. For that reason, Bay Bi, or the bi institution, urges that the WTA plan transportation needs and the necessary EIR for our region's future with subregional bioscience clusters ringing the bay, not as past, with most employers going into the city. 1

My purpose today is to ask the -- for the inclusion in the final EIR, additional ferry routes directly from the East Bay to the west part of our

bay. Those would connect directly from organization -- locations where biotech is concentrated -- Richmond, Berkeley, Albany, Alameda, Jack London Square, Harbor Isle, for examples. And that would connect with those other locations in the Peninsula, including Mission Bay, South San Francisco, Foster City and Redwood City. That's where our people are moving. That's where -- your transportation model should have shown you that that's what's happening in the future. And we encourage you to rewrite your EIR to include those direct routes. 1

Thank you.

MR. STRUMWASSER: Thank you very much, Ms. Day.

EIR 61

Paul Kamen and then Jennifer Clary.

MR. KAMEN: Hi. I'm Paul Kamen, chair of the Berkeley Waterfront Commission.

First thing, I would congratulate the authors of the EIR for getting the purpose right for the first time. The EIR starts by stating that the purpose is to increase regional mobility and transportation options. And Teri actually stole my opening by pointing out the difference between the purpose described by the EIR and the purpose in the IOP. 1

In the IOP and in previous documents, we 2

were told this is to reduce traffic congestion and improve air quality. In an absolute sense, any additive system can't possibly do this. You need to add to that "Compared to what?" And I think, if compared to any other method of increasing mobility using automotive or other land-based means, we might look good. But for the purpose of selling what is fundamentally a set of good proposals, I think it's important to emphasize mobility and options rather than traffic congestion and air quality. 2

Two comments on the methodology.

First, I don't think enough care was taken in selecting optimal sites. I know this is not a site-specific EIR, but in the case of Berkeley, for example, the site chosen has the worst land use compatibility, more wildlife disruption, requires a whole mile of additional dredging, has no existing transit service, no existing bicycle access and no existing publicly-owned parking compared to other sites which -- as you know, I'm an advocate of siting the Berkeley terminal at the Berkeley Pier. So, I think that needs to be fixed in revisions of this document. 3 4

Also, there's a mechanism for removing an offending site. I don't know if there is a mechanism 5

for removing a particularly-benign site back into a more intense program. Perhaps it would have been better -- instead of structuring the report based on the level of overall service all over the bay, maybe we would have gotten more useful information by dividing the various proposals into short routes with high demand versus longer routes with lower demand requiring higher speed. That leads to my third major comment. 5

The approach to reducing wake and emissions strikes me as being a little bit technology top heavy. There are mature technologies -- particularly low speed, long, slender hulls, long, slender multi hulls, or Proas (ph) -- that can reduce wake, require dramatically less fuel consumption and reduce less emissions per passenger mile. And these seem to take a back seat compared to the more exotic approaches -- all fuels, Hovercraft, wake-eating multi hulls, et cetera. 6

Again, I think the water transit --

MR. STRUMWASSER: Ten more seconds.

MR. KAMEN: Water transit does a little bit of disservice to itself by not looking at the existing technologies. 6

And, finally, everybody please pick up one of my Berkeley ferry schedules, which have just come out.

MR. STRUMWASSER: Thank you.

MR. KAMEN: No real relationship to an AC Transit schedule.

MR. STRUMWASSER: Thanks very much, Paul.

Jennifer Clary and then Alicia Mariscal.

EIR 62

MS. CLARY: Good afternoon. My name is Jennifer Clary. I'm the president of San Francisco Tomorrow, which is an urban environmental organization. And we've been depending on Bluewater Network to do a lot of our work for us, but she told me to do some reading this week.

Just a few quick comments, because I haven't finished the document.

The section on storm water runoff, you really need to have more work on it. That's a significant impact, having especially the runoff from all those vehicles washing into the bay. I mean, it's a significant reason why San Francisco Bay is an endangered waterway. So, I would like to see more analysis of what the pollutants are and more analysis of what the mitigation would be.

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And I think you ought to be looking at some design features. You say you're going to use, like, a standard plan. You're thinking of using, like, a standard terminal plan at each site. Will

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that standard plan could have standard things like roof runoff or vegetated swales around the parking lot or proximity to fresh water and storm water wetlands or something like that? 2

On transportation, I'm correct in thinking this was a regional transportation resource. And I see no discussion of the land site transit. I think, at the very least, you need an overlay map of what the land site transit currently is so we can see, you know, what the hubs are, how close are you to current transit, how much work is it going to be to get transit to the water. 3

We know you chose the Ferry Building because everyone knows it's an intermodal transportation hub, but what are the other hubs around the Bay Area? Are you siting your ferry terminals according to them? And we don't have that information. 4

You do give, in the air quality area, the impacts of bus service to the ferry sites. So, I know you have the information somewhere, because someone made up numbers about how far you're going to be driving. 5

I also notice Table 312-16 shows ridership splits and shows how many people are going to be taking transit on each site. It seems to me that -- several sites that have very low transit ridership, but they're 6

still on your build list.

And my question is, what is already around there? I mean, you're not going to build a transit hub -- you're not going to build bus service to serve five passengers. And some of them are that low.

So, is there already something there? Is there a Wal Mart there? And having the overlay maybe would help us with that information. 6

Also, I had asked at a meeting -- at a port meeting last week why all the ferry stops were at the Ferry Building, because we have all kinds of piers that could handle ferries. 7

We were told, "Well, it's an intermodal hub. You'll have water taxis going up and down the waterfront" -- not by your staff, but by someone who serves on the WTA.

And I guess the question is -- I didn't see water taxis listed. Are you assuming that water taxis are not going to be a natural outcome of your service? Because if you do, then it should be analyzed. 8

MR. STRUMWASSER: About 10 more seconds.

MS. CLARY: Okay. Then the last thing -- I really like the way you're nodding and it's very nice talking to staff, but I always understood the public comments were to be -- on an EIR are to be made to the 9

body that makes the decision on the EIR.

Can someone please tell me who wrote this EIR up and down, so I understand that?

And, also, having a public hearing two weeks into a 10-week process probably doesn't get you the best comments.

Thank you.

MR. STRUMWASSER: Thank you very much.

Alicia Mariscal and Brooke... Saleh (ph).

MS. MARISCAL: Good afternoon. My name is Alicia Mariscal, and I am representing myself. I am also a member of the East Bay Bicycle Coalition and the San Francisco Bicycle Coalition.

I'd like to begin by saying that I am in favor of an expanded ferry system, but I do have a couple comments on a couple of the things that I noticed in the EIR.

Specifically, under different sections. For the biology B1 section, loss of jurisdictional wetland habitat as a result of dredging and construction of terminal facilities, I just wanted to say please do not build in wetland habitat, especially the sites considered at Port Sonoma and Moffett Field.

And if you're considering Berkeley, the Gilman site -- I'm not sure if you still are -- I

EIR 63

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am in favor of B-2.1, the mitigation for non-native species, to try to keep those under control as much as possible.

And for B3, the special aquatic sites, eelgrass beds and mudflats, I wanted to urge that whatever happens in this updating of the system -- the ferry system -- that -- please do not disturb them. And mitigating in other areas in exchange for what might happen in certain eelgrass and mudflat sites shouldn't be all that's done in this area.

In terms of NO1-4, the noise exposure to -- of wildlife to noise -- I would like to mention to please really take special consideration of that, including the idea of not using Hovercrafts, because they're known to make a lot of noise, in addition to their other detriments, including increased fuel use, the pollution that comes from that operational cost. And I urge more study of these Hovercrafts which are mentioned in several areas of the EIR.

And for T1, transportation, you mentioned access by car or transit. I didn't notice too much mention -- I think only once in the EIR did I see a mention of bicycle use as a way to mitigate efforts. I would like you to decrease driving by encouraging

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bike access and use, being bicycle friendly, in terms of access, and, in some cases, reduced fare or no fare, if that is a possible consideration. 6

And, also, for T2, which mentioned the need for new parking spaces as a result of more people driving to ferry locations, to consider bikes. This would also lessen the need for parking. 7

Thank you very much.

MR. STRUMWASSER: Thank you very much.

If there are others who still would like to speak, make sure you fill out a card and bring it to the front.

EIR 64

Brooke and then Howard Strassner.

MS. COLE: Hi. My name is Brooke Cole, and I'm representing myself and the animals that might possibly be impacted by any WTA program.

I would like to thank you for your hard work and scope of consideration in this project. It's obvious and apparent with the presentation that you made today. Of course, there's always room for improvement, especially since most of the impacts that you talked about are going to affect the human population in the area as opposed to the animals that also use the area.

I would like that special attention be drawn to wetland areas, including those that already have been 1

restored and those that are potentially and designated areas, and to recognize that migratory species, as well as species that don't live in these areas, use wetland resources.

I would also like that long-term impacts be looked at as well in terms of how increased -- increased waterway traffic, noise and pollution that's introduced into these areas will affect the animals over long term.

I would also ask that the WTA promote alternative routes to, between and from proposed as well as existing ports, including bicycle and alternative fuel possibilities.

And, finally, I would just like to state that paramount consideration of the health of the entire San Francisco Bay estuary and watershed should be considered when looking at the impacts of a project such as this, and especially since much of the marine life that is in the area is already impacted by our heavy use of the waterways up and down, coastal and within the Bay Area.

Thank you.

MR. STRUMWASSER: Thanks very much, Ms. Cole. Howard Strassner and then Gopol Sarin.

MR. STRASSNER: I'm Howard Strassner, speaking

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EIR 65

for the Sierra Club. There will be many other Sierra Club people writing and speaking on different subjects.

My concern is total energy consumption.

I got concerned in looking at the EIR when I found that you said that there is only a small increase in the total energy consumed in the bay if you have an expanded ferry system. And then I searched into the appendix, and I found that you showed us what the fuel consumption -- the btu's, energy consumption for passenger mile -- you did it for cars, trucks, buses and trains and everything else, but not ferries. But the good thing about it, you provided so much information, as part of the EIR, that one could work these numbers backwards and -- with Excel and come up with the energy consumption that is attributable to ferries. 1

And before I say anything about that, I have to believe that your consultants in the year 2025 went out and found every possible ferry rider they could who would ride the system. But even so, the number of new riders -- not even new riders, total riders -- on the ferry system is so low that the energy consumed per person per passenger mile on a ferry is kind of terrible. It's almost five times what a bus consumes. And that's in the no-build

frame.

When you go to -- when you do any building, you're talking about 44 times.

You've compared this to BART. It's a-- I'm sorry. That's 44 times BART for no build. It's 180 if you do any little building at all -- you know, Alternative 3 which is not your heart's desire. So, you're consuming a lot of energy.

I have to look at this and say here you are. You're not spending the full price of an extra lane all over the place but, when you build this lane, you're then saying that only people with the biggest, crummiest, most fuel-consuming SUV's can drive in that lane. And then you're saying only one person per SUV. You have developed a system that somehow just crumbles, consumes fuel.

The basic definition that I think should apply to any transit system is that, when you employ that transit system, the total energy consumed is reduced, not increased. And your numbers show increases. That's what made it so easy to calculate the fuel consumption of these ferries.

So, this is a very bad -- I think this is a very bad project. There may be some that went into this looking where is the good ferries. I couldn't

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find any in total, and I used exactly your numbers.

So, one of the things that really got to me is that you told us what the energy consumption for a car was typically in the Bay Area --

MR. STRUMWASSER: About 10 seconds.

MR. STRASSNER: And it comes out that your minimum build -- that your Alternate 3 consumes twice the energy per person as a car driving alone would be.

That's not acceptable. You'll have to do better or not at all.

Thanks a lot.

MR. STRUMWASSER: Thank you, Mr. Strassner.

Mr. Gopol? Sarin.

EIR 66

MR. SARIN: I am a new person. My name is Gopol Sarin. I was a consultant in India for about six to 10 years. I have prepared some items. I have worked for a long time. I have got a lot of sympathy for Water Transport Authority. I have also prepared a project report for the water transport for taking goods for a distance of 180 miles.

I must congratulate Water Transport Authority because water transport itself is a low energy consumption medium, compared to others, because the water (unintelligible) is small.

Somebody told me -- my friend, yes --

there should be a project. Projects are always designed with a view of a number of persons and how many are to go and all that. I've not gone through that, and I specifically haven't considered that.

The most important point to my comments is that any EIR, when it's prepared, any project which is going to be made now -- particularly in the present times -- the total pollution, instead of increasing, it should become less. It should become less, because you are going to start a new project, a new ferry and a new transport medium, new fuel, and some pollution will increase. But what my own impression is and what my own perception is is that we must measure the pollution all around up to maybe 10, 20, even 30 miles. In India there are major sources of pollution. And all pollution should first come down, so that this new pollution becomes tolerable.

In total, the EIR must take into account total pollution, cumulative pollution, because cumulative pollution is much different than it is just the addition of two pollutions. That becomes many times much greater. That must be taken into view. And I still say that total pollution should come down.

Another thing. I'm studying also, to just acquire knowledge, in the master's course in San

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Francisco University and other University of San Francisco courses. I found that EIR is -- preparation become too big. Somehow the total aim --

MR. STRUMWASSER: If you can wrap up in about 10 seconds or so?

MR. SARIN: Number four is that CNG, as a medium of fuel, should be used because it is much more -- it clears lesser pollution. In India, the majority of cars are driven by CNG. I don't know why CNG is not used. I also don't know whether the present water transport ferry is going to use it or not. 4

MR. STRUMWASSER: Thank you, Mr. Sarin. I'll just cut you off there.

MR. SARIN: Thank you.

MR. STRUMWASSER: I'd appreciate -- if you have additional comments, you can provide them in writing.

Those are all the cards that we received.

I want to provide just a quick opportunity just for Steve to provide some little bit of feedback before we close.

(End of public comment)

(Off the record at 5:31 p.m.)

REPORTER'S CERTIFICATION

I, VALERIE E. JENSEN, C.S.R. No. 4401, Certified Shorthand Reporter, certify:

That the foregoing proceedings were taken before me at the time and place therein set forth;

That the proceedings were recorded stenographically by me and were thereafter transcribed;

That the foregoing is a true and correct transcript of my shorthand notes so taken.

I further certify that I am not a relative or employee of the participants, nor financially interested in the matter.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated this 18th day of September, 2002.

VALERIE E. JENSEN, C.S.R. No. 4401

REPORTER'S CERTIFICATE OF CERTIFIED COPY

I, VALERIE E. JENSEN, C.S.R. No. 4401, Certified Shorthand Reporter in the State of California, certify that the foregoing pages 1 through 28 constitute a true and correct copy of the original proceedings taken on September 17, 2002.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated this 24th day of September, 2002.

VALERIE E. JENSEN, C.S.R. No. 4401

REPORTER'S CERTIFICATION

I, VALERIE E. JENSEN, C.S.R. No. 4401, Certified Shorthand Reporter, certify:

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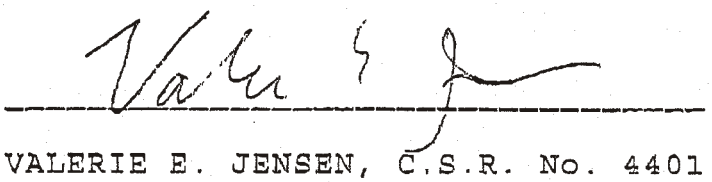
Dated this 18th day of September, 2002.



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VALERIE E. JENSEN, C.S.R. No. 4401

IOP Public Hearing
San Mateo County
October 1, 2002

Submitted Comment Sheets
&
Speaker Cards

OCT. 2.2002 12:51PM PUBLIC AFFAIRS MANAGEMENT WATER TRANSIT NO.406 P.16/29

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: GREG COCHRAN EXEC DIRECTOR SSF CHAMBER of Commerce

Topic: Oyster point TO EAST BAY Routes

Comment: Support for a oyster point to EAST BAY Route 1

EIR 45

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

2

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 46

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: PAUL REIMER

Topic: WATER TRANSIT PLAN

Comment: SUPPORT
WISH TO EMPHASIZE THE CONTRIBUTION THAT THE FERRY SYSTEM CAN MAKE TO DISASTER PREPAREDNESS IN THE BAY AREA. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Duane Sandul

Topic: election issues

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY 2

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: MIKE GIARI, PORT OF REDMOND CITY

Topic: FERRY SERVICE TO REDMOND CITY

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 52

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: DON WARREN

Topic: SUPPORT FOR IMPLEMENTATION / ROUTE SELECTION, LAND-SIDE LAND USE

Comment: ON BEHALF OF BUSINESS COMMUNITY, STRONGLY SUPPORT IMPLEMENTATION TO COMPLEMENT OTHER TRANSPORTATION MODES. ENCOURAGE MAXIMIZATION EAST BAY/WEST BAY CONNECTIONS WHERE FEASIBLE. B250, ENCOURAGE EARLY ESTABLISHMENT OF A TERMINAL AT THE PORT OF REDWOOD CITY. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

2

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 53

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: PEDRO GONZALEZ MAYOR PRO TEM CITY SO. S.F.

Topic: FERRY CROSSING THE BAY

Comment: Need To be Included, I OP PLAN OR the EIR. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

EIR 50

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: BRIAN CUNNINGHAM

Topic: SERVICE TO SO SAN FRAN

Comment: A CHANGE IN WHERE PEOPLE WORK & LIVE, ESPECIALLY IN BIOTECH, JUSTIFIES SERVICE BETWEEN EAST BAY & SO SAN FRANCISCO 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY 2

SPEAKER CARD

Speakers will have 3 minutes to speak. **EIR 51**
Please provide a brief description of what you will be discussing today.

Name: PETER GRENELL

Topic: SUPPORT 10P + OYSTER POINT SERVICE

Comment: SAN MATEO COUNTY HARBOR DISTRICT SUPPORTS THE 10P AND EAST BAY ROUTE(S) FROM/TO OYSTER POINT AS PER PLAN'S P. 33. SUPPORT SOUTH SAN FRANCISCO'S MARKET STUDY FOR EAST BAY NOW — OR AS SOON AS POSSIBLE 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: HANNS LEE Lee

Topic: DEMAND FOR SSF - EASTBAY route

Comment: Observations as a real estate developer.

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY 2

SPEAKER CARD

EIR 49

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Christine Maley - Grubl

Topic: Direct Ferry Service

Comment: Request Consideration of Adding direct Ferry Service from the EAST Bay to SSF to the PLAN

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

PORT OF REDWOOD CITY
San Francisco Bay

675 Seaport Boulevard
Redwood City, California 94063-2794
650 306 4150 FAX 650 369 7636
E-mail: portofrc@redwoodcityport.com

Comments by Richard Dodge, Commissioner, Port of Redwood City on the Draft Implementation and Operations Plan of the San Francisco Bay Water Transit Authority October 1, 2002

EIR 47

My name is Richard Dodge. I have been a member of the Redwood City Port Commission for 22 years and have had the pleasure of serving as a member of the Technical Advisory Committee of the WTA.

For a number of years, even before the creation of the San Francisco Bay Area Water Transit Authority (WTA) in 1999, the Port of Redwood City has taken the lead in studying the feasibility of ferry service in Redwood City. The Port has invested in preliminary studies of ferry terminal sites at the Port and taken surveys of potential ferry riders. We worked with local employers, business leaders, and elected officials to increase their awareness and urge their support of ferry service. In 2000, the Port and City of Redwood City worked with the San Mateo County Harbor District and the City of South San Francisco to get policy language adopted in the San Mateo County Transportation Plan to include ferry service for the Peninsula.

We are convinced that ferry service to the Peninsula is a viable transit alternative and should be vigorously pursued. The Highway 101 corridor is one of the most congested in the State. Hundreds of thousands of jobs have been added to the Peninsula and South Bay in the last decade as part of the high tech boom. Although there is substantial office space vacancy now, it is only a matter of time before they are filled and the congestion on the Peninsula limps back toward gridlock. Now is the time to develop and implement the WTA plan for a significant expansion of the region's water transit system. 1

The Port of Redwood City is located between the San Mateo and Dumbarton Bridges. In the event of a major disaster that would shut down these vital transportation routes, ferry service would provide an immediate response alternative.

We are, therefore, pleased that Redwood City has been included in the IOP. 2

Ridership is estimated to be 2,200 per day, which we believe will be even higher because of the renewed tenancy at Pacific Shores Center, and the future Abbott Laboratories project near the Port. 3

We are pleased that the WTA has designed a ferry system that will be cost effective while meeting the environmental challenges of expanded ferry service to include a plan to reach zero air emissions in new vessels.

Port Commissioners
Larry Aikins
Jack Castle
Dick Dodge
Lew Miller
Guy Smith

We are, however disappointed that the IOP shows implementation of the new route for ferry service in Redwood City not starting until 2010 to 2012. We will continue to work hard with WTA, other local officials and the business community to accelerate this schedule as much as possible to provide this transit alternative to the Peninsula. 4

SOUTH SAN FRANCISCO, CALIFORNIA, OCTOBER 1, 2002 - 7:03 P.M.

* * * * *

MS. JOHNSON: Mr. Lee, Hanns Lee.

MR. LEE: Mr. Lee, Hanns Lee.

Good evening, Madam President, directors and staff. My name is Hanns Lee. First I want to commend the WTA for pushing for this major effort. As a former resident of Europe, New York City and L A, I've seen the best and worst of public transportation alternatives, or lack thereof.

I'm here tonight to encourage and urge the WTA to move forward on studying the route between South San Francisco and the East Bay. And in particular to Oyster Point. I am a developer/manager for HIES; we are an international real estate firm that has owned and managed over a million square feet of property here in South San Francisco since 1996.

Over the years, we've observed that the east of the 101 area has exploded in terms of both, as you well know, South San Francisco is the biotechnology capital of the world. Ernst & Young, in one of their industry reports called the 21st century throw biotech century. As such, we agree with this notion and believe that South San Francisco will grow faster than other Bay Area cities over the next 100 years.

My company is a real estate developer, we also

EIR 48

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EIR 49

study markets and we have consistently observed from tenant demand the desire for public transportation alternatives, in particular BART, which suggests to me that there is demand coming over from the East Bay.

And so, again, I would like to urge the Board and encourage the Board to continue looking at the South San Francisco, Alameda or Oakland routes. Thank you.

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MS. JOHNSON: Thank you. Christine Maley-Grubl.

MS. MALEY-GRUBL: Yes. Good evening. Thank you. My name is Christine Maley-Grubl. I'm the Executive Director of the Peninsula Traffic Congestion Relief Alliance. We are the local transportation management agency here in San Mateo County and work directly with employer residents commuters that are going to from and through San Mateo County.

I'm here tonight to request your consideration of including in your plan the study of direct fairy service routes from the East Bay to South San Francisco Oyster point area, the alliance among other TGM. We manage other service routes to Cal Train to employer work sites in South San Francisco we currently run two BART routing and two Cal train shuttle routes transporting employees to BART and Cal Train to east of 101 in the biotech area.

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In this past fiscal area we transported 161,878 total riders with from BART and 16.6 percent from Cal Train, a large percentage of the BART riders are taking BART to

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alleviate driving over the Bay Bridge. 2

I also wanted to mention some information from an MTC report that I'm sure you are familiar with commuter forecast for the San Francisco Bay Area 1990 through 2020, based on a bag as projections in 2000. The report stated that there were more than 62,155 residents of Alameda County who commuted to San Francisco on a daily basis, but other important figure to take a look at is in addition to those commuters going directly to San Francisco. There were 31,643 Alameda County residents who commuted to San Mateo County directly each weekday. 3

There were also 11,402 Contra Costa residents and 4724 so LAL lan though county residents who commuted to San Mateo County directly. Not surprisingly with a housing market as it is and continues to be there were over 900 residents outside of the Bay Area, including Mendocino though Yolo Sacramento among others, who commuted directly each weekday to San Mateo County.

All these numbers are projected to rise with an estimated 20 percent increase from residents outside the immediate Bay Area who will commute to San Mateo County by 2010. 4

You can see that there are thousands of commuters who need service directly from Alameda County, Contra Costa Solano and the other counties to San Mateo County.

We find at the alliance the public transit and transit alternatives are effective when they provide any commuter with a convenient affordable and I'm saving way to commute to and from work, studies have shown that the more a commuter has to change modes of transportation the less likely they are to take modes of transit other than their car.

If me Water Transit Authority determines that East Bay commuters who are working in San Mateo County must first commute to San Francisco and then to San Mateo County, please consider the amount of added time for the commuter and take into considers that the commuter had to first get to fairy, take the fairy to San Francisco, then to San Mateo County and then will probably meet to take a shuttle as well to employer's work site. 5

In addition the Alliance in cooperation in the city of South San Francisco will soon be undertaking a G I S mapping study where employs of companies east of 101 live to determine commuters to where people live to where they work. We would love to have the opportunity to provide this information to the Water Transit Authority to further validate our request for direct ferry service. 6

Please consider adding direct route service component to your plan to provide these thousand of commuters access from the East Bay directly to South San Francisco

providing them the time and convenience to make ferry service an attractive alternative to get to and from work. Thank you.

MS. JOHNSON: We hear you loud and clear. Brian Cunningham, then Peter Grenell.

MR. CUNNINGHAM: My name is Brian Cunningham. I'm president and COO of righter pharmaceuticals a biotechnology company here in South San Francisco. I'm also the chairman of the Bay Area bioscience center. I'm here to support the Water Transit Authority's efforts to establish expanded ferry service an to also request that ferry service come directly to Oyster Point from the East Bay.

Approximately 20 percent of our employees live in the East Bay, and commute in some cases up to two hours using more than three or more modes of transportation, we believe that ferry service to South San Francisco would be a tremendous assistance to those employees both in terms of improving their commute and improving their quality of life.

I should also mention that separate and apart from Water Transit Authority's effort there has been an growing effort on the part of biotechnology companies in South San Francisco working with the city of South San Francisco and the south San Francisco Chamber of Commerce to examen transportation alternatives for polices who come to South San Francisco. Now, I believe based on my conversations with

EIR 50

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these companies that there is significant support for ferry service to South San Francisco including the willingness to work with the city of South San Francisco and the WTA to make that service possible. 3

I would encourage you to call on us in anyway that could be supportive of your efforts including figuring out ways to make those facilities economically feasible. 4

EIR 51

MS. JOHNSON: Thank you very much. Mr. Grenell.

MR. GRENELL: Good evening. Peter Grenell, general manager San Mateo County Harbor District. We have been working together for quite some time, so I'll dispense with the formalities.

First I would like to on behalf of the direct, indicate our solid support for the IOP and all of your efforts, same efforts I'm saying that especially as it will be useful as you go before the state legislature in the spring. 1

Secondly, we are also in full support of the folks around us regarding an East Bay route. We know the reasons behind your current projections and we are committed and offer whatever assistance we can to you working with the South San Francisco and others to come as quickly as possible with the necessary information to establish an East Bay route whether it is Alameda point or the estuary, whatever seems cost effective. 2

And along those lines I would like to update you very quickly on our efforts to prepare Oyster Point Marina for ferry service. We now are about to sign a cautionary agreement with the United States Army, Corp of Engineers to open up the mouth of the Oyster Point break water to facilitate ferry service coming in and out. The goody there for everyone who is not familiar with it is that ~~core of~~ Corps of Engineers ~~injuries~~ will be providing 90 percent of the construction funding we hope to be in construction in a year. 3

So again the timing about determining what the routes are in an out of Oyster Point is important because at that point we will be looking at terminal planning and dock planning so we'll need to know how many people are going to be coming in and out. 4

Along those lines I would also like to go on record as well as offering our support to whatever efforts you may require to continue to work to obtain federal funding particularly a California set aside of ferry money. And that is something I know we were working on. And we would like to offer that. 5

Again if I do continue to have a job after November 5th, you can count on my active involvement on behalf of the Harbor District in working with the city on that.

I think that is all if you have questions I'm

here.

MS. JOHNSON: Thank you very much. Don Warren and Pedro Gonzalez.

EIR 52

MR. WARREN: Madam chairman and members of the Commission and staff and audience. I'm Don Warren I'm here tonight representing two organizations who have a vital interest in seeing the implementation of the Water Transit Authority's IOP plan for the Bay.

First of those organizations is the Redwood City, San Mateo County Chamber of Commerce I'm here representing the Board of directors of that chamber, that chamber I guess the largest Chamber of Commerce between San Francisco and San Mateo and has a membership of over 1,000 businesses in the mid- and South Peninsula. Included in that membership are key major employers, in and around the Port of Redwood City. In fact, in that membership probably 90 percent of those employers who you may wish to work with in the future in terms of public private partnerships on funding and shore side facilities and so on.

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The other organization is the Bay Planning Coalition I represent the Board of Directors of the Bay Planning Coalition which is an organization made up of members of both public an private members, cities, agencies, all of the ports around the Bay, land owners private landowners who land around the Bay, and the majority of the

users of the surface of San Francisco Bay.

The planning coalition is very much involved in representing the interests of those landowners and cities and users in the regulatory environment involving use of the Bay and the periphery of the Bay. So those two organizations have both taken positions in strong support and encouragement of the WTA moving forward with rapid implementation of the plan. And offer to you whatever support we can in implementing both recent region wide an certainly in central and south San Mateo County.

Two or three comments: I would like to make our reportive of the interest of both of those organizations, one is that we want to encourage the Commission and staff not to underestimate the time and the effort and the involved that it will take to implement the shore side facilities necessary to make the system work.

We know you are very aware of that and Steve certainly highlighted it tonight, but one who has been involved in the regulatory morass over San Francisco for 25 years, I know that there may be a tendency to underestimate the time and effort necessary to actually get facilities on the ground.

That comment, by the way, through those organizations, is also to represented of cities and the other agencies who are involved would be involved directly an

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indirectly in implementation of shore side facilities. The need is now to begin that planning at a local level the cities and the counties and the eighteen agencies involved so that built into those that planning effort and the City of Redwood City is an example. The need to build into close planning efforts that are undergoing now the facilities and the planning necessary to receive and to compliment and capitalize on the ferry terminal that may in fact be involved there. WATOD, WATOD. I snickered when I heard that. But you are absolutely right, Steve, those of us who in my case a former life as a developer of Redwood Shores, we need to be looking five eighteen ten years down the pick for opportunities like WATOD development. The current.

MS. JOHNSON: I hope we can call up with something else.

MR. GRENELL: And I agree. It needs to be a more kit kiting phrase, but the concept is there. If the ports Luke the Port of Redwood City and South City can think about the synergy that can be developed over time between a water transit facility and surrounding and peripheral development it is an exciting concept, over the last ten years and ongoing for probably the next ten years the big thing is transit oriented development focused around rail notes WATOD are coming up. So that is going to be important.

I also want to on behalf of the Redwood City

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chamber strongly encourage the Commission to continue to look at direct West Bay/East Bay connections, I know that your ridership surveys and the model you used to develop those predicted otherwise. And therefore that East Bay/West Bay connection didn't double to the top in tomorrow obvious priority. I will offer you that in the course of time and further study and involvement of the communities in which you will serve, and I'm speaking specifically of the business community in San Mateo County where a high majority of their employee base is in transit every day up to two hours in some cases, making that transit from somewhere in the East Bay and beyond into San Mateo County and reverse. I would offer to you therefore that the support of those corporations may in fact be a direct proportion to the support there is for a direct East Bay connection, I don't know how we get from where we are today to that point, but I will offer to you that over time that may in fact evolve. The connection may be to South San Francisco, that could be it that they be fine. Nevertheless we courage you to move forward with that. Thank you very much. 6

MS. JOHNSON: Thank you very much.

Councilman Gonzalez. And then next is Duane Sandul. EIR 53

MR. GONZALEZ: Thank you. Good evening, Madam Chair and members of the Board. As Steve very well said and he

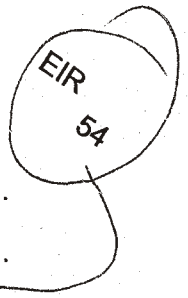
said you have heard this so many times so I did so too. And is worthy to report it. I have some comments and questions that my constituents have asked me and after that release of these documents, that is when we knew more we had more questions and comments. 1

For instance, South San Francisco believes that the majority of biotechnology and high technology employment will originate in the East Bay and that ferry service should emphasize trance bay crossing from the East Bay to Oyster Point Marina and Redwood City.

This is a question: Why didn't the plan and the EIR evaluate proposed ferry routes across the Bay from San Leandro to South San Francisco? In terms of channel depth, dredging, requirements and wave actions. 2

This is a comment the plan and the EIR do not adequately address the opportunity cost for individuals travelling from the East Bay to the peninsula or from the peninsula cities to South San Francisco. 3

The first time I hear I think I'm going to repeat it again the first time I heard about in ferry here in South San Francisco it was 1995, if I remember by one of the council members. But I think his vision was crossing the Bay and that was his vision because at that time he noticed already that we needed the service of the fairies here in South San Francisco. Thank you very much.



MS. JOHNSON: Thank you.

Mike Giari is after this gentleman. Mr. Sandul.

MR. SANDUL: Good evening. My name is Duane Sandul. Normally I'm a behind-the-scenes person not speaking publicly. I do represent the Board of Redwood City, and previously I've had the pleasure of working with Peter in South San Francisco and Oyster Point and covered Bay Area council and the sure WTA process, and I'm not here representing any of those folks but actually it is from an old life for 14 years I was a political writer for the San Mateo times I'm sort over racing some of the questions now from the political aspect I think you ever a good operational plan.

Ironically here in San Mateo County where 30 years ago the Board of Supervisors had an opportunity to get into the BART system and on a slit vote they DIRNL do it now that remains 30 years the missing link that has help paralyze some of the situation we have.

So I'm just raising that as a criticism but a question for your board madam share Chan to consider is that here you are going to go to voters in 2004, with a baby bullet measure A in San Mateo County pull his STI Arkansas and things lake bay crosses quitting the sock lack STRANCE run all those things related and we're going to say to the San Mateo County voters what is one of the seven counties

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voting on this. But an important coin to vote on it here else a GLAETS lan we're going to solve your member and we're not going to do it until 2011 or 2014.

My prospective and continuing to work for Mike that our members justify a more current system. I imagine everybody is going do stand up and say that if you look at it from a political context of whether you can win the vote I think you have to reanalyze what I consider the bold vision when ran cowant was doing that no criticism. It is a great plan if we're going to ruin the Bay, let's do it now. So people know they are.

What I'm really concerned again based on all the years of covering politics in this county it is going to be a hard sell in 2004 and say here savior we're going to solve it in seven to nine years.

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MS. JOHNSON: Thank you, Mr. Sandul.

Mike Giari.

EIR 55

MR. GIARI: Good evening. Mike Giari. I'm port director for the Port of Redwood City. I'm here tonight on behalf of the Board and in particular on behalf of port Commissioner dick don't. And I have a copy of the comments that we would like to submit on behalf of Commissioner Dodge, he has been a port Commissioner in Redwood City for 22 years, he also serves on the technical advisory committee for the W TA he is sorry he couldn't be here tonight.

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Dick and the Port of Redwood City have been studying and working on ferry service to the Port of Redwood City for a number of years even before the creation of the WTA. We've gone out and done a siting study of ferry terminal locations in the port. We have worked with local employers to them of the potential for ferry service we've done our own surveys of potential ridership and as a result of all these efforts we're convinced that ferry service to the peninsula is a viable transit alternative and should be vigorously pursued an as soon as possible. 1

I think everyone is aware of the fact that currently on the peninsula there is millions and millions of square feet of empty office space, but all the big real estate tycoons tell me it is only a matter of time before that office space is filled up again and going again. And the Highway 101 corridor is probably one of the worst congested corridors in the State of California. And it is going to be impossible to transit -- do move on that corridor once the employment levels in the peninsula and the south bay grow again. 2

I was very pleased to hear the support tonight for and the WTA's support for relooking at the potential for ferry service between the peninsula and the East Bay. So I know you are going to look at Oyster Point, please don't forget about the Port of Redwood City and the Redwood City 3

area. Whoa offer our support there that. We'll work with the Redwood City San Mateo County Chamber of Commerce and the local employees if you do employee surveys and gather other information and we'll give you our full support. 4

Lastly, certainly the IOP is a great document and we fully support it. But we certainly want to let it be ninety-one that we would like to see the schedule for implementation of ferry service in Redwood City accelerated and accelerated significantly. And we will work with you again and the local community to see what we could to do that. Thank you very much. 5

MS. JOHNSON: Thank you, Mr. Giari. Do you want to submit those comments. Greg Cochran and Paul Reimer. EIR 45

MR. COCHRAN: Hello. Greg Cochran. I'm Executive Director of the Chamber of Commerce in South San Francisco.

I over the last 12 years, 15 years South San Francisco Chamber of Commerce has been active in pursuing the ferry service to Oyster Point. This is not something that is new to South San Francisco. And I did want to say that we've conducted a number of meetings committee meetings you know about committee meetings over the last year especially, and the majority of those meetings when we discuss the ferry service the 12,000 employees that the Chamber of Commerce employs, over 3200 businesses that are here in South San Francisco also the City of South San Francisco represent the 1

majority of these meetings we also concur with what has been said tonight, that a viable route between Oyster Point and the East Bay is something that everyWOP has on their mind.

Don't underestimate what private industry can bring do the table. Here are people who have very innovative ideas, a whole lot more innovative than they were 15 years ago. You look at some of the businesses in South San Francisco, Redwood City, San Mateo, and what they're doing for their employees are things that we are were not done 15 years ago. We've you say if we come back to full employment, this may be an island, how do we get here, yeah, four or five hours on the freeway, one of the features of attracting good employees is creating ways for them to get to work what that are viable, that are real and we leave the word fun out too. How often have you thought of the drive from Contra Costa to Redwood City has fun?

I say don't underestimate our businesses. I could mention ten businesses right here right now that have been so creative in childcare, so creative in their transit plans, so creative in their plans to attract great employees to this area that if we put these minds at the table, we're going to come up with a plan that is going to make this thing work. These are the folks that will say what do you need from us to make it work?

So I want to offer our facilities South San

1

2

Francisco Chamber of Commerce, as a point for you to we can use our facilities and our help to bring these folks to the table to talk about innovative ways that we can possibly make this thing happen that we haven't thought about yet. But invest industry support.

So, again, thank you for your help and every time we've asked the WTA for anything, bingo, they're right there. Thomas bur kin came to our chamber over commerce transportation committee meeting in September, and gave an absolutely flawless presentation. And everyone was very impressed with your work. And thank you again fur your diligence.

EIR 46

MS. JOHNSON: Thank you. Mr. Reimer.

MR. REIMER: Madam president, members of the Board. I happen to have been the member of the Governor's Committee that preceded your authority. And therefore I suppose it comes as no surprise that I had be here tonight as a peninsula resident to support the plan.

I do wish you well in your progress I think it has been a very determined step in the right direction, and I hope that your efforts of the funding will reveal.

This one point that I would like emphasize and continue to do in thinking about how the ferry service itself can be made to have as much people as possible both in terms of searching for funding as well as in the long run its

2

1

appeal to the voters.

In your description of the plan, there is the note that six times over the 23 years that the ferries were called in to service to help the Bay Area in the face of a disaster. And I believe that is an supremely important point given our current status both positive and respect to disaster preparedness, and positive I hope as well in what we are doing across the Bay Area in our fight against terror. 1

In this intense, it does seem to me that though ability of the ferries to move when all other transportation may be physically shut down and deprived of access ability, and also to take advantage of the military bases that are around the edge of the Bay as potential centers for consent TRAILGS of relief and relief supplies after measures.

So my even hope is that not only will the planning be successful, but that you will find a way it continue to emphasize this aspect which I believe in today's world is that much more important as a contribution to the success of the Bay Area overall, and the safety of its sit since, thank you. 2

MS. JOHNSON: Thank you, Mr. Reimer.

Does anyone else have a comment or would like to address us tonight?

(No response)

End comments) 8:05

9/30/2002

EIR 31

Dear Tom Bertken,

I am happy with the possibility of the expansion of the ferry system in the San Francisco Bay Area. I urge you and the WTA to build a clean & green ferry system. The new ferry system should include ferries that are at least 85% cleaner than the federal law requires. Biodiesel would be a great alternative to fuels that would damage the fragile San Francisco Bay ecosystem. I believe that the Ferry system would be utilized by commuters that ride their bicycles, to and from the city, so fares for bike riders should be reduced, or even free.

Please do not include any wetland sites from your plan, and avoid dredging in the Bay.

Please integrate the ferry service with other public transportation systems like Bart, Muni, or AcTransit, so public transportation can be real for everyone, not just those who can afford it. Thank you.

Lawrence Tiglao, 1520 Berkeley Way

1015 Sierra St.
Berkeley, CA 94707

September 28, 2002

EIR 32

WTA
120Broadway
San Francisco, CA 94111

Dear People:

I am writing about a possible Gilman Street Ferry terminal. I have lived in Berkeley most of my life. I am a docent teaching about the SF Bay **Estuary** to families, at the Berkeley Shorebird Nature Center. I have taken an Aquatic Outreach Class called Watching Our Watersheds.

I am concerned about significant **impact from dredging for this terminal.** Destruction to bottom dwelling organisms is a bad idea. The Bay **estuary** serves as one of the world's largest nurseries for marine organisms. Harming the bay estuary has huge impacts to our fisheries, marine life and to the East Bay Shoreline Park which does not permit recreational craft for half of each year. Large numbers of water birds frequent around this location. 1

The Port Sonoma ferry terminal would have **non-mitigable** impacts on endangered species such as the **California Clapper Rail**. Ferry wakes can swamp nests, destroy eggs and kill chicks. There is a large amount of tidal marsh at the site. 2

Ferry impacts to rafting ducks has not been evaluated sufficiently. Birds fatigued from avoiding ferries would be impacted in their reproduction activities. 3

Since these impacts are very significant, the DEIR should not be approved until further work on this issue has been completed. 4

Sincerely,

Wendy Weikel

Wendy Weikel

1015 Sierra St.
Berkeley, CA 94707

September 28, 2002

EIR 32

WTA
120Broadway
San Francisco, CA 94111

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Sincerely,

Wendy Weikel

Wendy Weikel

Martinez 9/26/02 Raw 10 pg DEIR Comments Transcription

EIR 33-42

MS. HAUGHT JOHNSON: We can take some public comments. I have some speaker cards.

Remember, if anyone wants --

MR. BIANCO: Can I say something, please?

MS. HAUGHT JOHNSON: Yes.

MR. BIANCO: As usual, Steve's presentation and Veronica's is excellent.

I think it would be very helpful if you would spend a few minutes explaining Martinez's role in this ferry system.

Delete that.

MS. HAUGHT JOHNSON: I'm sorry. We're supposed to be keeping a format going.

Why don't you get up and ask your questions?

MS. NIMR: I had three basic questions, I guess.

EIR 33

No comment sheet or card

One of them was the studies that you did to see where the people were coming from. Particularly, I was interested in Martinez and Antioch.

Are they available on the web, the actual studies where the people are coming from and how it was conducted and so forth?

The reason I'm concerned is that, when you

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talk about reducing the NOX and so forth, I wondered if your assumption was that people were not going to drive their cars down there because, as soon as they start their car, the cold start is the air pollution. They may as well drive to Oakland if they're already starting their car. I wondered what your assumption was on the reduction of the NOX. 2

And then the third question I had had to do with the agency that would operate it. Would this be an elected agency or... 3

The present agency is appointed by the governor. Is that correct?

MR. CASTLEBERRY: (Nods head.)

MS. HAUGHT JOHNSON: Certain members are appointed by the governor.

MS. NIMR: Those are my basic three questions, I guess, as far as information.

MS. SANCHEZ: Would you like to take the questions?

Maybe the speaker should identify herself, though, for the record.

MS. NIMR: My name is Kathleen Nimr. I'm the transportation chair for the Sierra Club.

MR. CASTLEBERRY: The first question was did we account for cold starts. The answer is yes.

The model included mode splits at all terminals, how many people would be coming by bus, how many people would be coming by single occupant vehicle, how many would be riding their bikes. So, the numbers for NOX and PM include cold starts from people who would be driving. And I don't have the Martinez numbers at my fingertips, but... but they do reflect that.

It also -- I've got to note we also included additional bus service to try and get people off. So, that was included in the model and reflected in the air quality calculations.

MS. SANCHEZ: Regarding the governance of the agency, the agency -- the authority is governed not only by a board of gubernatorial appointees -- we have six gubernatorial appointees -- but we also have legislative appointees from the Assembly and Senate Rules Committee, such as Mr. Withington and Ms. Secchitano, who were appointed by the legislature. Excuse me. Four government appointees and legislative appointees. We also have representatives also from our community advisory committee that are locally elected officials.

So, that's been specified by statutes, and those terms are eight-year terms. So, that's in our existing statute.

MS. NIMR: That would be in the plan?

MS. HAUGHT JOHNSON: There's no plan at this time to change that.

MS. SANCHEZ: Right.

MS. HAUGHT JOHNSON: If we could, maybe we should just get the comments and, if there are any questions at the end, we'll answer them then.

Okay. So I'm just going to call in the order I received the cards. The first one is from Karen Dorantes.

MS. DORANTES: Hi. Good evening. My name is Karen Dorantes. I'm one of the friends. I'm one of the friends of the Richmond ferry.

EIR 34

Submitted Comment Sheet

Once upon a time, not too long ago, we used to have a wonderful ferry service out of Richmond which proves that water transportation in west county and on the Carquinez Strait can and does work.

I wanted to remind folks that Richmond is not a new route, technically. It's going to be the restored route, because the ferry terminal is there now. It exists. It's a fully-dredged channel, and all we're waiting for is to get those boats back in the water.

We're really excited about the plan because it has the potential to put clean, safe, efficient, cost-effective boats in the water that will not only get

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people to and from the areas they need to get to, but it's going to relieve what's already become critical mass in west county.

Now, I don't know if anybody takes the little route that I do from Crockett every morning down to Richmond where I catch presently a BART train, but what I've noticed in the last couple of years is I have noticed an exponential explosion of housing. And it starts at the Safeway Store in Rodeo and goes all the way over the hills, all the way down Richmond Parkway, all the way through Hercules. They're springing up like mushrooms on a wet lawn. It's incredible.

Just in the last year I've already noticed a tripling of traffic on the Richmond Parkway. I've noticed a tremendous increase in traffic on not just I-80, but San Pablo Avenue. Any time anything happens on either that main road or the arterials, it doesn't just affect people in cars; it affects any type of wheeled transportation, including buses. 1

And what I've noticed is we have -- this plan could not have possibly come at a better time the sooner the better. I totally support it. We get the boats back in the water at Richmond as we've had. That's the jumping-off place to get the rest of the Carquinez Strait operational.

I totally support -- especially support the ferry terminal in Martinez. You have a wonderful waterfront. You've got some tremendous restoration and development I've seen and observed firsthand. You've got great potential. You can get yours going quick and ease. Once it starts, all the way up the strait we're going to get excited. 1

You have the ridership. It already exists. There's people who were shoved off their boats who want to get back on them. We're tired of being on the freeways. We've got new people coming in all the time. All this new housing, new development, families are growing, housing is booming here in this area. And this is the best plan I think to address it. And I'm totally in support of it.

I want you to know that there is ridership waiting for ferries. And friends of the Richmond ferry and other people who are dying to get on a ferry boat will be behind you, will support you. We'll help you through marketing efforts. And there is a grass roots movement out there among commuters and residents in this area who are completely in support of this project. 2

MS. HAUGHT JOHNSON: Thank you very much.

The next speaker card is from Jamie Brown.

MR. BROWN: Hi. I'm Jamie Brown. I live

EIR 35

Submitted comment sheet

right here in Martinez. I'm sorry. I'm a little bit underdressed, but I was stuck in traffic because there isn't a ferry here yet.

Anyways, I commute every single morning. And it seems like traffic just gets worse and worse and worse, and it's just -- it's terrible. Sometimes, when I'm lucky, I'll get over to Vallejo in the mornings and take the Vallejo ferry over, and I can tell you that boat is packed. Every time I've done that, that boat is absolutely packed. It's so much more relaxing. It's the best way to travel, I think.

And I think it would do a lot of good for Martinez, a lot of good for all these other communities too, if they can get the ferry terminal in there.

And that's all I wanted to say. I just want to put in two cents.

1

MS. HAUGHT JOHNSON: Thank you, Mr. Brown.

Richard Pearson.

MR. PEARSON: I'm Richard Pearson. I'm the community development director for the City of Martinez. And I'm here under strict instructions from the city manager to let you know that the mayor and the city council are in full support of your plan and obviously want a ferry terminal here.

EIR 36

1

no comment sheet or card

We have been working on a ferry terminal in

Martinez since 1992 or maybe '93 when the original MTC plan came out. We haven't got much done on the ground, but we actually -- in 1994 we got a grant from the Coastal Conservancy to build a ferry plaza.

In 1996 we got a grant from the federal government under "iced tea." There's a strange little ferry boat category under "iced tea." And they gave us 250 thousand dollars to put a little shelter in on top of this plaza. Of course we haven't put the shelter in because we haven't built the plaza yet.

But I just came back today -- just flew in from Southern California. My arms are tired. But I was down there because the Coastal Conservancy gave us an additional 250 thousand dollars to put a retaining wall in. This is all at the marina where we plan to have the ferry terminal. 2

The intermodal project which we -- was our fancy name to our Amtrak station, included a ferry element in that. So it's already been through environmental review to have it at the marina, to extend the triple CTA buses down to the marina. 3

We in 1998 we had a feasibility study of where to actually put the dock. In our wild-eyed optimism early on we thought we could bring the ferry into the marina and dock it at this plaza. Turns out that these

ferries are sort of bigger than the marina itself. The most logical place to put it is actually at the old ferry dock.

There used to be a ferry that ran from here to Benicia. The ferry dock is still there. We just recently have updated that -- it's still in the draft form. But we've updated that study to look at those original alternatives, and it still looks like the best place to put it is out there. There was some thought that we could actually bring it up Alhambra Creek to the Amtrak station, which looks good on paper, but in terms of wetland impacts and many other things, it's not very effective way to go. 3

At that point I'll stop, but I did want to say that the mayor and the city council from '93, '94 all the way through right now have always been in full support of this and they're in full support of your plan.

MS. HAUGHT JOHNSON: Thank you. Thank you, Mr. Pearson.

Joe Lucas.

MR. LUCAS: My name is Joe Lucas. I'm a member of the ILWU. I've lived in Contra Costa County for over 50 years. And I can say, like they said about the Maxwell Coffee, what's taking you so long? This is

EIR 37

no comment sheet or card

a good program, and it should have been working sometime ago.

I work in San Francisco, and I drive over there. And I have a friend that lives in Vallejo, and she rides the ferry. When I get to work, I'm all tired. She's just as fresh as a daisy. So I'm very much in accord with what you are doing, and I approve of it. And I just hope that you can get it done as soon as possible. Thank you. 1

MS. HAUGHT JOHNSON: Thank you, Mr. Lucas.

Victor Ryerson.

MR. RYERSON: Yes. I'm a fairly frequent rider of the Oakland-Alameda ferry. I live in Orinda. So I drive to the ferry and utilize the free parking at either the Jack London Square or Alameda terminals. So, I guess you would say I use the combination of the ferry and the Muni ride, which is included with the same ticket as kind of a people mover from a remote parking lot, but it works out very nicely for me, and I enjoy the experience. 1

I'm a great believer in ferries. Last year I was in Sydney and I spent a day just riding the ferries out in Sydney harbor, which compares very favorably in terms of its demographics and so on to the San Francisco Bay. And interestingly enough, they do have a ferry

EIR 38

no comment sheet or card

that is somewhat similar to what you're thinking of, serving Martinez and Antioch, Pittsburg. There's a specialized type of catamaran ferry called the River Cat that serves an area up the Paramata River. So I found some good comparisons interesting.

The real reason I wanted to address you is to make sure that you include something on the agenda that I haven't yet heard about.

I work for the state Public Utilities Commission. I must say that nothing that I say necessarily represents the views of the commission. But I've written a number of the decisions adopted by the commission in connection with providing operating authority to existing non-public agency operators of ferries on the bay. And I can tell you, from being in the belly of the beast, that this is not the bread and butter of the Public Utilities Commission. It's a -- something that used to be quite important, I think, in its past and isn't anymore but presents all kinds of problems because of the cumbersome procedure involved with getting operating authority or getting authority to stop operating ferries on the bay. The commission still asserts that it has the power to do that, as it does under state statute.

If the agency is going to operate an efficient

1

and streamlined fashion, I suggest that you ought to be looking at obtaining some sort of legislative relief so that you have full control over the situation and don't have to deal with my employer's, you know, unfortunate obligation to regulate in this area.

1

MS. HAUGHT JOHNSON: Thank you, Mr. Ryerson.

Allen Payton.

MR. PAYTON: I'm from Antioch. And I wanted to encourage the support for the terminal and the station in Antioch.

EIR 39

No comment sheet or card

We're not as far along as Martinez is in the planning and support of it. Right now we don't have full support of the council, but I think we will in time.

The basic concern of the council is that, since the higher priority is BART from the transit standpoint to Antioch, I want to make sure that the funding source going to be the ferry system doesn't compete with BART. If there is going to be some money coming from the bridge toll increase to BART -- at least proposed at this point -- that it doesn't compete. So, I think there's going to be more than enough money.

1

My understanding is there is a question on the 125 million dollars a year from the bridge toll increase

total. This is -- 665. Assuming the entire funding source for the 665, that's -- over a 20-year period from 2005 to 2025, that's 36 million a year. There should be more than enough money to go around for both, is what I'm thinking, both the terminal in Martinez, Antioch and also the BART extension to Antioch. That's the main concern. 1

But from a timing standpoint, it's great because right now we're in the process of updating our general plan as a city, and we're updating the waterfront plan which has been approved years ago. Not enough has been done about it. One of the key developers interested in doing that right now working with the city says include a ferry terminal in the plan. 2

The other timing aspect that's perfect if this can be done by 2011 right in time with the Olympics, should the Bay Area get that. We're working to try to be part of that aspect. 3

I wanted to pass that along from the timing standpoint.

MS. HAUGHT JOHNSON: Thank you.

Bill Sutherland.

MR. SUTHERLAND: Yes. I'm Bill Sutherland.

I firmly believe that it's inevitable that the water transportation system has to be expanded because

EIR 40

no comment sheet or card

of the congestion on the highways, congestion in the cities, no place to park once you get there. So, that -- I'm sure it's going to happen. It's just when is it going to happen. Hopefully, it'll be soon.

Now would be a very good time. The economy seems to be down. May be available money, less expensive.

Also, kind of a personal note, I ride a bicycle quite a bit, and I know that the ferry boats have very good facilities for bicycles. Every one I've been on. As a matter of fact, I was riding one, there was over a hundred bicycles on it on one boat.

So, there's plenty of space for bicycles on the boats, whereas your ground transportation cannot provide that. They would never be able to handle a hundred bicycles I guess. I don't know how they would do it. 1

So, that's on kind of a personal note for me and my bicyclists.

So, thank you very much.

MS. HAUGHT JOHNSON: Thank you, Mr. Sutherland.

Mr. Bartz.

MR. BARTZ: Yes. Unfortunately, I got here a little bit late, and I didn't get to hear everything

EIR 41

no comment sheet or card

that was said.

My name is William Bartz. I'll give you a little bit different perspective. I actually work on one of the ferries. I work on the Vallejo ferry.

If you've never taken a ferry in to work or taken it into San Francisco just for a pleasure trip, bringing your relatives or friends or family in, you're missing out on something. You eliminate all the headaches, all the heart aches, all the expense, and it becomes just a pleasure trip.

I bring my family down there and -- on my time off. And it's just a great way to go. You have no traffic to deal with. 1

If you can bring that service up here or further up into Pittsburg, Antioch, Rio Vista -- I mean, down into Redwood City -- it really doesn't matter where it goes. The idea is if it goes and that's an alternative means of transportation, you've got to take it. You really have got to take it.

If you haven't tried it before, come down and try it.

MS. HAUGHT JOHNSON: Thanks very much.

Is there anyone else who would like to say anything?

Mr. Bianco?

MR. BIANCO: I said it.

MS. HAUGHT JOHNSON: Okay.

MR. BIANCO: Just so you know that Martinez will be the first phase of this plan.

MS. HAUGHT JOHNSON: (Nods head.)

MR. BIANCO: Put that on the record.

MS. HAUGHT JOHNSON: Okay. If anybody wants -- that didn't feel like getting up and saying anything, but you would like to have your comments recorded, please send us a fax or e-mail so we can get them and we can respond to them.

A couple people had questions before the comments.

Does anyone have any questions of our staff or us?

Was there anything to add to respond?

I don't think so.

I guess there was a gentleman who thought... (unintelligible).

It's actually 10 years. But he's gone. So, he missed it.

Well, thanks very much for attending. I guess the meeting is adjourned.

(Off the record at 8 oh 4 p.m.)

EIR 42 1

no comment sheet or card

2/19/03 asr \28000519 WTA\comment letters\EIR-033-42.cdr

WATER TRANSIT AUTHORITY

SPEAKER CARD

40

EIR 40

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Bill Sutherland

Topic: Available space on Boats for Bicycles is great Crown Transportation does not provide ~~an~~ enough space

Comment: I fully support the expansion of the Water Transportation System. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY 1

SPEAKER CARD

41

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: William F Bartz

Topic: General (Pro Ferry Service)

Comment: There could not be a better way to commute 1

omment sheets are available at the sign-in table for written comments
at can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

38

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Victor Kyerson

Topic: Regulatory constraints

Comment: Need to be certain that legislation is passed to address the current vessel common carrier regulatory authority of the California Public Utilities Commission. 1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

39

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Allen Payton

Topic: Antioch Ferry Station / Terminal

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

36

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Richard Pearson

Topic: City of Martinez

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY 1

SPEAKER CARD

37

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: JOE LUCAS

Topic: APPLAUSE FOR THE JOB THAT'S BEEN DONE

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

34

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Karen Dorantes

Topic: West County Ferry Service

Comment: I would like to point out that Richmond is ready to go & should be first.

1

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

WATER TRANSIT AUTHORITY

SPEAKER CARD

35

Speakers will have 3 minutes to speak.
Please provide a brief description of what you will be discussing today.

Name: Jamie Brown

Topic: Commuter – Pro Ferry

Comment:

Comment sheets are available at the sign-in table for written comments that can be turned in today or mailed to WTA at a later date.

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

EIR 34

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: Karen Dormites Date: 9/26/02

Affiliation (if applicable): Friends of the Richmond Ferry

Address: 112 Bridgeview Court,
Crockett, CA 94525

Topic: water transit in West Contra Costa

Comment: I'd like to see Richmond re-
opened as soon as possible. 1

I am definitely a proponent of
bringing water transit to the
entire Carquinez Strait. 2

Please continue on back side.

Comments should be submitted by **October 31, 2002**

COMMENT SHEET — WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

EIR 35

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: Jamie Brown Date: 9-26-02

Affiliation (If applicable): Martinez local

Address: 1285 Center Ave
Martinez, CA. 94553

Topic: Proposed Ferry Terminal

Comment: Bay Area traffic is absolutely horrendous during rush hour. I usually work from 8AM to 5PM in San Francisco and it is not unusual for me to spend 3 to 4 hours in traffic a day. I sincerely support the proposed Martinez ferry terminal. I believe that a local ferry terminal would provide a safe / cost effective alternative to driving every morning.

1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

COMMENT SHEET

WATER TRANSIT AUTHORITY

Comment sheets may be deposited in the comment box today or mailed to:

EIR 44

Water Transit Authority
IOP Comments
120 Broadway
San Francisco, CA 94111

Fax Comments to: 415/291-3388
Attn: WTA IOP Comments

Email Comments to: email@watertransit.org
Subject Line: WTA IOP Comments

Visit WTA's Web site at www.watertransit.org

Name: JON PRATO Date: 9/28

Affiliation (if applicable): None

Address: 141 Donaleen Court, Marsing

Topic: Economic Impact of Bridge Tolls

Comment: As part of your study on Funding as it relates to Bridge Tolls have any research been done on the impact of Bridge ~~[illegible]~~ crossings during none ~~[illegible]~~ commute hours. Have we seen ~~[illegible]~~ a reduction in non-commute traffic as a result of increased Bridge Tolls 1

Please continue on back side.

Comments should be submitted by **October 31, 2002**

Tristan Bettencourt

EIR 43

From: Wade, Kathy [KAWa@pge.com]
Sent: Tuesday, October 08, 2002 9:29 AM
To: 'email@watertransit.org'
Subject: Draft IOP comments

Dear Water Transit Authority -

I read your report to increase water transit in the bay area. As a regular rider of the Sausalito ferry, I support your efforts. However, it is ironic that your report is coming out just when Golden Gate Transit is cutting several of it's ferry feeder bus runs, including mine. 1

It is impossible to have an effective water transit system without having an infrastructure to get people to and from the ferry terminals. In addition, this infrastructure must allow for flexible travel schedules, or people will never leave their cars. 2

I hope you are coordinating your efforts with Golden Gate Transit, and that you will encourage them not to remove the existing bus routes to and from their existing ferries. When my service is cut, our family will be forced to purchase a second car, and will probably switch from public transit to driving across the bridge every day. Not a desirable option, but Golden Gate Transit is leaving us with no choice. 3

Again, I support your efforts to increase water transit, and want to emphasize that getting people to and from the the ferries is a critical part of your plan's success.

Thank you,

Kathy Wade
431 Green Glen Way
Mill Valley, CA 94941

EIR 10

Tristan Bettencourt

From: j.arnold@fehrandpeers.com
Sent: Monday, September 16, 2002 4:04 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(j.arnold@fehrandpeers.com) on Monday, September 16, 2002 at 16:04:29

---

email: j.arnold@fehrandpeers.com

Name: Jackie Arnold

WTA_Comments: I am working on a county-wide transporation plan for Contra Costa County. I would like to know where the new ferry station is being propsed in Antioch. Thanks for the information it is a big help.
Sincerely,
Jackie Arnold

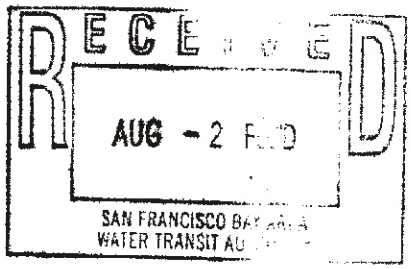
1

SUBMIT: SEND COMMENTS

EIR-11

EIR 11

July 30, 2002



Mr. Tom Bertken
Chief Executive Officer
San Francisco Bay Area Water Transit Authority
120 Broadway
San Francisco, CA 94111

SUBJECT: Meeting Follow-Up, City of Sunnyvale

Dear Mr. Bertken:

Sunnyvale staff would once again like to thank you for your visit to Sunnyvale this past June to brief the Mayor, the Vice Mayor, the City Manager and me on the preliminary findings of the WTA's planning efforts. The meeting was highly informative, and as successful meetings often do, raised a number of additional questions and comments. I'd like to take this opportunity to provide you with feedback to incorporate into the plan that will be released later for public review. My apologies for the lateness of this response, but these comments appear to have been caught in a paperwork "snafu."

Issues/questions from the City range from technical clarifications to broader planning issues:

1. The City is concerned with land use and job assumptions that were used for the modeling effort for the north Sunnyvale Moffett Park and NASA areas. While we understand the need for ABAG "consistency", this can be interpreted in different ways. Sunnyvale staff believe that ABAG numbers may mis-report the location of workers in geographic areas by being based upon employment locations and business license reporting, rather than location of the actual worker. For example, an employer may report 500 employees on a business license, but may have an additional 100 contract employees on site. Also, some agencies do not require business licenses to be held. 1

   Also, while the City generally agrees with the current ABAG forecasts for overall City employment, the allocation to TAZ's conflicts with the City's General Plan. Most new employment in the City will occur in the Moffett Park area, while ABAG forecasts these jobs to be located in the mostly built-out El Camino Real corridor.

ADDRESS ALL MAIL TO: P.O. BOX 3707 SUNNYVALE, CALIFORNIA 94088-3707
For deaf access, call TDD/TTY (408) 730-7501

Differences in model trip generation assumptions can also have an effect on ridership forecasts. Models using MTC trip rates tend to forecast lower than models using ITE rates. Sunnyvale's experience has been that daily trip generation in the industrial areas of the City closely matches ITE rates, and the City's model uses those rates. While we understand the WTA's need for regional model consistency, we ask that WTA planners consider the effects that more detailed and precise forecasting in the areas immediately surrounding potential ferry terminals may have on ridership forecasts. 1

Further, the environmental review and approval process for the NASA/Ames Development Plan is largely completed, and will certainly be complete by the time WTA plans are released. We believe this project should be considered reasonably foreseeable and programmed into the WTA model. 2 We also urge you to discuss the City's Moffett Park Specific Plan and it's potential to increase the number of workers in close proximity to a potential South Bay ferry terminal. 3

The City has recently completed a transportation model and received a consistency finding with regional modeling from the Santa Clara County Congestion Management Program. Sunnyvale urges the WTA to review the City model assumptions for jobs in Sunnyvale and consider referencing the City's distribution. 4

2. City staff initially agree with a phased approach to expanded ferry service. As part of the phasing plan, the City recommends that the WTA conduct an assessment of "Phase II" service requirements, including ferry landing site requirements. 5 Detailed recommendations on priorities for site access/land use/etc. improvements during the "Phase I" implementation period that will facilitate "Phase II" service implementation should be included in the Phase I recommendations. 6

3. From the conversation in the meeting it sounds as though the WTA modified the mode split component of the model based on the results of a public opinion survey. Please provide more detailed information on how mode split was determined, or how the survey results were fed into the model. What was the sample size of the survey? 7

4. How were socioeconomics taken into account in determining mode split? Ferries are a unique service, and rightfully so it sounds as though the WTA has tried to quantify market potential when setting up the ferry model. City staff wonder if a transportation model will best represent the true market potential. Perhaps a separate market survey would be beneficial to the study process? 8

5. Has the modeling methodology been reviewed by regional agencies such as MTC, ABAG, or any CMA's? 9

6. What assumptions were made about fares, and how was this factored into the ridership model? 10

7. The City urges the WTA to actively participate and influence planning for the Cargill ponds restoration, so as not to preclude potential future ferry landing areas. 11

8. What travel time assumptions were made for the South Bay/San Francisco ferry service? 12

9. The City encourages the examination of a range of ferry technologies that can address varying landing requirements, e.g. shallow water, etc. 13

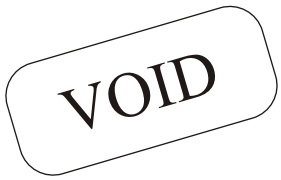
10. The City looks forward to working with the WTA to promote consideration of increased federal funding for ferry service. Please contact Dieckmann Wolfe, Transportation Planner at (408) 730-2713 or email at diwolfe@ci.sunnyvale.ca.us to coordinate the City's involvement.

Once again we very much appreciate the personal visit and the information that was presented to the City. We look forward to continued participation in this important regional effort.

Sincerely,

Jack Witthaus
Transportation and Traffic Manager

cc: City Manager
Director of Public Works
Lisa Klairmont, WTA


VOID

EIR 13

August 19, 2002

San Francisco Bay Area Water Transit Authority
Thomas Bertken, Chief Executive Officer
120 Broadway
San Francisco, CA 94111

Attn: Steve Castleberry, System Planning Manager

RE: **Sunnyvale Comments Regarding the Administrative Draft of the WTA Implementation and Operations Plan**

Dear Mr. Bertkin,

Sunnyvale City Staff would like to thank you for the opportunity to review the administrative draft of the San Francisco Bay Area Water Transit Authority (WTA) Draft Implementation and Operations Plan (IOP). We have appreciated the level of local agency involvement that has been encouraged throughout the development of this plan and the Programmatic Environmental Impact Report. Because of this involvement many of Sunnyvale's initial concerns have been addressed.

However, Sunnyvale has a policy to support the concept of a water transit system that serves Sunnyvale. Consequently, we urge the WTA to incorporate a more specific long-term strategy into the IOP for the planning and analysis of future ferry terminal locations that become viable due to land use and ground transportation related improvements.

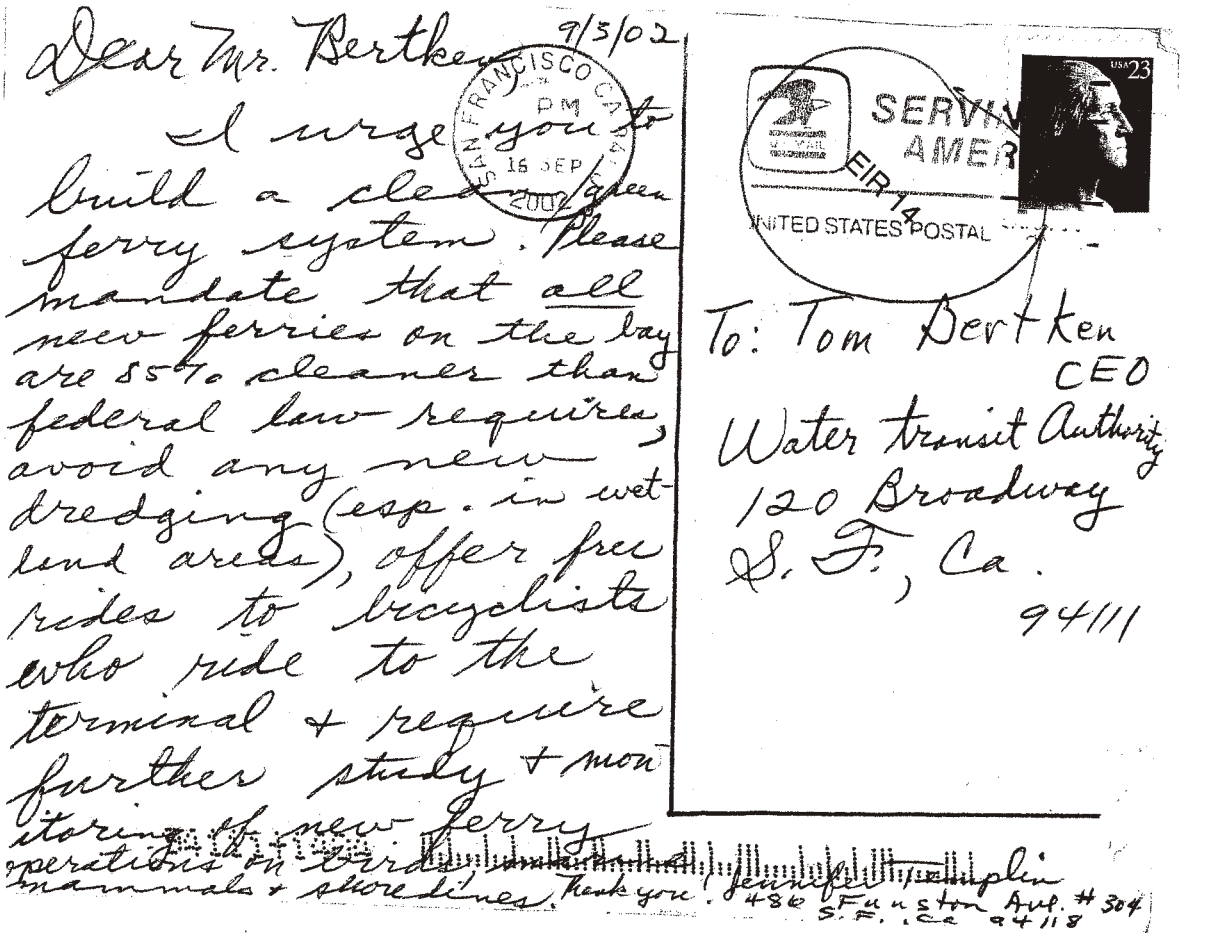
Moffett Field and the Sunnyvale Moffett Industrial Park are both in the process of going through large scale land use and transportation changes that have not been incorporated into the rider-ship projections in the IOP. The City of Sunnyvale feels that when these land use and transportation plans have been finalized, the rider-ship projections could be significantly different. If that is in fact the case, we would like to assure that the reevaluation of a Moffett Field or Sunnyvale ferry terminal location, and other locations in similar situations, would be analyzed in the future as part of the implementation and operations plan. 1

Thank you very much for your consideration of this request. Please me at 408-730-7330, or Dieckmann Wolfe of my staff at 408-730-2713 with any questions or comments.

Sincerely,

Jack Witthaus
Transportation and Traffic Manager

CC: Julia Miller, Sunnyvale Vice Mayor; Robert S. LaSala, Sunnyvale City Manager; Marvin A. Rose, Director of Public Works



Dear Mr. Bertken 9/5/02

I urge you to build a clean, green ferry system. Please mandate that all new ferries on the bay are 85% cleaner than federal law requires, avoid any new dredging (esp. in wet-land areas), offer free rides to bicyclists who ride to the terminal + require further study + monitoring of new ferry operations on birds, marine mammals + shorelines. Thank you.

Jennifer Templin
486 Funston Ave. #304
S.F., Ca 94118

SAN FRANCISCO CA
PM
16 SEP
2002

SERVING AMER
EIR 14
UNITED STATES POSTAL

USA 23

To: Tom Bertken
CEO
Water Transit Authority
120 Broadway
S. F., Ca.
94111

1

2

3

4

EIR 15

Tristan Bettencourt

From: Tom Bertken [bertken@watertransit.org]
Sent: Tuesday, September 17, 2002 2:35 PM
To: Tristan Bettencourt
Subject: Fw: Ferry System

For IOP and EIR comments
----- Original Message -----
From: Robert Kevess
To: bertken@watertransit.org
Sent: Tuesday, September 17, 2002 12:06 PM
Subject: Ferry System

Dear CEO Bertken,

I am writing to you about my concerns re: the proposed expanded ferry system on the bay.

I urge the Water Transit Authority to do everything it can to assure that expanded ferry service does not pose any new environmental hazards. Please mandate that all new ferries on the bay are at least 85% cleaner than federal law requires; exclude important wetland sites, including Port Sonoma, Moffett Field, and Berkeley's Gilman site; avoid any new dredging, especially in wetland areas; minimize new parking lots, and charge daily fees at any that are built; recommend only cost-effective routes that don't steal riders from BART or buses; offer free rides to bicyclists who ride to the terminals (not drivers!); require further study and monitoring of new ferry operations on birds, marine animals, and shorelines. 1, 2, 3, 4, 5, 6,7

Thanks for considering these requests,

Sincerely,

Robert Kevess MD
6660 Dana St.
Oakland, CA 94609

Tristan Bettencourt

From: Steve Castleberry [castleberry@watertransit.org]
Sent: Wednesday, September 18, 2002 5:51 PM
To: 'Tristan'; ian_austin@urscorp.com; jeff_zimmerman@urscorp.com
Subject: FW: Question on Alternatives, Emissions

EIR 16

Tristan - can you log this as a comment.

Ian/Jeff, can you easily locate the spreadsheet that details the model runs for each of the altenratives. Is it in the appendix?

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: Teri Shore [mailto:tshore@bluewaternetwork.org]
Sent: Wednesday, September 18, 2002 3:55 PM
To: castleberry@watertransit.org; ian_austin@urscorp.com
Cc: sanchez@watertransit.org; bertken@watertransit.org
Subject: Question on Alternatives, Emissions

Dear Steve and Ian,

1. Please clarify whether the existing ferry fleet emissions in Alternative 4 are included in the ferry emissions tallies in the other alternatives.] 1

2. What are the total emissions for Reduced Alternative 2 with SCR and PM traps (ferry, bus and car) after mitigations, and how does it compare to the other alternatives?] 2

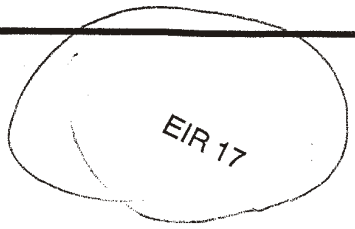
If this is contained in the EIR or any of the tables or appendices, please direct me. I cannot find the bus and car emissions from Reduced Alternative 2, only from the full alternative 2. It seems that bus and car emissions would decrease along with ferry emissions since there are fewer terminals.

Thank you, I would appreciate a response at your earliest convenience.

Teri Shore

****
Teri Shore
Campaign Director, Clean Vessels
Bluewater Network
311 California St., Suite 510
San Francisco, CA 94104
415-544-0790, ext. 20
fax 415-544-0796
www.bluewaternetwork.org
****

Tristan Bettencourt



From: Steve Castleberry [castleberry@watertransit.org]
Sent: Friday, September 20, 2002 8:59 AM
To: 'Tristan'
Subject: FW: clean, green ferry system

Please add to the EIR comment file.

Steve Castleberry
Water Transit Authority
120 Broadway
San Francisco, CA 94111
415-291-3377
415-291-3388 fax
castleberry@watertransit.org

-----Original Message-----
From: Heather Woods [mailto:hrwoods@earthlink.net]
Sent: Thursday, September 19, 2002 9:46 PM
To: castleberry@watertransit.org
Subject: clean, green ferry system

To San Francisco Bay Area Water Transit Authority:

I am writing to urge you to make sure the expanded ferry system does not create more pollution to our water and air. Please mandate that ferries are 85 percent cleaner than federal standards; fund low-emission demonstration vessles; exclude wetlands sites; avoid new dredging; offer bicyclists free rides; recommend only cost-effective routes; and require whale observers on fast ferries.] 1] 2] 3, 4, 5] 6, 7

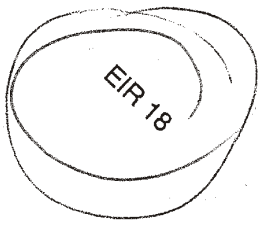
Let's make the system benefit the total Bay Area environment, not just take cars off the freeways.

Sincerely,
Heather Woods
642 Menlo Park, CA 94025

p.s. I do NOT wish to receive EIRs, etc.

Tristan Bettencourt

From: mullin@ssf.net
Sent: Monday, September 23, 2002 12:59 PM
To: email@watertransit.org
Subject: WTA Feedback



Below is the result of your feedback form. It was submitted by (mullin@ssf.net) on Monday, September 23, 2002 at 12:58:31

---

email: mullin@ssf.net

Name: Gene Mullin

WTA_Comments: Concerns focus on lack of direct link to Peninsula from East Bay as part of the study area. I speak as Mayor of SSF and 19th AD Democratic nominee. My sense is that there is suficient potential traffic to so warrant, and wonder how current passenger data is. 1

SUBMIT: SEND COMMENTS

EIR 19

Tristan Bettencourt

From: pmeier@spiholdings.com
Sent: Friday, September 27, 2002 2:01 PM
To: email@watertransit.org
Subject: WTA Feedback

Below is the result of your feedback form. It was submitted by
(pmeier@spiholdings.com) on Friday, September 27, 2002 at 14:00:31
---

email: pmeier@spiholdings.com

Name: Peter Meier

WTA_Comments: I am writing in support of the Bay Area Water Transit Plan. I am particularly interested in bringing bay transit ferry service to Port Sonoma. The Marin County corridor can not accommodate the daily traffic and alternatives are needed for several socially prudent reasons. 1

SUBMIT: SEND COMMENTS

EIR 20

Steve Castleberry

From: Teri Shore [tshore@bluewaternetwork.org]

Sent: Friday, September 27, 2002 9:41 AM

To: castleberry@watertransit.org; culnane@watertransit.org; ian_austin@urscorp.com; cmkesson@jjma.com

Cc: sanchez@watertransit.org; bertken@watertransit.org; Russell Long

Subject: Questions on ferry emissions calculations

Dear Steve and EIR team,

In order for Bluewater Network to make the best possible comments on the EIR air quality segment, Russell and I could use your assistance in clarifying some of the calculations and conclusions contained in the EIR document. Your prompt response to the following quesitons would be very much appreciated:

1. Marine emissions comparisons
Questions refer to Air Table in the EIR Appendices titled "Summary of Marine Emissions for the No Project and "Reduced" Alternative 2 Project Scenarios Assuming Diesel Engines with SCR" 1
a. As labeled, this would indicate that the calculations on this chart are for marine emissions only, is that correct?
b. Why is the decrease in Nox emissions in pounds per day only 21 percent when SCR technology provides 80 to 90 percent or more in NOx reductions? 2
c. Why is the decrease in PM emissions only 60 percent when PM traps typcially provide a reduction of 80 percent or more? 3
d. Why is the increase of SO2 so high, about 9X higher? (For example, Is this a byproduct of using the SCR or PM traps? Or increased consumption of fuel due to increased number of vessels or as a result of the added weight of the SCR?) 4
e. Why is the increase of CO emissions so high, about 6 times higher? 5
f. Why are VOCs three times higher? 6

2. These questions pertain to Table 3.6-6 Emission Estimates for Year 2025 No-Build vs Alternative 2 (lbs/day)
a. Under ferries, the column titled "Reduced Altnerative 2 with sCR and PM traps" reflects the same emissions reductions and increases for the fleet as the above. So we have the same questions for this column as questions A through F above. 7-12
b. What are the total emissions from ferries, buses and cars for Reduced Alternative 2? (It seems that only ferry emissions are calculated for Reduced Alternative 2.) 13
c. What are the total emissions increases or decreases for cars for Reduced Alternative 2 compared to no-build alternative 4. 14
d. What are the total emissions increases or decreases for buses for Reduced Alternative 2 compared to no-build alternative 4. 15
e. What are the total VMTs, increases and decreases, for Reduced Alternative 2 compared to the no-build alternative 4. 16

3. Additional Emissions Questions and Requests
a. Please provide Per Passenger Mile calculations for emissions for at least Reduced Alternative 2 for ferries, cars, buses separately and IN TOTAL compared to no-build Alternative 4.

(This should really be done for all the alternatives, as requested in the environmental scoping sessions as this is a standard way to compare emissions for public transport. However, realizing the tight timeframe and the fact that the IOP calls for a system similar to Reduced Alternative 2, the calculations for this one alternative would be the most important.) 17

3. Please provide ferry, bus, car and TOTAL emissions calculations for the Proposed IOP plan, since it is not represented in any of the EIR Alternatives.

Please note that the Reduced Alternative 2 does not include Redwood City or South San Francisco, which are proposed routes. The addition of these routes to the calculations could have a significant impact on the total emissions and air quality impacts of the ferry system as proposed. We need as true an emissions picture as possible to provide meaningful comments. 18

4. What type of diesel fuel were the emissions calculations in the EIR for ferries based on? (CARB diesel, which will be required as of January 2003? Or was it based on ultra-low sulfur diesel, which is expected to be required by CARB in the near future? Or standard non-road diesel?) 19

5. What ridership models were used to calculate the emissions and VMT? Were they the same ridership models used in the IOP? (ie, were these the ridership projections based on the new market data or some other assumptions, such as full boats, half-full boats or ????) 20

Please let Bluewater Network know when you might be able to respond or if you cannot. Thank you very much for your assistance and patience.

Sincerely,

Teri Shore

****

Teri Shore
Campaign Director, Clean Vessels
Bluewater Network
311 California St., Suite 510
San Francisco, CA 94104
415-544-0790, ext. 20
fax 415-544-0796
www.bluewaternetwork.org

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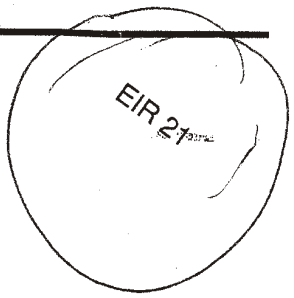
Tristan Bettencourt



From: Mary Frances Culnane [culnane@watertransit.org]
Sent: Thursday, September 26, 2002 10:00 AM
To: Tristan Bettencourt
Subject: FW: WTA Proposals

Comment on IOP...the Boats...

-----Original Message-----
From: Bailey, Andrew [mailto:Andrew.Bailey@babcockbes.co.uk]
Sent: Thursday, September 26, 2002 9:44 AM
To: culnane@watertransit.org
Subject: RE: WTA Proposals

Great, I am so glad you are opting for HSC Code, from a personal and ethical point of view, it would be a retrograde step to offer US travelling public a lower level of safety than exists elsewhere in the world and so can be easily achieved.

I also supsect that if an accident occurred questions would be asked as to why the HSC Code was not used. 1

A very couragious decision I know, which will not please everyone bidding, but definitely the right one. They'll build a statue in your honour yet!

Thanks for the info.

Andrew Bailey C.Eng MRINA MIESIS ASNAME
Director - Technical Business Development and Sales
FBM Babcock Marine
TEL: 02380 210008
FAX: 02380 210001
andrew.bailey@babcockbes.co.uk

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Telephone: +44 (0) 1383 412131
Website: www.babcockbes.co.uk
****

EIR 22

EIR 22

September 24, 2002

Mr. Tom Bertken, CEO
San Francisco Water Transit Authority
120 Broadway St.
San Francisco, CA 94111

RE: Programmatic EIR, BAAQMD analysis

Dear Tom,

As we discussed informally at the EIR public hearing on September 17, the Bay Area Air Quality Management District has not yet completed an independent comparison of air quality impacts between an expanded ferry system and other transportation modes for the WTA programmatic EIR as required by WTA's authorizing legislation (SB428). As you confirmed, the legislation requires that the air district analysis be included in the programmatic EIR. The independent analysis will provide decision-makers, concerned stakeholders and the public with an important perspective on the proposed ferry expansion.

We believe that to fulfill the mandates of SB428, the BAAQMD report should be produced and released for review as part of the draft programmatic EIR before the end of the public comment period on October 31. If the report comes out after the public comment period, it will not be timely and the programmatic EIR will fall short of the authorizing legislation's intention to provide the best possible information for decision making.

1

We realize that the draft programmatic EIR compares the air quality impacts of a no-build alternative to various sized ferry systems in 2025 based on trips and vehicle miles traveled. The WTA's analysis shows a decrease in some emissions, increases in others, and a minimal reduction in total VMT. This assumes that trips will continue to be made in the about the same way by car, bus and ferry.

However, the EIR does not compare the air quality impacts of a new ferry system to an alternative public transit system such as express buses, which was requested

2

311 California, Suite 510 ~ San Francisco, CA 94104
T: 415.544.0790

BLUEWATER NETWORK

www.bluewaternetwork.org ~ bluewater@bluewaternetwork.org
F: 415.544.0796

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by several environmental groups during the scoping meetings on the EIR. Such an analysis may prove beneficial in evaluating the air quality characteristics of different transit modes. 2

We urge the WTA to work with BAAQMD to ensure that the mandated air quality analysis is completed and released for public review before the October 31 deadline because the results could affect public comment on the draft programmatic EIR. If it is not available by that date, then we request that the public comment period for the draft programmatic EIR be extended until the analysis is completed and made available for public review. The draft programmatic EIR will simply be incomplete without it. 3

Thank you for your attention and consideration.

Sincerely yours,

Teri Shore

Teri Shore
Clean Vessels Campaign Director

CC: Tom Perardi, Director of Planning, BAAQMD
David Burch, Senior Planner BAAQMD
Steve Castleberry, WTA
Veronica Sanchez, WTA

EIR 23

September 23, 2002

Water Transit Authority
120 Broadway
San Francisco, CA 94111

Attn: Steve Castleberry

Dear Mr. Castleberry:

I am writing to comment on the Draft EIR for the "Expansion of Ferry Transit Service in the San Francisco Bay Area" with its possibility of a ferry terminal at the foot of Gilman here in Berkeley. As a houseboat resident in the Berkeley Marina, the idea of a ferry service within easy walking distance is very attractive. However, the attraction of the convenience is far outweighed by the potential impact on the bird life of the area.

Year round, but particularly in the fall, winter and early spring the area supports large number of water birds who have migrated from further north in order to winter on the Bay. There is also a significant amount of tidal marsh that would be impacted by the ferry and its terminal and would have a negative impact on the endangered California Clapper Rail. 1

As you have no doubt guessed, I'm a birder. I track the comings and goings of the birds in this area year round, and I am very concerned that the EIR reflect adequately and completely the impacts on the bird life in the area.

Thank you for your attention.

Sincerely,

Dorothy D. Gregor

Dorothy D. Gregor
201 University Ave. H6
Berkeley, CA 94710-1618

Sept. 23, 2002

EIR 24

Dear Tom Bertken,

I urge the Water Transit Authority to build a clean and green ferry system. 1

Please mandate that all new ferries are at least 85% cleaner than federal law requires. 2

Exclude wetland sites. 3

Avoid dredging. 4

Minimize parking lots and increase public transit. 5

Offer free rides to bicyclists who ride to the terminal (not drivers). 6

And make sure routes are cost-effective. 7

Please update me on future developments.

Thank you.

Margaret Pratley

Margaret Pratley
2322 Shattuck #204
Berkeley, CA 94704

FAX TRANSMITTAL

PAM
PUBLIC AFFAIRS
MANAGEMENT

FROM: Dawn Schellenberg
EXT: 22

EIR 25

DATE: September 30, 2002	NO. PAGES (INCLUDING COVER):
PROJECT NAME: WTA Public Relations	
PAM REFERENCE NO.: 1575.1	

TO: NAME	COMPANY	FAX
Steve Morrison	WTA	291-3388
Tristan Bettencourt	WTA	291-3388

SUBJECT

EIR Public Hearing 1st Transcript

REMARKS

I will mail the original to Tristan's attention.

If you do not receive all pages, please call 415.227.1100. Our FAX Number is 415.227.1110

WATER TRANSIT AUTHORITY

PUBLIC HEARING REGARDING THE

DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT REPORT

ORIGINAL

Metropolitan Transportation Commission Auditorium

101 Eighth Street

Oakland, California

TUESDAY, SEPTEMBER 10, 2002

ATKINSON-BAKER, INC.
CERTIFIED SHORTHAND REPORTERS
5 Third Street
Suite 625
San Francisco, California 94103-3202
(800) 288-3376

REPORTED BY: VALERIE E. JENSEN, CSR NO. 4401

FILE NO.: 9C053F6

PUBLIC COMMENTS

(On the record at 5:01 p.m.)

MS. JACKSON: Hi. My name is Jennifer Jackson, and I'm just a citizen.

And I just would like to encourage you to definitely take a look at the impacts of the fuel that you'll be using on the areas where the terminals will be -- particularly for wetland areas -- and try to look at fuel cell technologies and really encourage the Federal government to give you that grant that is noted on the sheet that I was looking at.

And, also, to look at how to improve the bike-to-ferry and ferry-to-bike linkages. I'm a bicycle commuter, and the ferries are fairly inaccessible in a lot of areas as they are right now.

And then also to encourage more bikers than -- to maybe give them a discount or not charge for their bicycles, because I know some of the ferry companies do charge to bring your bike on ferries.

So, that's it. Thanks.

MR. STRUMWASSER: Thank you very much.

(Off the record at 5:04 p.m.)

1

2

3

4

5

REPORTER'S CERTIFICATION

I, VALERIE E. JENSEN, C.S.R. No. 4401, Certified Shorthand Reporter, certify:

That the foregoing proceedings were taken before me at the time and place therein set forth;

That the proceedings were recorded stenographically by me and were thereafter transcribed;

That the foregoing is a true and correct transcript of my shorthand notes so taken.

I further certify that I am not a relative or employee of the participants, nor financially interested in the matter.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated this 18th day of September, 2002.

Valerie E Jensen

VALERIE E. JENSEN, C.S.R. No. 4401

REPORTER'S CERTIFICATE OF CERTIFIED COPY

I, VALERIE E. JENSEN, C.S.R. No. 4401, Certified Shorthand Reporter in the State of California, certify that the foregoing pages 1 through 3 constitute a true and correct copy of the original proceedings taken on September 10, 2002.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Dated this 18th day of September, 2002.

VALERIE E. JENSEN, C.S.R. No. 4401

Tristan Bettencourt

EIR 26

From: Mary Frances Culnane [culnane@watertransit.org]
Sent: Monday, September 30, 2002 10:28 AM
To: John Lee
Cc: Chris Weaver; Tristan Bettencourt; Steve Morrison
Subject: RE: WTA's draft IOP


Weaver Pres 07-09-02.ppt


Emission Data Report.pdf

John,
The detailed info you are requesting was presented at a Technical Advisory Committee meeting 09 July 2002. I'll forward same plus Chris .pdf report. I don't think we have all the data you requested, like time of rebuilds; but, I'll send what we possess.
I put figure 23 together as NOx, PM and HC are the "big three" pollutants that we looked at when performing emission testing. The actual are our actual emission testing results. The published are engine manufacturer's published results. These aren't the "total emissions" considered in the EIR as you may realize during your review of same.
I'll also forward your questions - as all questions are deemed comments - to the IOP staff.
Mare
-----Original Message-----
From: John Lee [mailto:jlee@arb.ca.gov]
Sent: Monday, September 30, 2002 9:45 AM
To: Mary Frances Culnane; Chris Weaver
Cc: Paul Milkey
Subject: WTA's draft IOP

Hello.
I have a few questions regarding Figure 23 in the draft Implementation and Operations Plan (IOP). Who put this figure 23 together? Why were these particular "Actual" emissions chosen? Where did the "Published" emissions come from and which test cycle are they based on? 1
Chris, can I get a more detailed list of the engines in the ferries, complete engine model identification, year of manufacture, date of recent rebuild, and where you acquired the BSFC data? Please call or email. Thanks. 2
--
==========
John Lee
Air Resources Engineer
916-327-5975
==========

For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.arb.ca.gov.

Tristan Bettencourt

From: lelef@aol.com
Sent: Sunday, September 29, 2002 8:08 PM
To: email@watertransit.org
Subject: WTA Feedback

EIR 27

Below is the result of your feedback form. It was submitted by (lelef@aol.com) on Sunday, September 29, 2002 at 20:07:38

---

email: lelef@aol.com

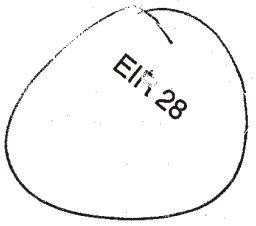
Name: lele forood

WTA_Comments: Has an SF system of transportation along the waterfront like the vaporetto in Venice been explored? With stops like Crissy Field, Marina, Ghirardelli, Pier 39, Market St. etc all the way around to Pac Bell Park and farther perhaps if appropriate. Just wondered. 1

SUBMIT: SEND COMMENTS

Tristan Bettencourt

From: Clem Molony [cmolony@lyngsogarden.com]
Sent: Wednesday, October 02, 2002 2:35 PM
To: 'email@watertransit.org'
Cc: Mike Giari (E-mail); Dick Dodge (E-mail); 'dhoward@redwoodcity.org'
Subject: Comment on 10/1 public hearing in SSF.



To the WTA,

I attended the presentation and hearing last night at South San Francisco.

Thank you for explaining the potential ridership numbers who will leave their cars behind, the costs of the system expansion, how the funding must be from new sources, and the environmental issues. I also noted in your summary of the Operations Plan that demand for water transit will be driven by a 30% increase in travel in the region soon, and that the WTA plan will deliver operating costs per seat that are comparable to rail and bus services. 1

Some thoughts:

1. Refering to your management approach as designed to produce the Southwest Airlines of ferry service may emphasize your frugality and profit potential, but their flights are hell to ride. If the ferries are that crowded, noisy, uncomfortable, and stressful, many many many people will choose not to ride them. I never take SW Air -- it is not worth the aggravation. 2

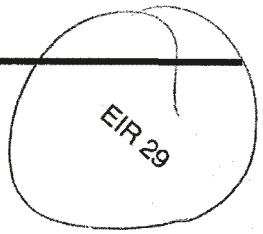
2. In seeking to find new funding, talk to San Mateo County Transit District senior manager Howard Goode (and Rich Gordon one of the county supervisors) about getting some funding for WTA included in the Measure A list of funded projects for the re-passage of Measure A in the next few years. 3

3. I support ferry service to Redwood City, and from the east bay to the Peninsula. 4

Clem Molony

Secretary of the Seaport industrial Association
19 Seaport Blvd., Redwood City, CA 94063

Tristan Bettencourt



From: margolies@mac.com
Sent: Wednesday, October 02, 2002 10:27 AM
To: email@watertransit.org
Subject: IOP Comments

Below is the result of your feedback form. It was submitted by (margolies@mac.com) on Wednesday, October 2, 2002 at 10:27:05

---

email: margolies@mac.com

Name: michael margolies

IOP_Comments: I just want to add my support for a ferry in Antioch. I both enjoy riding the ferry and would welcome the added choice it offers to the commuters forced to deal with hwy 4. Even when 4 is widened it will not support all the growth in the area. A ferry system would mean so much to the development of the river front and improve our community in every way. And the ferry is more relaxing and comfortable than Bart which may never be built to the satisfaction of the Tr-City areas of Antioch Oakly, and Brentwood. 1 2 3

I would be glad to offer my time to support this effort in any way I can.

SUBMIT: SEND COMMENTS

SCTLC

SONOMA COUNTY TRANSPORTATION & LAND USE COALITION

October 1, 2002

EIR 30

Water Transit Authority, EIR Comments
120 Broadway
San Francisco, CA 94111

The Sonoma County Transportation Land Use Coalition has advocated for twelve years for rail startup and multimodal approaches to transportation planning. We have examined the EIR on a water transit approach to Bay Area transportation solutions. We are in favor of the recommended first phase of the plan putting ferries on the Bay and the study of the second phase. 1

The second phase of the plan, to study a San Quentin and a Port Sonoma site, leads us to favor San Quentin or a site south of San Rafael connected to a railroad. 2

A rail connection to Port Sonoma would not function for Sonoma County because population projections cannot support a train with the only destination being the ferry. 3 North-south trains between Cloverdale and San Rafael would not satisfy riders if they were delayed for half an hour while passengers were delivered to the ferry. 4

A ferry south of San Rafael, contiguous with a railhead, would have a rider catchment area of all of Sonoma County and most of Marin County including its two largest cities. Enough riders would allow multi destination ferries compared to a one destination ferry serving Port Sonoma. 5

The Coalition emphasis has been on transit oriented development in Sonoma within incorporated areas. All stations in Sonoma County are within incorporated cities. Port Sonoma is encircled by wetlands, open space, and farmland, with no urban services. The growth stimulation and impact on land use of a Port Sonoma ferry terminal and parking lot would affect all of the South County. A long time policy of Sonoma County is to preserve South County agriculture and open space. 6

Sincerely,

Joel Woodhull

Joel Woodhull
Chair, SCTLC

EIR 221

EIR 221

Tristan Bettencourt

From: corinnelouise paff [corinnelouisedesign@yahoo.com]
Sent: Thursday, January 30, 2003 1:52 PM
To: castleberry@watertransit.org
Cc: bettencourt@watertransit.org; N.laforce@attbi.com; afeinstein@goldengateaudubon.org
Subject: proposed expansion of ferry transit service to gilman street/north basin and other berkeley waters

To: WTA, Steve Castleberry, and other concerned parties

> The EIR and IOP for the proposed ferry transit service expansion to Berkeley waters, especially plans for a terminal at Gilman Street, fails to address the immediate and cummulative negative impacts that installation of such a structure and accompanying activity will have on wildlife that utilizes the rocky shore and waters of the North Basin.
> > In addition, the Plan is inadequete regarding protection of specific Species of Special Concern and Federally Endangered Species that reside and utilize this area. Failure to properly protect the habitat and these species is in contradiction to the requirements of CEQA regulations.

> > The State Parks Commission, U.S. Fish and Wildlife Services, and California Department of Fish and Game have been notified of the protected species.

> > The North Basin waters is under the jurisdiction of
Eastshore State Park, whose mandate is to protect wildlife; the ferry service plans intrude into this, and ignores the fact that any activity in an area of protected species is subject to protection requirements. 1
> >
> > Protected species endangered by the expansion of ferry transit service plans, because of direct disruption by ferry itself, such as problems from frequent and repeated wake action, or impacted by ferry expansion because of disruptions to habitat by increased traffic and human activity to get to area:

> > 1. Double Crested Cormorant, California Species
> of Special Concern, utilize the Basin waters for feeding and resting for many months of the year
> > 2. California Least Tern, Federally Endangered
> > Species, breeds nearby, and utilizes the Basin waters for foraging for themselves and young.
> > 3. Northern Harrier nest in the Berkeley Meadow almost at the water boundary and forage throughout the meadow... increased traffic/activity will negatively impact them, perhaps to the point of disrupting and finally discouraging courting, nesting, breeding, and raising young there.
4. White Tail Kites court and forage in the meadow, and have been known to nest there... the same problems exist for them as for the Northern Harriers.
> >

Some of the Migrating waterfowl threatened by the Ferry Plans:
> >
> > 1. Scaup, whose populations are in continent-wide
> > decline, and who reside, feed, rest, and sleep in
> > great numbers (hundreds at a time)
> > 2. Ruddy Ducks; many rafts numbering in the
> > hundreds can be seen through out the fall, winter, and spring... some continue their migrations after
> > crucial stopovers for food and rest after journeys of thousands of miles; some remain in the area for the season.
> > 3. Surf Scoters, whose populations are suffering
> a world=wide decline, dive for food and rest in the North Basin and Marina waters fall through spring.
> > 4. Western Grebes, Clark's Grebes, Pied Billed
> > Grebes, Horned Grebes, Eared Grebes also migrate here and use the waters, while Western Sandpipers, Least
Sandpipers, Whimbrels, Curlews, Godwits, Dowitchers,
> > Stilts, Willets, Yellowlegs, Black Turnstones,
> > Ruddy Turnstones migrate here and use the shore
> > and rocks at lower tide times.
> >
> > These birds will suffer negative impact from
> the Ferry Plan. Hundreds of birds have been
> flushed by as few as one kayak. These and other water
> sport activities will interfere with crucial feeding,
rest, and recuperation needs. The intensity of disruption from ferry wakes and frequency of service will supercede and compound those by kayak or boat. If there is consistant disruption, survival can be effected. How frequent and wide a width of flush will result in permanent departure of rafting ducks?
> >
> > I urge you to cease and desist from
> > implementing this harmful and poorly conceived
> > water usage plan.
> > > >
> > > > Thank you for your consideration.
> > > > Sincerely,
> > > > Corinne Greenberg, M.A.
> > Environmental Educator
> > Sierra Club and
Golden Gate Audubon Society
> > Conservation Committee Member
> > > > > > ,
> > > > > >
> > > > >
> > _____
> > > > > > Do you Yahoo!?
> > > > > > Yahoo! Mail Plus - Powerful. Affordable.
> > Sign
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> > > > > Yahoo! Mail Plus - Powerful. Affordable.

2

3



EIR 222

San Francisco Tomorrow

Since 1970, Working to Protect the Urban Environment

RECEIVED
JAN 31 2003
SAN FRANCISCO BAY AREA WATER TRANSIT AUTHORITY

January 29th, 2002

Water Transit Authority
150 Broadway
San Francisco, CA 94111

Re: Comments on Draft Program Environmental Impact Report on Expanded Ferry Service in the San Francisco Bay Area.

Dear Commissioners:

San Francisco Tomorrow is pleased to offer the following comments on the Draft EIR for the Water Transit Authority's Ferry Service Plan, as well as the proposed Implementation and Operations Plan. These comments are meant to supplement the public comment already offered at two public hearings.

One general note on the EIR; we recommend that the tables in each chapter be placed in proximity to the descriptive text. Bunching all of the tables at the end of the chapter makes it difficult to relate facts to the narrative. 1

Alternatives

In order to accurately compare the relative impacts and benefits of ferry service, an alternative transit option should be studied that uses existing and new foreseeable *land* transit options to cover the same routes. 2 Alternatives that just look at different levels of ferry service are not effective comparisons. 3 Also, since the ferry system will be competing with other transit services for capital and operational funding, it is appropriate to compare the effectiveness of this service with other forms of transit that can carry the same ridership. For instance, in the IOP, the cost effectiveness of the ferry system is compared with various capital projects around the Bay Area. 4 But virtually all of the ferry routes in the plan have a terminus in San Francisco, where an abundance of transit alternatives exist which could be expanded with much less capital investment. The major transit alternative to ferry service is, in most cases, Bart. Would Bart require additional capital investment to handle these customers? Would AC Transit require new equipment and new routes? The Metropolitan Transportation Commission expressed concern that this project would divert capital and operational funds from MTC projects. 5 Analyzing a transit alternative could allay these fears.

2.4 Terminal Function and Design

The IOP states that the new terminals will be designed as a sort of modular unit, with the same basic design to be fit into different locations. But although the EIR states that design work has 6

been done, no information on the design, the footprint, or relative features are included in this document. Since this is a standardized design intended to help streamline the approval process, it is appropriate and necessary to include more information about its design features and impacts in this programmatic document. 6

Dredging

A list of possible sites for beneficial reuse of dredge material is shown in Table 3.1-4, but no projected volumes for the amount of dredge material each site could accept is included. Also, landfills are noted as sites for dredge material - but what constraints are they operating under? There must be some number for the volume of dredge material that the landfills can accommodate. And if these landfills are to be listed as possible dredge material sites, this EIR must also list the possible sites at which dredge material can be located during the drying process. 7

Mitigation D.1-1 is faulty, because it state that the LTMS target volume is sufficient mitigation for the amount of dredge material. How can that be? If you build a route, but can't dredge it, the route can't be used. The amount of dredge material produced by this project is a large percentage of the target volume, so it is conceivable that dredging will regularly have to be postponed at some sites to accommodate the target volumes. What impact could that have on ferry service? What other dredge projects could be impacted if ferry routes are given preference? Is it possible in such circumstances that necessary dredging will be done and the dredge material placed at a land site until it can be disposed of? Again, possible storage sites for dredge material need to be included. 8

Impact D-4 is incomplete. Although this is a programmatic EIR, the impact of dredging activities on marine life is an extremely important issue which is barely mentioned here. There should be table of what species are likely to be impacted, whether any of those species are considered endangered, and what general BMPs could be used to mitigate the impacts. 9

I see no mention of the sustenance fishing that occurs on the shoreline throughout the Bay Area. Are any of these dredge sites adjacent to areas where sustenance fishing occurs? Will any dredging activities impact fish that are consumed by sustenance fishermen? 10

Water Resources

Impact W-1 is incomplete. A major concern of environmental organizations about the ferry plan is the fact that it will bring more cars to the Bay shoreline and increase the amount of polluted runoff and air pollution entering the Bay. Nothing is done to address these concerns in this document. There is no information about the amount of runoff that would occur at the sites of the new ferry terminals and parking lots, nor is there information about the likely pollutants contained in that runoff. Since information is already available about the building design and the 11



San Francisco Tomorrow

Since 1970, Working to Protect the Urban Environment

amount of parking that would be required, there is no reason why that information can't be supplied in this document. In addition, the examples of BMPs listed on Page 3.4-19 seem to apply only to construction runoff, not operational runoff. We would suggest looking at more progressive and aesthetically pleasing BMPS for the sites - such as creating stormwater wetlands at appropriate locations, routing rooftop runoff directly to the Bay or to the wetlands, and/or building vegetated swales in and around parking lots to carry and treat runoff 11

Biology

Please expand the discussion of mitigation B-1.1. Is the "Goals Project" a list of wetlands restoration sites that the project would pay money to in proportion to the amount of habitat lost to construction of the terminals? And is such mitigation generally done on an acre-to-acre basis? In the general wetlands mapping that was done for this document, did it appear that any access roads might have to go through rather than around sensitive sites? If so, that is an impact that should be noted and studied in this document. 12

Figures 3.5-2 through 3.5-6 would be more helpful if the different habitat types could be distinguished. Were these meant to be color plates? While not wishing to waste public money, it would be helpful if a way could be found to differentiate these land types more clearly. 13

Air Quality

Mitigation A-1.2 is confusing. The IOP states that all of the ferries used will be cleaner than required by the EPA's 2007 emission rules. But the EIR doesn't reflect this statement in its analysis. We understand the need to analyze the most conservative alternative, but the proposal in the IOP should be studied as a mitigation measure for the air quality impacts of the project. Since the impacts of ROG, CO, and SO2 are still significant with the proposed mitigation, why isn't a further mitigation measure studied – such as using zero emission vehicles? 14

For all of the impacts in this section, please consider tabulating the impacts before and after mitigation to make them easier to compare. 15

Land Use

The discussion of environmental and social justice in the EIR is interesting, but doesn't seem applicable to the project. The greatest threat of this project to minority or low income communities is not necessarily direct. Rather, this is an expensive project, construction and operation of which will divert funds that might otherwise have funded improved transit for such communities. And the beneficiaries of this project are the ridership - which has not been characterized in this document (but should be), but which might be assumed to be mostly white, mostly middle or upper middle class commuters. A more appropriate discussion in the EIR would 16

4/21/03 cm \28066519 WTA\comment letters\EIR-222.cdr

be a comparison of the ridership to the adjacent communities. Will the ridership be driving through low-income communities to reach any of these sites? And what are the impacts of that increase in traffic in those neighborhoods. The impacts of increased traffic congestion and pollution in the community will be exacerbated if those in the community are unable to afford or enjoy the benefits of the service. 16

San Francisco's Ferry Building is the terminus for a majority of the ferry trips; the IOP would significantly impact the current layout of the ferry piers just built at the Ferry Building as well as the Golden Gate Ferry Terminal. Is the IOP being realistic in its use of the Ferry Building for virtually all trips into San Francisco? The EIR should analyze any potential conflicts between existing and proposed ferry service. 17

Aesthetics

Mitigation V-1 1 states that the WTA has established Intermodal and Design Guidelines. They should be included in this document, at least in summary form, so that the public can comment on them. 18

Transportation

The EIR lacks information on landside transportation options. Figure 3.12-1 is much too general. Since transit access to the ferry terminals is a key component in the plan, this is a significant oversight. This section of the EIR should include maps of existing transit lines, with ridership and frequency of service, and then show the impacts of ferry ridership on these lines. 19

Table 3.12-16 shows the modal split of riders, and it's obvious that several terminals will not generate sufficient traffic to support land transit. Is there adjacent development in existence or being planned for these sites? Is the creation of routes at any of these sites contingent on transit-oriented development? In a previous section, the development plans of communities adjacent to proposed terminals are listed. A similar review of the transportation plans of these communities seems like a logical inclusion in this section. 20

Please clarify the meaning of Table 3.12-18 - what does "Parking Demand Percentage" mean? Does is meant that there are only enough spaces to supply 64% of the vehicles using the terminal (looking at line 1)? Another column showing the number of cars using the lot on a daily basis would be helpful. 21

The EIR states that the reduction in pollution from autos as a result of this project is insignificant, while the increase in pollution from buses is significant. But this is not a correct comparison. What should be compared are actual emission figures. What is the actual projected reduction in 22



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emissions from autos, and is it more or less than the actual increase in emission from buses? Is the result a net increase or decrease in overall emissions as a result of this project? 22

The complete lack of mitigation for the transportation impacts is disappointing, especially since a major source of our concern is the increase in Bay pollution that will occur with the increase of cars at the shoreline. While some mitigation measures may be site specific, many are common to each site, and should be listed here. For instance, the $2 parking fee is an appropriate mitigation and should be listed as such. Other mitigation measures could include the establishment of free off-site parking lots with shuttle service (like the Golden Gate Transit Park & Ride lots), the establishment of Car Share programs at each site, free bicycle rental and/or parking, and the sale of transit passes at each terminal. 23

There is no mention of pedestrian access in the EIR, even though table 3.12-16 indicates that 9000 passengers per day will be accessing the ferry terminals on foot. Of course, several of these are in urban settings that already have pedestrian amenities; but it would be nice to see standards set for pedestrian access and safety - such as traffic calming measures and speed limits on access roads and in parking lots; appropriate lighting and landscaping, and minimum sidewalk widths. 24

Hovercraft.

Hovercrafts are mentioned as options to dredging and wake problems, but there seems to be no analysis of this vehicle in the EIR. It would be helpful to have a table reviewing the different vehicles under consideration and their impacts. 25

Thank you for the opportunity to comment on these documents. We look forward to your responses to these as well as to our oral comments.

Sincerely,

Jennifer Clary, President
(415) 585-9489

Norman Rolfe, Transportation Chair
(415) 775-9167

EIR 223

DUCKS UNLIMITED

WESTERN REGIONAL OFFICE
3074 Gold Canal Drive
Rancho Cordova, CA 95670-6116
(916) 852-2000 Fax (916) 852-2200
www.ducks.org

January 28, 2003

Thomas G. Bertken, Chief Executive Officer
San Francisco Bay Area Water Transit Authority
IOP and DEIR Comments
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

Ducks Unlimited, Inc. is the world's foremost private waterfowl conservation organization. We are very aware of the great importance of San Francisco Bay to wintering and migrating waterfowl of the Pacific Flyway. We have previously shared our concerns on the impact on waterfowl and wetlands of the proposed expansion of ferry service, and we provided URS Corporation with extensive scientific literature on the topic of waterfowl disturbance. Ducks Unlimited appreciates the effort that the Water Transit Authority, URS Corporation and others have put into this stage of consideration of expanded ferry transit service. However, we believe that the impacts of ferry expansion on waterfowl, wetlands and habitat have been insufficiently described and evaluated in the DEIR. Furthermore, we believe new studies of waterfowl distribution and habitat usage are necessary in order to adequately characterize these impacts. 1

The DEIR contemplates system expansion that could greatly increase ferry traffic on San Francisco Bay. This level of expansion is likely to result in more significant impacts on wildlife than the current draft acknowledges. These impacts should be assessed in greater detail in the EIR at the programmatic level. Combined impacts to these resources from a proposed ferry system expansion could be significant, even if a particular site-specific impact is not significant, and the cumulative impact might be impossible to mitigate. 2

Operation of ferries may have detrimental impact on sensitive wetland habitat and wildlife, both from their transit through waters frequented by wildlife, and from wakes that accelerate erosion of shorelines and damage fringing marshes, as well as levees that protect important wetland and salt pond habitat. Wakes may contribute to erosion of levees that are essential to current and future wetland restoration projects around San Francisco Bay. A large wetland restoration project is underway at Bair Island within the San Francisco Bay NWR, in close proximity to proposed ferry service at the Port of Redwood City. Levees at Sonoma Baylands near the mouth of the Petaluma River, and at the mouth of 3

Tolay Creek are close to a proposed ferry terminal at Port Sonoma, and salt pond levees are found throughout the South Bay; these salt pond levees protect habitat that is of great value to shorebirds and waterfowl. 3

General Recommendations:

a) The EIR should analyze in greater detail the impacts of increased ferry activity on waterfowl, especially diving ducks (scaup, scoter, canvasback), that rest and forage on the open Bay. Several of the proposed ferry routes pass through the largest concentrations of waterfowl in the North and South Bays, as well as the major concentrations on the Contra Costa shoreline. This impact is not sufficiently recognized in the DEIR. A comprehensive, not site-specific, examination of the cumulative impacts on the San Francisco Bay's waterfowl population should be made now to provide public disclosure on significant system impacts and to assist in the determination of alternatives for system expansion. In order to do this, new comprehensive aerial surveys of waterfowl use patterns will be required. We recommend that veteran waterfowl biologists with USGS-BRD be funded to perform at least two years of bi-weekly surveys, using the protocols used in Accurso 1992. Such as study would provide a baseline condition for future monitoring of changes in waterfowl distribution, and assist in the development of mitigation measures. 4

b) The EIR should analyze wake impacts for each proposed route and terminal where new service or altered service may occur. Wake impact analysis should include impacts on existing tidal marsh, areas where restoration is underway, areas where restoration is planned, and levees that may provide habitat values. It is not appropriate to defer such analysis to a future site-specific EIR for a particular ferry terminal or route. Instead, that wake impact analysis should be conducted in this programmatic EIR to assist in the determination of alternatives for system expansion, and to provide public disclosure on significant system impacts. 5

c) The EIR should analyze in greater detail the impacts of dredging and ferry c) activity on the amount and quality of waterfowl and shorebird habitat. In particular, the system-wide impacts on all shallow water habitat, including mud-flats and eelgrass beds. These impacts must consider impacts from destruction of habitat, as well as the rendering of habitat as inaccessible through repeated disturbance. A comprehensive, not site-specific, examination of the cumulative impacts on the San Francisco Bay's waterfowl population should be made now to provide public disclosure on significant system impacts and to assist in the determination of alternatives for system expansion. In order to do this, new comprehensive aerial surveys of waterfowl use patterns are required. 6

Specific Recommendations re: Section 3.5 Biology

3.5.1.2 Habitat Types

Bayflats

Bayflats are used by waterfowl, for both foraging and roosting. 7

Salt Ponds

Salt ponds are used by waterfowl for foraging as well as roosting. Salt ponds provide abundant populations of invertebrates (e.g. brine shrimp, brine flies, benthic mollusks, etc.) that are exploited by a wide range of waterfowl species. Three additional duck species (that are not mentioned in the DEIR) which occur on the salt ponds in large numbers are ruddy duck, bufflehead, and northern shoveller. 7

3.5.1.3

North Bay

The importance of the North Bay to canvasback needs to be explicitly stated; the San Pablo Bay NWR was established by the U.S. Fish and Wildlife Service to protect wintering habitat for the canvasback. The geographic extent of the North Bay should be clearly defined; this section references the Suisun Marsh and farmed wetlands of the Delta, neither of which are typically considered part of the North Bay. 8

3.5.2.6 Potential Effects on Birds

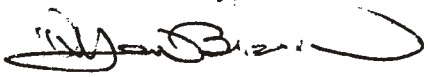
Construction could also result in loss of habitat for waterfowl. 9

Ferry traffic could disturb waterfowl in the North, Central, and South Bay, as well as the Contra Costa shoreline. This impact would not be limited to the South Bay as implied on page 3.5-39. To illustrate this, we suggest you develop (and include in the final EIR) a series of figure which overlays the proposed ferry routes on the waterfowl distribution maps from Accurso (1992). This would clearly demonstrate the locations and ferry routes with the highest potential for waterfowl disturbance. 10

The impact of ferry traffic on San Pablo Bay is not adequately recognized. Just because "large areas of San Pablo Bay would remain undisturbed" does not mean that the impact is not significant. Significant impacts may apply to the species that primarily use San Pablo Bay. As stated previously, the San Pablo Bay NWR was established by the U.S. Fish and Wildlife Service to protect wintering habitat for the canvasback. Canvasback populations are currently well below goals set by the North American Waterfowl Management Plan. For this reason, the U.S. Fish and Wildlife Service closed the hunting season on canvasbacks throughout the United States in 2002-2003. Protection of areas used by canvasback must be a high priority. 11

Thank you for the opportunity to provide input to the WTA.

Yours Sincerely,



Ryan Broddrick
Director of Conservation, Valley Bay/CARE

Cc: Robert Floerke, CDFG
Bob Hight, CDFG

EIR 224

RECEIVED
FEB 25 RECD
SAN FRANCISCO BAY AREA
WATER TRANSIT AUTHORITY

BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

February 20, 2003

Thomas G. Bertken
Chief Executive Officer
Water Transit Authority
120 Broadway
San Francisco, CA 94111

Dear Mr. Bertken:

The Bay Area Air Quality Management District has completed its independent air quality analysis of the Water Transit Authority (WTA) Implementation and Operations Plan (IOP). A copy of the completed analysis is enclosed. Our analysis was reviewed at public meetings held on February 13 and 19, 2003, and was approved by the Air District's Board of Directors. We believe that this analysis fulfills the requirements of the California Health and Safety Code Section 66540.22k. 1

As noted in our report, the expansion of ferry service proposed in the WTA's IOP should result in less emissions than the current passenger ferry services in the Bay Area. However, there is a potential for concentrations of nitrogen dioxide and particulate matter at the San Francisco terminal to be above state and federal ambient air quality standards. 2

We recommend that the WTA examine the potential for further reductions in emissions from future ferry vessels by scaling back non-peak service on some routes and through the use of alternative diesel fuels, such as water emulsion fuels and biodiesel. We also recommend that vessel design, pier design, and system operations be carefully planned to minimize local exposure to air pollutants and associated cancer risk. 3

I would like to express my appreciation for the efforts of you and your staff in providing technical data for our work and comments on our draft analysis. I look forward working with the WTA in its ongoing efforts to expand ferry service in the Bay Area in a manner that minimizes impacts to the region's air quality. 4

Please contact Michael Murphy, Principal Planner, at 415/749-4644, if you have any questions regarding the enclosed analysis.

Sincerely,

William C. Norton
Executive Officer/APCO

Enclosure

WCN:MRM

G:\EN _REV\WTA Review\WTA Transmittal Letter Analysis.doc

ALAMEDA COUNTY
Roberta Cooper
Scott Haggerty
(Chairperson)
Nate Miley
Shelia Young

CONTRA COSTA COUNTY
Mark DeSaulnier
Mark Ross
Gayle Uilkema
(Secretary)

MARIN COUNTY
Harold C. Brown, Jr.

NAPA COUNTY
Brad Wagenknecht

SAN FRANCISCO COUNTY
Willie Brown, Jr.
Chris Daly
(Vacant)

SAN MATEO COUNTY
Jerry Hill
Marland Townsend
(Vice-Chairperson)

SANTA CLARA COUNTY
Liz Kniss
Julia Miller
Dena Mossar
(Vacant)

SOLANO COUNTY
John F. Silva

SONOMA COUNTY
Tim Smith
Pamela Torliatt

William C. Norton
EXECUTIVE OFFICER/APCO

BAY AREA AIR QUALITY MANAGEMENT DISTRICT **5**

Memorandum

To: Chairperson Smith and
Members of the Mobile Source Committee

From: Thomas Perardi
Director of Planning

Date: February 6, 2003

Re: Independent Analysis of the Bay Area Water Transit Authority's *Implementation and Operations Plan*

RECOMMENDED ACTION:

Consider recommending to the Board of Directors that the Executive Officer forward the Air District's independent analysis of the air quality impacts from the Bay Area Water Transit Authority's (WTA) *Implementation and Operations Plan – December 2002* to the Water Transit Authority. The WTA will include the independent analysis in their final plan to the Legislature when it is submitted in Spring 2003.

BACKGROUND

The WTA was created in 1999 by SB428 (Perata). The WTA was created to "... *operate a comprehensive San Francisco Bay regional public water transit system, that includes water-transit terminals, feeder buses and any other transport and facilities supportive of the system." (Health & Safety Code §66540.24)* The legislation also directed the WTA to "... *prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan. The plan shall include all appropriate landside, vessel, and support elements, operational and performance standards, and policies. " (Health & Safety Code §66540.20)* A draft Implementation and Operations Plan (IOP) was submitted to the Legislature on December 13, 2002. A final plan, along with environmental documentation, is due to the legislature by the Spring 2003.

The final plan is to be accompanied by ".. *an independent evaluation conducted by the Bay Area Air Quality Management District to assess the air quality impacts of the complete water transit system, as set forth in the ... Implementation and Operations Plan, in comparison to transporting the same number of people over the same distance by motor vehicles and other modes of transportation." (Health & Safety Code §66540.22(k))* This staff report represents the independent evaluation of the WTA's IOP and covers both regional and localized impacts from the proposed expansion of ferry service in the Bay Area.

SUMMARY FINDINGS

1. Implementation of the WTA's proposal will result in overall emissions that are lower than those attributable to current passenger ferry service.

2. If the future ferry service passengers used automobiles and other modes of transportation (rail, bus, carpools), regional emissions would also be less than current emissions from passenger ferry service. In comparison to the WTA's proposal, regional emissions of

oxides of nitrogen and particulate matter would be less, but hydrocarbon emissions would be higher.

3. The proposed increase in ferry service at the San Francisco Ferry Building has the potential to increase local concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} & $PM_{2.5}$). Future impacts will depend on actual design of boats and piers, and future operating procedures. Based on available information and reasonable assumptions, the NO_2 concentrations could exceed California's ambient air quality standard, unless dockside operations are limited to approximately 5 minutes per landing. The State PM_{10} & $PM_{2.5}$ standards are already exceeded in most urban areas of California, including San Francisco. The Air District staff's analysis shows that the WTA proposal could add from 6 to 55% to existing concentration values, depending on pollutant, boat design, and dockside idle time. Additionally, the Air District staff's analysis indicates that the potential for localized increases in exposure to particulate matter at the San Francisco terminal could lead to a significant increase in cancer risk. Boat design and exhaust height specifications could be used to mitigate local air quality impacts and risk.

DISCUSSION

During the two-year development of the IOP, the WTA studied four alternatives for service expansion: 1) A comprehensive region-wide system based on the Water Transit Initiative developed by the Bay Area Council and Bay Area Economic Forum; 2) an expanded region-wide system that could be implemented within 10 years; 3) enhancements to the existing ferry system; and 4) A "No-Build" scenario based on the Metropolitan Transportation Commission's *2001 Regional Transportation Plan* (RTP), which envisions future ferry service to be similar to today's ferry routes and frequencies.

The current WTA proposal in the IOP is a subset of the second studied alternative -- enhancements to services on existing routes, plus new services between San Francisco and terminals in San Mateo, Alameda, Sonoma, and Contra Costa Counties. As shown in Table 1, the WTA is proposing more frequent service on six existing routes and new service on eight routes.

TABLE 1
PROPOSED FERRY ROUTES AND PROJECT 2025 DAILY RIDERSHIP

Existing Routes	Oakland – Alameda – San Francisco	4032
	Bay Farm Island – San Francisco	679
	Vallejo – San Francisco	4411
	Sausalito – San Francisco	5118
	Larkspur – San Francisco	6576
	Tiburon – San Francisco	2649
New Routes	Berkeley – San Francisco – Mission Bay	2357
	Richmond – San Francisco	1780
	Treasure Island – San Francisco	2485
	Antioch/Pittsburg – Martinez – San Francisco	2038
	Hercules/Rodeo – San Francisco	933
	South San Francisco – San Francisco	2496
	Redwood City – San Francisco	1420
	Port Sonoma – San Francisco	1657
	Total Daily Ridership	38,631

Source: WTA, *Implementation and Operations Plan – December 2002*, page2

Building on MTC's regional transportation model, WTA has projected that the IOP would result in 38,631 weekday ferry passengers in 2025 (See Table 1). This is approximately 14,000 passengers more than the ridership level projected in the 2001 RTP. The WTA assumed that ferry service would operate on an hourly basis on most routes. Service would be provided for 14 to 16 hours per day. They also assumed that bridge tolls will be $3.00 per vehicle and that parking at BART stations will be $2.00 per car.

Integral to the WTA's plan is the deployment of ferry vessels with engines that are 85% cleaner than the EPA's 2007 marine engine emissions standards. In making this commitment, the WTA is following the recommendations of a 1999 study by the California Air Resources Board (CARB). In their study, CARB staff projected significant increases in overall emissions unless the engines in the ferry vessels were very low emitting.

A comprehensive examination by the WTA of potential emission control technologies concluded that several different mixes of engine and fuel types could achieve the very-low-emission goals adopted by the WTA. Rather than select a preferred approach to controlling the emissions from the future ferry vessels, the WTA proposes to set forth their emission goals in the design specifications for new ferries and leave selection of engines and fuel types to the boat building industry.

Regional Air Quality Impacts

In order to assess the potential impact on regional air quality, Air District staff assessed the potential net emissions of oxides of nitrogen (NOx), hydrocarbons (HC) and particulate matter (PM_{10}) for the following scenarios:

1) Existing ferry service (excluding recreational/tourist services);
2) IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards;
3) IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – with no ferry service provided.

Results of our analysis are shown in Table 2. For each scenario, Air District staff determined net emissions by estimating the emission reductions that will occur from reduced automobile travel by ferry passengers and then added back in the estimated emissions that will occur from the ferry vessels and from the transit and shuttle buses servicing the ferry terminals. A positive number in Table 2 indicates that emissions reductions achieved by removing vehicles from the roadways are exceeded by emissions from the vessels and/or buses. A negative number (shown in parentheses) indicates that the emissions reductions achieved by removing vehicles from the roadways are greater than the emissions from the vessels and buses.

TABLE 2
ESTIMATED EXISTING AND 2025 EMISSIONS (tons/day)

Scenario	NOx	HC	PM_{10}*	$PM_{2.5}$*
Existing ferry service (excluding recreational/tourist services)	2.32	(0.02)	0.12	0.12
IOP proposed service in 2025 with engines 85% cleaner than the EPA 2007 emissions standards	1.04	(0.42)	0.02	0.02
IOP projected ferry passengers in 2025 travel by motor vehicles, buses and rail transit – no ferry service.	0.29	0.07	0.02	0.02

* PM emissions will be fine particulate < 2.5 micrometer, so $PM_{10} = PM_{2.5}$

Current weekday ferry service contributes 2.32 tons per day (t/d) of NOx and 0.12 t/d of PM_{10} emissions to the Bay Area, while providing a net reduction of 0.02 t/d of HC. The WTA proposed expansion of ferry service would decrease the amount of NOx and PM_{10} that ferry service contributes to the region, and further reduce hydrocarbon emissions. If the same number of ferry passengers as projected by the WTA instead used automobiles (either alone or as carpools) or rode on transit buses, BART and Caltrain, then regional emissions of NOx and PM10 would be further reduced, but HC emissions would increase.

While Air District staff has generally used data on ridership, service frequency and vessel characteristics provided by the WTA, there are differences in several assumptions between Air District staff's analysis and the analysis in the DEIR:

1) Air District staff used only weekday travel and hours of operation; the DEIR included weekend service.
2) Air District staff used lower daily ridership numbers, as provided by the WTA, and less frequent headways than those used in the DEIR analysis.
3) Air District staff assumed longer idling times for some routes, because the WTA's DEIR contained idling times on these routes of less than five minutes.
4) Air District assumed that the future engines would be 85% cleaner than future EPA standards, while the DEIR assumed the engines would be approximately 90% cleaner.

Despite the differences in these assumptions, the results of Air District staff's analysis show the same relative conclusions as the analysis in the WTA's DEIR and CARB's 1999 study: the deployment of very-low-emitting ferry vessels would result in a reduction of the current regional emissions attributable to passenger ferry service.

Localized Air Quality Impacts

In addition to examining the regional impacts of the WTA's IOP, Air District staff analyzed the potential for increases in localized concentrations of three pollutants – carbon monoxide (CO), NO_2 and particulate matter (both PM_{10} and $PM_{2.5}$) – at the proposed ferry terminals. A review of the proposed ferry service indicated that only the San Francisco terminal would have sufficient numbers of vessel operations to warrant additional consideration. Air District staff used currently available data and computer models to predict pollutant concentrations under three scenarios: existing conditions, one that assumed idling times consistent with the

regional analysis of the IOP discussed above and another that limited dock-side idling under the IOP proposal to five minutes per vessel operation.

Methodology

The computer model chosen to predict the localized impact is an EPA Guideline Model, the Industrial Source Complex Version 3 Model. This is a Gaussian air quality model routinely used to model impacts from a variety of sources.

Two meteorological data sets were considered for use in modeling the impacts at the terminal: data from the San Francisco International Airport (SFO) and data from the Oakland International Airport (OAK). Meteorological data from other Bay Area monitoring stations were analyzed and determined not to be representative of the area around the ferry Terminal. Modeling was performed using both data sets: the latest three years available from SFO (1989-1991) and from OAK (1981-1983). Receptors were placed on all of the gates and other locations around the terminal, inland to a distance of 0.8 miles, to model exposure to passengers and others that would frequent the areas around the San Francisco terminal. Receptors were not placed over San Francisco Bay.

The Air District maintains and operates regional air monitoring stations around the Bay Area. The closest monitoring station, San Francisco - Arkansas Street, is located just 2 miles south of the Terminal. As a regional monitoring station, it is believed that the Arkansas Street monitoring station provides a good representation of the background concentrations around the San Francisco terminal area. Background PM_{10}, $PM_{2.5}$, CO and NO_2 data were available for the last three years (1999-2001). To represent a worst-case situation, background concentrations were assumed to remain constant into the future.

It is important to point out that this analysis of localized impacts, while complete, is only a preliminary analysis. As such it may reflect an overestimation of future pollutant concentrations. With the dedication of more resources and more site-specific information regarding meteorological and ambient air quality conditions, vessel characteristics, and terminal layout, the analysis could be refined to provide better estimates of the potential impacts.

Existing Conditions

For the analysis of the existing situation, we used the current physical layout of the San Francisco terminal and the current vessel fleet. The current fleet consists of a mix of vessel designs – single hull and catamarans – and most significantly for our analysis, varying locations of exhaust pipes. Some of the single hull vessels have exhaust pipes located mid-vessel 24 feet or higher above the water, while others have exhaust pipes located at the rear of the vessels, at about six to eight feet above the water. The catamaran vessels have their exhaust pipes either in the rear, approximately three feet above the water line, or vent exhaust into the space between the two vessel hulls. As discussed below, localized pollutant concentrations are sensitive to the location of the engine exhaust pipes: venting emissions higher above the water tends to lessen concentrations of pollutants at dockside. Emission rates for the current engines were derived from test data published by engine manufacturers and the WTA. Emission rates take into account the benefits achieved through recent engine replacements on a number of current ferry vessels via funding from the Air District's Carl Moyer Program.

Table 3 shows the predicted maximum air quality impacts for the existing fleet of vessels at the existing San Francisco Ferry terminal. Currently, concentrations of particulate matter exceed the California 24-hour and annual PM_{10} standards and the California annual $PM_{2.5}$ standard.

TABLE 3
MAXIMUM EXISTING CONCENTRATIONS
AT SAN FRANCISCO FERRY TERMINAL ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	306.1	6,111	6,417	23,000	40,000
8-hour	87.3	4,090	4,177	10,000	10,000
NO_2					
1-hour	127.2	193.6	321	470	-
annual	6.3	39.5	46	-	100
PM_{10}					
24-hour	2.0	77.9	**80**	50	150
annual	0.37	26	**26**	20 [2]	50
$PM_{2.5}$					
24-hour	2.0	45.1	47	-	65
annual	0.37	12.6	**13**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Future Conditions – WTA IOP

For the two IOP idling scenarios, the future physical layout of the San Francisco terminal was based on a figure in the Draft IOP, published in September 2002. This layout, while very conceptual, reflects the configuration of two recently constructed gates at the terminal. Ferry vessels were modeled as point sources adjacent to each side of six gates (two ferry vessels per gate). Hourly emission rates were calculated based on the estimated number of ferry vessels per hour that would dock to load and unload passengers at each gate.

For the purposes of our analysis, we have assumed that all existing vessel would have been retired from service. Ferry vessels in 2025 would use diesel engines that are compliant with EPA's 2007 emission standards, in conjunction with selective catalytic reduction (SCR) devices and diesel particulate filters (DPF). The use of the SCR and DPF control devices would reduce NOx and PM_{10} from engine exhaust by at least 85%. We selected these control devices to be consistent with the DEIR and the IOP. It should be noted that by assuming the use of diesel engines, we are modeling a reasonable worst-case scenario in terms of exposure to diesel particulate. The use of other engine types and/or cleaner fuels might show different results.

Vessel characteristics were based on conceptual designs published by the WTA in the technical appendix to the IOP. The newest ferries operating on the Bay have exhaust points located approximately three feet above the water. This design was incorporated into the modeling analysis for future local impacts.

Tables 4 and 5 show the predicted maximum air quality impacts for the two future idling scenarios. Table 4 shows that for the regional analysis idling scenario the federal 24-hour and annual $PM_{2.5}$ standards and four California ambient air quality standards could be exceeded -- the one-hour NO_2 standard, the 24-hour and annual PM_{10} standards, and the annual $PM_{2.5}$ standard. Table 5 shows that if the idling for each ferry is limited to a maximum of five minutes at each of the gates, the California 24-hour and annual PM_{10} standards, and California annual $PM_{2.5}$ standard could be exceeded; and the margins would be much smaller.

TABLE 4
MAXIMUM CONCENTRATIONS FROM IOP
IDLING SCENARIO – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	2,970.1	6,111	9,081	23,000	40,000
8-hour	1016.3	4,090	5,106	10,000	10,000
NO_2					
1-hour	430.6	193.6	**624**	470	-
annual	33.8	39.5	73	-	100
PM_{10}					
24-hour	24.3	77.9	**102**	50	150
annual	6.7	26	**33**	20 [2]	50
$PM_{2.5}$					
24-hour	24.3	45.1	**69**	-	65
annual	6.7	12.6	**19**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

TABLE 5
MAXIMUM CONCENTRATIONS FROM IOP IDLING SCENARIO, WITH IDLING TIME LIMITED TO 5 MINUTES – WITH LOW EXHAUST HEIGHT ($\mu g/m^3$)

Pollutant/Averaging period	Maximum impact	Max. 3-year background	Impact plus Background [1]	California Standard	Federal Standard
CO					
1-hour	927.6	6,111	7,039	23,000	40,000
8-hour	338.8	4,090	4,429	10,000	10,000
NO_2					
1-hour	192.1	193.6	386	470	-
Annual	18.1	39.5	58	-	100
PM_{10}					
24-hour	7.9	77.9	**86**	50	150
Annual	2.3	26	**28**	20 [2]	50
$PM_{2.5}$					
24-hour	7.9	45.1	53	-	65
Annual	2.3	12.6	**15**	12 [2]	15

1 Concentrations exceeding a standard are shown in bold type.
2 Adopted by CARB on June 20, 2002; final approval by the Office of Administrative Law is pending.

Health Risk Screening

A health risk screening -- consisting of a screening cancer risk analysis[1] and a chronic health risk analysis[2] -- was also conducted for the existing ferry service and terminal configuration, the IOP scenario, and the IOP scenario with idling limited to five minutes. Under the Air District's *CEQA Guidelines,* a project is acceptable if the associated incremental cancer risk is equal to or less than ten in a million. Additionally, a chronic hazard index of 1.0 or above is considered significant. Table 6 shows the incremental cancer risk and chronic hazard index associated with the existing conditions and the two future IOP idling scenarios.

The estimated existing incremental cancer risk from ferry operations at the San Francisco terminal currently exceeds the Air District's threshold for risk from exposure to diesel particulate matter. Incremental cancer risk is estimated to increase significantly in the future under both IOP idling scenarios because of the increase in ferry operations that is proposed by the WTA. It is estimated that there is not currently nor under the IOP scenarios significant risk for non-cancer health problems due to exposure to diesel particulate matter.

TABLE 6
SUMMARY OF HEALTH RISK ASSESSMENT RESULTS

	Existing idling scenario	IOP idling scenario low exhaust height	IOP scenario with idling limited to 5 minutes low exhaust height
Incremental Cancer Risk	3 in a million	58 in a million	20 in a million
Chronic Hazard Index	0.003	0.059	0.020

As noted above, the results of the health risk assessment were sensitive to the height of the exhaust pipes above the waterline. The higher location of the exhaust pipes on some of the existing vessels, as compared to the assumed height of three feet for future vessels, explains why potential cancer risk under the IOP scenarios is higher than under existing conditions. Since we estimated that future emissions would be less than under existing conditions, we would expect future cancer risk due to exposure to diesel particulate matter to also be lower than under existing conditions.

To test the assumption that the height of the exhaust pipes influenced the Incremental Cancer Risk results shown in Table 6, we conducted a separate health assessment wherein we assumed that for all three scenarios exhaust pipes were located 20 feet above the water. As can be seen from the results shown in Table 7, assuming higher exhaust heights significantly reduces the estimated Incremental Cancer Risk. It should also be noted that higher exhaust locations also should result in lower concentrations in PM_{10} and $PM_{2.5}$.

Although the WTA has already committed to very-low-emission engines in future vessels, the health risk assessment suggests that additional actions and emissions controls to reduce diesel particulate may be warranted.

---

[1] A screening risk analysis estimates the maximum offsite cancer risk from exposure to toxic air pollutants.

[2] A chronic health risk analysis is used to estimate the risk of the development of long-term non-cancer health issues, such as asthma, emphysema, high blood pressure, etc. The result of this analysis is expressed in terms of a risk index to allow comparisons between different scenarios and projects.

TABLE 7
SENSITIVITY MODELING OF HEALTH RISK ASSESSMENT
(WITH EXHAUST STACKS AT 20 FEET ABOVE THE WATER)

	Existing idling scenario	IOP idling scenario	IOP scenario with idling limited to 5 minutes
Incremental Cancer Risk	3 in a million	2.6 in a million	1.3 in a million

CONCLUSIONS

The implementation of the WTA's IOP, including the deployment of low emitting ferry vessels, should result in a reduction of current emissions attributable to passenger ferry service. It is recommended that the WTA examine the potential for further reductions in NOx and particulate matter emissions from the ferry vessels by scaling back non-peak service on some routes and through the use of alternative diesel fuels, such as water emulsion fuels and biodiesel.

There is a potential for localized increases of concentrations of NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) above applicable state and federal ambient air quality standards at the San Francisco terminal. Boat design, pier design, and system operations should be carefully planned to minimize local exposure and associated cancer risk.

The WTA should specifically examine the feasibility of reducing local impacts through the use of alternative fuels and through the location of exhaust points on future ferry vessels. It is also recommended that a more thorough examination of localized impacts be conducted once the WTA's operational plans, ferry vessel design and gate layout for the San Francisco terminal are finalized.

BUDGET CONSIDERATIONS/FINANCIAL IMPACT

Staff resources were drawn from Program 605 – Mobile Source Measures, using General Fund revenues. Subsequent work, if any, will draw upon the same resource. State law required the Air District to perform this analysis, but our requests for state funding of the work were not successful.

Respectfully submitted,

Thomas Perardi
Director of Planning

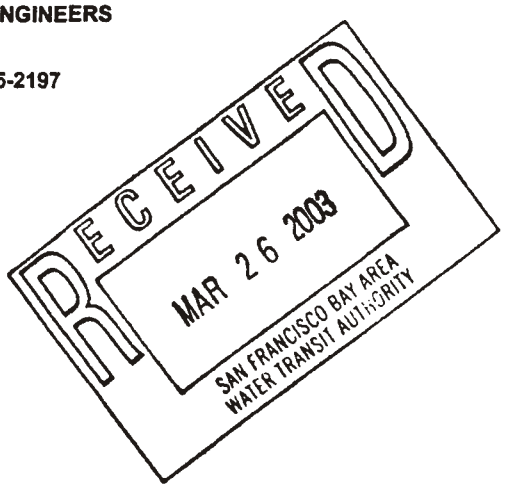
Prepared by: Michael Murphy and Glen Long

Forwarded _____

EIR 225

DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, CORPS OF ENGINEERS
333 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105-2197

MAR 2 5 2003



Regulatory Branch

SUBJECT: File Number 27272S

Mr. Thomas G. Bertken
San Francisco Bay Area Water Transit Authority (WTA)
120 Broadway
San Francisco, California 94111

Dear Mr. Bertken:

Your request for comments on behalf of the Water Transit Authority concerning the Expansion of Ferry Transit Service in the San Francisco Bay Area project, dated August 23, 2002, has been received by the Corps of Engineers. This project is located at multiple sites around the Bay area, in Marin, Napa, Solano, Contra Costa, Alameda, Santa Clara, San Mateo, and San Francisco Counties, California. The construction of marine terminals and associated dock structures for ferry service facility installation will impact waters of the Unites States, and thus require review by the Corps of Engineers. 1

The Corps of Engineers is concerned about the environmental impacts associated with building a ferry terminal facility in Redwood City. The Corps has noticed that a number of commercial and municipal projects at the Port of Redwood City and nearby locales have been developed, are in development, or have been proposed. Previously permitted projects include the Port Yacht Harbor Public Launch Ramp Expansion Project (File # 22835S). The Corps is currently reviewing the 408-boat slip Westpoint Marina and Boatyard Project (USACE File # 22454S), and the proposal by RMC Pacific Materials (Harbor Sand and Gravel) to install mooring dolphins and a spud barge platform in Redwood Creek (File # 26735S). In the near future, Hanson Aggregates, Inc. will also apply for a permit to build to build a marine terminal and install spud barges on Redwood Creek (File #27694S). Lastly, with the present request it appears that the Water Transit Authority may propose to develop ferry services from Redwood City to other areas on San Francisco Bay. 2

We have concerns that these activities will result in an increase in the amount of barge, ferry, and recreational boat traffic on Redwood Creek and Westpoint Slough. In particular, this increase in boating traffic will generate additional boat wake frequency and energy, given the existing and planned activities. The high quality salt marshes of Bair and Greco Islands surround the entrance to Redwood Creek, and they form one of the shorelines of each creek. Federally protected species such as the western snowy plover (*Charadrius alexandrinus nivosus*), the California clapper rail (*Rallus longirostris obsoletus*), and the salt marsh harvest mouse (*Reithrodonomys raviventris raviventris*) are known to use these islands for breeding, nesting, and/or foraging. 3

The Corps of Engineers has determined that the effects of these activities, considered together, are cumulatively significant and are likely to have an adverse impact upon the Federally protected species that reside on Bair and Greco Islands. As such, the Corps will henceforth require that all applications involving activities that will directly or indirectly result in boat traffic increases on Redwood Creek or Westpoint Slough be accompanied by an analysis of boating trends and wake impacts on these protected species and their salt marsh habitat before being given a permit. 3

All proposed work and/or structures extending bayward or seaward of the line on shore reached by: (1) mean high water (MHW) in tidal waters, or (2) ordinary high water in non-tidal waters designated as navigable waters of the United States, must be authorized by the Corps of Engineers pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Additionally, all work and structures proposed in unfilled portions of the interior of diked areas below former MHW must be authorized under Section 10 of the same statute. 4

All proposed discharges of dredged or fill material into waters of the United States must be authorized by the Corps of Engineers pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). Waters of the United States generally include tidal waters, lakes, ponds, rivers, streams (including intermittent streams), and wetlands. 5

Your proposed work appears to be within our jurisdiction and a permit may be required. Application for Corps authorization should be made to this office using the application form in the enclosed pamphlet. To avoid delays it is essential that you enter the file number at the top of this letter into Item No. 1. The application must include plans showing the location, extent and character of the proposed activity, prepared in accordance with the requirements contained in this pamphlet. You should note, in planning your work, that upon receipt of a properly completed application and plans, it may be necessary to advertise the proposed work by issuing a public notice for a period of 30 days. 6

If an individual permit is required, it will be necessary for you to demonstrate to the Corps that your proposed fill is necessary because there are no practicable alternatives, as outlined in the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines. A copy is enclosed to aid you in preparation of this alternative analysis.

Should you have any questions regarding this matter, please call Andrew Muss of our Regulatory Branch at 415-977-8442. Please address all correspondence to the Regulatory Branch and refer to the file number at the head of this letter.

Sincerely,

Edward A. Wylie

Edward A. Wylie
Chief, South Section

Enclosures

Copy Furnished (w/o encl.):

US FWS, Sacramento, CA Attn: Dan Buford

RESPONSES TO PUBLIC COMMENTS
ON THE
DRAFT PROGRAM EIR
&
REVISED DRAFT PROGRAM EIR

EXPANSION OF FERRY TRANSIT SERVICE
IN THE
SAN FRANCISCO BAY AREA

RESPONSES TO PUBLIC COMMENTS

VOLUME 1

SECTION 1 PUBLIC COMMENT LETTERS AND TRANSCRIPTS 1-1

VOLUME 2

SECTION 2 PUBLIC COMMENT SUMMARIES 2-1

SECTION 3 COMMENT RESPONSES 3-1

INTRODUCTION

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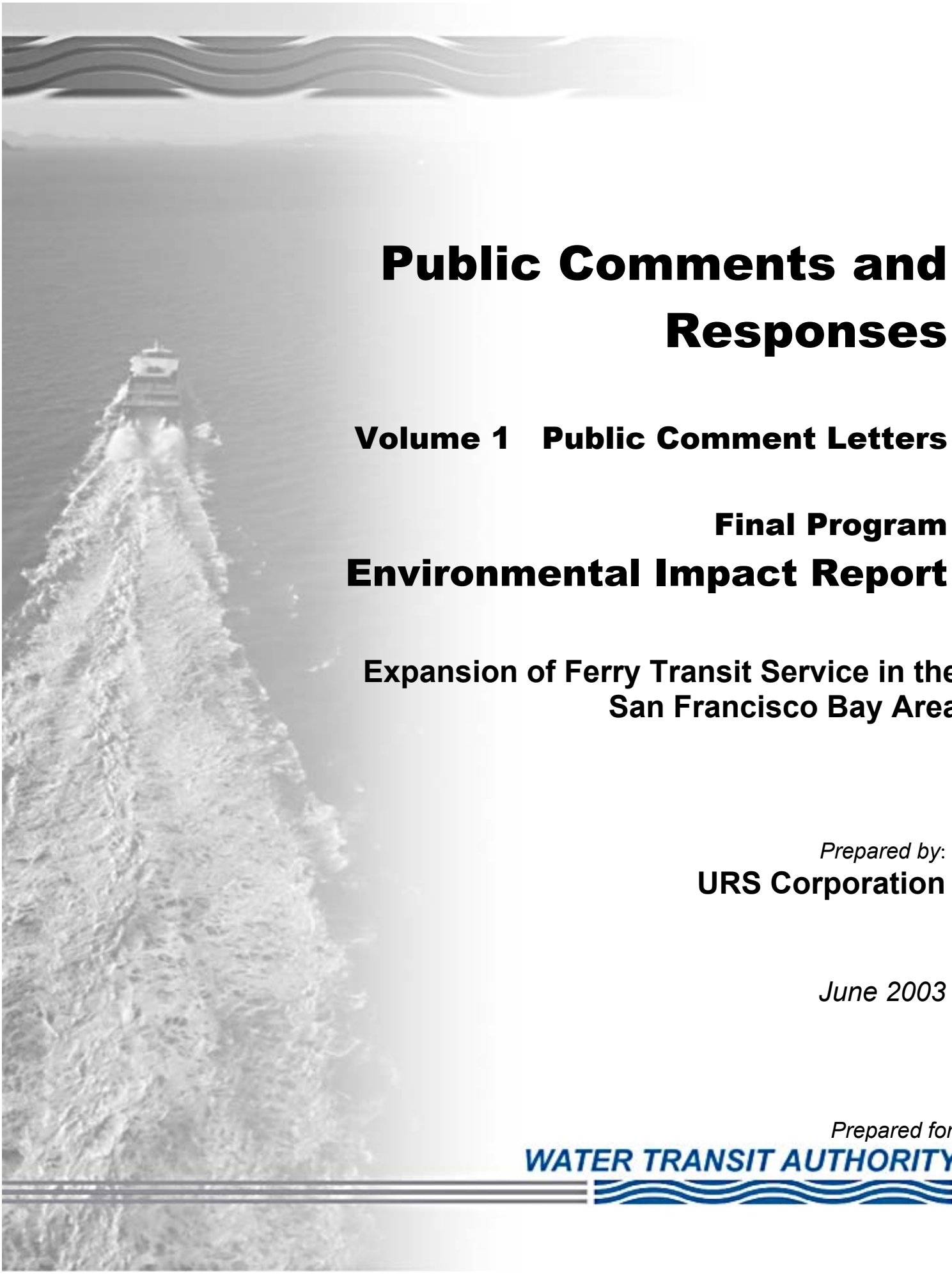

Public Comments and Responses

Volume 1 Public Comment Letters

Final Program
Environmental Impact Report

Expansion of Ferry Transit Service in the San Francisco Bay Area

Prepared by:
URS Corporation

June 2003

Prepared for:
WATER TRANSIT AUTHORITY

RESPONSES TO PUBLIC COMMENTS
ON THE
DRAFT PROGRAM EIR
&
REVISED DRAFT PROGRAM EIR

EXPANSION OF FERRY TRANSIT SERVICE
IN THE
SAN FRANCISCO BAY AREA

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San Francisco Water Transit Authority
Expanded Ferry Service EIR

FINDINGS OF FACT AND STATEMENT OF OVERRIDING CONSIDERATIONS

INTRODUCTION

Project and Alternatives:

The San Francisco Water Transit Authority (WTA) is a regional agency established by the state of California for the purpose of evaluating options to improve and expand ferry service in the Bay Area. As required by its enabling legislation, the WTA has prepared an Implementation and Operations Plan (IOP) for presentation to the California Legislature. As also required by its enabling legislation, the WTA has prepared and considered an Environmental Impact Report (EIR) that describes the project, alternatives to the project, the adverse impacts of the project, and mitigation measures that would substantially reduce or avoid those impacts. The EIR is intended to inform decision-makers and the public of the adverse environmental impacts that would result from implementing the IOP (Proposed Project) or one of the project alternatives.

The purpose of the IOP is to increase regional mobility within the Bay Area by providing new and expanded ferry transit services and related ground transportation terminal access. The IOP does not represent a precisely fixed set of routes and terminal sites. Instead, it proposes a general program of development. The Proposed Project is based on the anticipated routes and terminals that would result from implementation of the IOP.

Under the Proposed Project, ferry routes serving the Bay Area would be increased from the existing seven routes to a total of 15 routes. The existing routes – Oakland to San Francisco, Alameda Point to San Francisco, Harbor Bay (Alameda) to San Francisco, Vallejo to San Francisco, Sausalito to San Francisco, Larkspur to San Francisco, and Tiburon to San Francisco – would be joined by new routes from Berkeley to San Francisco (2 routes), Richmond to San Francisco, San Francisco to Treasure Island, Antioch/Pittsburg to Martinez to San Francisco, Hercules/Rodeo to San Francisco, and Redwood City to San Francisco. These routes would be served by clean vessels only (exceeding Environmental Protection Agency 2007 Tier II air quality standards). With the exception of the Hercules/Rodeo terminal, all of the sites proposed for expanded ferry service are within existing marinas or ports and would not require substantial additional dredging. The Hercules/Rodeo terminal would need to be dredged.

The initial draft EIR examined four alternatives. Alternative 1 included most of the routes included in the Proposed Project, plus another 17 routes. These additional routes would extend service to Benicia/Martinez, San Leandro, Oakland Army Base, South San Francisco, Redwood City, Moffett Field, Hunters Point, Coyote Point, Foster City, East Palo Alto, and Port Sonoma. Alternative 2 included most of the routes included in the

Proposed Project, plus another 9 routes. The additional routes would have extended service to Benicia/Martinez, San Leandro, South San Francisco, Redwood City, Moffett Field, and Port Sonoma. Alternative 3 would focus on limited expansion of the existing ferry system by increasing the number of trips along the existing routes. Alternative 4, the No-Project alternative, consists of the continuation of existing ferry service, with minimal improvements. Ferry service would continue on existing routes at the existing rate of frequency.

Based on the responses received on the initial draft EIR, the WTA determined that Alternatives 1 and 2 are not feasible. As result, they are identified as alternatives considered, but rejected, in the revised draft EIR and have been eliminated from further consideration. The WTA developed the Proposed Project from the prior Alternative 2, with mitigations included as part of its design.

The project's EIR has been prepared by the WTA in compliance with the California Environmental Quality Act (CEQA, Public Resources Code Section 21000, et seq). The information and conclusions contained in the EIR reflect the WTA's independent judgement regarding the potential adverse environmental impacts of the Proposed Project and the project alternatives.

Required CEQA Findings of Fact:

CEQA requires the lead agency (i.e., WTA) to make written findings whenever it decides to approve a project for which an EIR was certified (Public Resources Code Section 21081). The findings explain how the lead agency approached the significant impacts identified in the EIR. "Significant impacts" includes those adverse effects of the project that can be reduced to a less-than-significant level as a result of the mitigation measures identified in the EIR. The State CEQA Guidelines (Title 14, California Code of Regulations) further explain the required findings.

Specifically, Section 15091 of the State CEQA Guidelines states that:

> "(a) No public agency shall approve or carry out a project for which an EIR has been certified which identifies one or more significant environmental effects of the project unless the public agency makes one or more written findings for each of those significant effects, accompanied by a brief explanation of the rationale for each finding. The possible findings are:
>
> > "(1) Changes or alterations have been required in, or incorporated into, the project which avoid or substantially lessen the significant environmental effect as identified in the final EIR.
> >
> > "(2) Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.

"(3) Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the final EIR.

"(b) The findings required by subsection (a) shall be supported by substantial evidence in the record."

The "changes or alterations" referred to in the Guidelines may be mitigation measures, alternatives to the project, or changes to the project by the project proponent. "Substantial evidence" means factual evidence, including expert opinion supported by facts.

With respect to findings (a)(1) stated above, all measures contained in the final EIR that mitigate significant impacts associated with new ferry service (e.g., new ferry terminals, new ferry service routes) are within the authority and jurisdiction of the WTA. With respect to findings (a)(2) stated above, all measures contained in the final EIR that mitigate significant impacts associated with expanded ferry service (e.g. additional ferry service on existing routes and expansion of existing terminals) are within the jurisdiction of existing ferry service operators, such as Alameda/Oakland Ferry Service, Harbor Bay Maritime, Golden Gate Bridge, Highway and Transportation District, and Vallejo Transit.

In addition to describing the disposition of the various significant effects identified in the EIR, the findings must also explain why the project alternatives described in the EIR are not being selected for implementation. In other words, the WTA is required to describe the specific economic, legal, social, technological, or other considerations that make each alternative infeasible.

Required Statement of Overriding Considerations:

CEQA prohibits an agency from approving a project which will have significant, unavoidable environmental impacts unless the agency adopts a statement describing the specific benefits of the project that will outweigh its expected unavoidable impacts. If the project's specific economic, legal, social, technological, or other benefits outweigh the unavoidable adverse environmental effects, those effects may be considered acceptable, notwithstanding the fact that they cannot be avoided. This "statement of overriding considerations" must be supported by substantial evidence (State CEQA Guidelines Section 15093).

FINDINGS OF FACT

The findings described below are organized by resource issue, in the same order as the project impacts appear in the revised Draft EIR prepared for the project. The findings of infeasibility being made for the project alternatives follow the individual impact findings.

PROPOSED PROJECT IMPACT FINDINGS

Dredging

Impact D-2: Dredging new channels to accommodate expanded ferry service could locally reduce water quality by exposing and suspending contaminated sediment.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the findings:

(1) Mitigation measure D-2.1 provides that as part of the Dredge Materials Management Office (DMMO) dredging permit requirements, proposed dredging locations shall be sampled and tested to determine the existence and extent of any contamination. Whenever contaminated materials are to be dredged, negative impacts on water quality shall be minimized through the use of the most appropriate dredge type and dredging techniques for each site. Engineering included in the plans and permits for dredging projects shall include the use of best management practices (BMPs) to reduce potential impacts to less than significant levels. These BMPs may include:

- Use of silt curtains, which prevent suspended sediment from migrating out of the immediate project area;
- Dredging only on the incoming tide;
- Hydraulic or closed clamshell dredging to reduce the generation of suspended sediments;
- Shunting, which involves pumping of the free water in a sediment holding barge to the bottom of the water body, which reduces turbidity; and
- Employment of an independent, certified, on-board dredging inspector to ensure compliance with permit conditions.
- Monitoring should be conducted during dredging to allow for the following:
  - Measurement of the efficiency of contaminated sediment removal;
  - Determination of dredged volumes;
  - Measurement of sediment re-suspension at the dredge site; and
  - Checking performance of barriers and other controls.

(2) The WTA will consult with the DMMO operated jointly by the San Francisco Bay Conservation and Development Commission (BCDC), Regional Water Quality Control Board (RWQCB), State Lands Commission (SLC), U.S. Environmental Protection

Agency, Region 9 (USEPA), and the U.S. Army Corps of Engineers, San Francisco District (USACE). The purpose of the DMMO is to cooperatively address dredge materials management issues, including sediment quality sampling. WTA will make an application to the DMMO which the member agencies will jointly review before issuing their individual authorizations. The DMMO permit requirements also include a Section 401 Water Quality Certification from the RWQCB, which will require implementation of appropriate BMPs if they are necessary to protect water quality.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact D-4: Dredging activities could adversely impact threatened, endangered, or protected species.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the findings:

(1) Pursuant to Mitigation Measure D-4.1, negative impacts on threatened, endangered, or protected species shall be minimized through use of dredge types and techniques and implementation of BMPs described under Impact D-2. Use of BMPs and appropriate dredging techniques will be part of the DMMO recommendation and incorporated as conditions for regulatory approval of the permit application.

(2) Pursuant to Mitigation Measure D-4.2, individual projects would undergo consultation with the resource agencies. This includes the agencies identified above in Impact D-2. Several mitigation measures have been utilized in previous projects to reduce or avoid impacts to biological resources related to dredging operations. These include the use of physical barriers such as silt curtains to contain the turbidity plume; selection of dredging equipment to reduce suspension of materials; and, if construction sequencing permits, restricting dredging in shallow water to between June 1 and November 30.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact D-5: **Dredging for construction of access channels to new ferry terminals could result in loss or disturbance of jurisdictional wetlands.**

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the finding:

(1) New channel dredging would only be necessary at the Hercules/Rodeo terminal. This site has not been identified as an area of wetland habitat.

(2) Implementation of Mitigation Measure B.1-1 will require as part of the environmental studies and documentation for specific projects that wetland areas be delineated on a site-specific basis, if present. Specific wetland boundary determinations shall be used to avoid disturbance of these resources when specific dredging plans are defined. In cases where wetland impacts are unavoidable, suitable compensatory mitigation shall be designed within the same subarea and implemented in consultation with the appropriate regulatory agencies.

(3) The Goals Project (1999) has described habitat restoration goals and 115 potential restoration sites around the Bay, representing tens of thousands of acres of potential habitat restoration. While not all of these sites may be within the same subarea, available, or suitable for the types of mitigation necessary for impacts from terminal construction, a substantial amount of area could potentially be used by the project proponent for compensatory mitigation. The total area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation.

(4) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Navigation

Impact NAV-1: Existing ferry service results in some navigational incidents, including accidents involving collisions, allisions, and groundings. There is a potential for an increase in these incidents with expansion of water transit service.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding(s):

(1) Mitigation measure NAV-1.1 will require the WTA to implement best practices to meet or exceed United States Coast Guard (USGC) requirements as recommended by the preliminary risk assessment prepared by ABS and cited in the EIR for this project. These practices include, but are not limited to, the following:

- Design and implement a preventive maintenance system that meets or exceeds manufacturer's service requirements.
- Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as master-in-charge. (Note: Program training should meet or exceed the requirements in the USCG National Maritime

Center Policy Letter 06-01 subj.: "Qualification for Issuance of Type Rating Endorsements Authorizing Service on High-Speed Craft.")

- Design the terminal to facilitate docking under both prevailing and seasonal environmental conditions.
- When conditions make it difficult for the master-in-charge to effectively maintain situational awareness, assign another person to the bridge watch (i.e., another licensed master or a senior deckhand) to share the workload and serve as a safety double check.
- Design and install gangway systems (1) that help steady the ferry and hold it firmly to its dock, (2) that can be adjusted to accommodate changing environmental forces, and (3) that can be manipulated by crew having different physical abilities.
- Install, operate, and maintain technology (e.g., portable pilot units, and/or automatic identification system tracking and display) to facilitate communication of intent and to audit conformance with navigational protocols.
- Install, operate, and maintain a backup radar and separate power supplies for radars.
- Train/certify all bridge watchstanders in radar operation.
- Periodically survey the water depth in the vicinity of a terminal to identify shoaling, and set and maintain private markers to identify shoal water.
- Conduct periodic electrical safety inspections and daily check of ground faults. Install a bridge alarm/indicator that alerts the licensed master of the location of electrical shorts.
- Install and maintain a fixed fire suppression system that has sufficient capacity to flood the engine room twice with CO_2 or equivalent fire suppression agent.
- Eliminate or minimize hazardous materials used in maintenance and repair.
- Use a closed gauging system for checking fuel levels.
- Develop company policy and standard procedures for emergencies and adverse weather and normal operating conditions. Implement and enforce procedures through training and company communications. Audit conformance. Provide job aids for critical procedures. Policy and procedures manual and an operational training program will be developed using the guidance in the USCG Navigation and Vessel Inspection Circular 5-01 subj.: "Guidance for Enhancing the Operational Safety of Domestic High-Speed Vessels."

(2) Elimination of all risk of navigational incidents is technologically infeasible. Human error, instrumental error, and equipment failure cannot be completely avoided. For example, commercial air travel involves highly trained flight crews, advanced avionics, strict aircraft maintenance regimes enforced by the federal government, advanced air traffic control, and modern weather forecasting, yet serious accidents occasionally occur.

(3) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact NAV-2: Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between recreational water users (e.g., windsurfers) and ferries. This raises concerns for public safety, especially where windsurfers launch and sail in close proximity to ferry vessels.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) The WTA will implement mitigation measure NAV-2.1 requiring the appropriate training of crew of ferry vessels servicing new terminals located near existing windsurfing launch sites to reduce the risk of incidents involving ferries and windsurfers. Training shall include awareness of windsurfing locations and specific windsurfing events. The San Francisco Boardsailing Association should be encouraged to participate in the development and delivery of such training.

(2) Pursuant to mitigation measure NAV-2.2, specific ferry employees shall be designated to stand watch on the bridge of ferries on select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) to reduce the risk of incidents involving ferries and windsurfers.

(3) Elimination of all risk of navigational incidents is technologically infeasible. Human error, instrumental error, and equipment failure cannot be completely avoided. Inexperience or poor judgement on the part of recreational water users can lead to unexpected or unpredictable incidents.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact NAV-3: Increased numbers of ferry transits in the Bay may lead to an increased risk of collision between recreational boaters and ferries.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3) as stated in State CEQA Guidelines Section 15091, as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) As described under Impact NAV-2, the WTA will implement mitigation measure NAV-2.1 requiring the appropriate training of crew of ferry vessels servicing new terminals located near existing windsurfing launch sites. Such training will also increase crew awareness of and opportunities to avoid conflicts with recreational water craft.

(2) Mitigation measure NAV-3.1 will require additional training, education, and public advisory programs for recreational watercraft users related to navigational safety requirements could reduce the risk of incidents associated with expanded ferry service in the Bay. The project proponent could work with the Harbor Safety Committees (which include recreational boaters) and could fund or sponsor new education and advisory training programs and strengthen existing ones. Potentially affected recreational users, especially those docking at marinas located in the vicinity of proposed new ferry terminals, shall be reached through public notices.

(3) Pursuant to mitigation measure NAV-3.2, specific ferry employees shall be designated on selected ferries/routes to stand watch on the bridge for navigational hazards (i.e., during periods of high recreational use, such as weekends or race events, or when weather hazards exist) to reduce the risk of navigational incidents.

(4) Elimination of all risk of navigational incidents is technologically infeasible. Human error, instrumental error, and equipment failure cannot be completely avoided. Inexperience or poor judgement on the part of recreational water users can lead to unexpected or unpredictable incidents.

(5) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Wake Analysis

Impact WW-1: New routes and increased frequency of ferry trips across the Bay could increase the wave height (energy) at some shorelines, potentially causing increased erosion.

Findings: The WTA hereby makes findings (a)(1) and (a)(2) as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding(s):

(1) Mitigation measure WW-1.1 provides that ferry routes and service may need to be modified such that:

- The route alignments are maintained at more than 1,500 meters from potentially sensitive shorelines (e.g., mudflats, unprotected tidal marshes).

- Operation of the vessels (primarily speeds) are maintained such that predicted wake wave heights at the shoreline would be less than 16 cm.
- Operation of vessels are maintained such that predicted wake waves at the shoreline would be less than 50 percent of the average sustained wind wave height on a monthly basis.

If resulting ferry routes meet one or more of the above criteria, impacts would be less than significant.

(2) Pursuant to mitigation measure WW-1.2, new ferry routes could potentially be modified to redirect energy away from sensitive habitats, to reduce or eliminate increased wake energy. Adjustment to routes can be used to focus wave energy on rocky or armored shorelines or to direct energy away from sensitive areas. Detailed wave refraction, diffraction, and reflection analysis would be required to predict the efficacy of wave energy focussing.

(3) Mitigation measure WW-1.3 will require the use of existing low-wake vessel technology to reduce both the total wake wash energy and heights of individual waves.

(4) Mitigation measure WW-1.4 will require WTA to implement operational adjustments, such as slowing down vessels, to reduce wake energy near sensitive tidal marsh habitat. The change in wave form (and hence wave period) would also be considered because high-speed ferries generate a different wave patterns at high (operating) and low (motoring) speeds.

(5) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact WW-2: Increased frequency of ferry trips across the Bay could increase the wave heights at surrounding marinas, potentially damaging moored vessels and interfering with recreational users.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Individual wave height is the primary factor of concern for impacts at unprotected marinas, due to the potential for damage to moored vessels, docks, etc., or potential safety issues for users of the marina. Mitigation measures WW-1.1, WW-1.2, WW-1.3, or WW-1.4 will be implemented to reduce this impact to a less-than-significant level.

(2) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact WW-3: Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3) as stated in State CEQA Guidelines Section 15091, as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure WW-3.1 provides that where any shoreline areas have potential clapper rail nesting habitat within 50 meters of the edge of a marshland (or within marshland that does not appear healthy and could limit attenuation of wave energy as a result) and are along a proposed ferry route, habitat surveys should be conducted to determine whether nesting sites exist. If nesting sites or suitable nesting habitat do exist within 50 meters of the edge of the marshland, site-specific measurements of wake attenuation should be performed at the potential site to determine whether wash will be an issue. An analysis such as that provided as part of the documentation for the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model could be used to predict wave propagation and decay at high water (FEMA 1988). If the measurements/calculations indicate that nest inundation could potentially occur, one of the mitigation measures WW-3.2, WW-3.3, or WW-3.4 may be necessary. For nesting sites more than 50 meters inland from the edge of the marshland, no significant impacts would occur.

(2) Pursuant to mitigation measure WW-3.2, the use of existing low-wake vessel technology could reduce both the total wake wash energy and height of individual waves. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels.

(3) Pursuant to mitigation measure WW-3.3, new ferry routes could be adjusted to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels.

(4) Mitigation measure WW-3.4 will require that operational adjustments, such as slowing the vessel down near sensitive areas, be performed during ferry operation to reduce wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less-than-significant levels.

(5) Mitigation measures WW-3.1, WW-3.2, WW-3.3, and WW-3.4 could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis. Reducing this impact to a less-than-significant level may be infeasible for practical reasons if avoiding significance was only possible through elimination of the route or if avoidance would substantially increase travel times making the route noncompetitive when compared to other travel modes. The WTA is legally obligated by its enabling

legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to drop routes is limited.

(6) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact WW-4: Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites. This includes routes that pass near seal haul-out sites, in particular Yerba Buena Island and Castro Rocks. The Proposed Project also includes new routes across the Bay, with the potential to impact areas not currently served by water transit.

Finding: The WTA hereby makes finding (a)(1) and (a)(2) as stated in State CEQA Guidelines Section 15091, as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure WW-4.1 will require that ferry routes should be at least 300 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations.

(2) The National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters. Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Accordingly, the mitigation measure will employ a more conservative distance in order to reduce this impact to a less-than-significant level.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Water Resources

Impact W-1: Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface at terminal sites, causing an increase in stormwater discharge. If the stormwater came in contact with pollutants or disturbed soil, discharge of the runoff could impact the quality of the receiving water.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Adoption of BMPs during construction to prevent, minimize, and clean up spills and leaks from construction equipment, as required under mitigation measure W-1.1, would reduce the potential for impacts to water quality. Examples of BMPs include:

- refueling and maintenance of equipment only in designated lined and/or bermed areas;
- isolating hazardous materials from stormwater exposure; and
- preparing and implementing spill contingency plans in specified areas.

Storage and parking of any equipment with a fuel tank or other oil tank, such as heavy excavation machinery, shall take into account oil spill prevention regulations to ensure that the area is free of drains or other avenues though which spills may escape containment.

(2) Pursuant to mitigation measure W-1.2, new terminal facilities shall be designed such that stormwater runoff would be controlled and discharged in an appropriate manner. Construction and industrial stormwater National Pollution Discharge Elimination System (NPDES) permits would be required, and BMPs shall be adopted to reduce the chance of pollutants entering surface and groundwater, thereby reducing the potential for impacts to water quality. Typical pollution control measures include BMPs designed to reduce the quantities used of materials that may produce pollutants, changing the way various products and materials are handled or stored, employing various structural devices to catch and restrict the release of pollutants, and establishing appropriate responses to spills and leaks. Examples of BMPs include:

- temporary silt fencing;
- protection devices such as rock aprons at pipe outlets;
- stabilized pads of aggregate at points where construction traffic would be leaving an unimproved construction site to enter a public street;
- temporary drain inlet protection devices such as filter fabric and sand bags;
- concrete washouts for cement mixers;

- preservation of existing vegetation; and
- vehicle and equipment cleaning.

(3) Consideration and issuance of NPDES permits is the responsibility of the RWQCB. The RWQCB is authorized to place conditions on the NPDES permits, as discussed above.

(4) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact W-3: Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure WW-3.1, the WTA will incorporate safety issues identified by the Harbor Safety Committee into the annual review of the Harbor Safety Plan reviewed and approved by the state Oil Spill Prevention and Response Administrator.

(2) Pursuant to mitigation measure WW-3.2, ferry operators shall update their contingency plans and continue to use emergency response services for pollution incidents. As part of the ferry expansion program, the contingency plans, drill exercises, and emergency response service agreements will be reviewed and modified, if necessary, to reduce potential impacts to water resources resulting from spills. Such modifications would include ensuring that all of the spill response equipment required at new terminals is available. The work of updating and expanding the spill response plans should be based on NOAA's Environmental Sensitivity Index (ESI).

(3) Pursuant to mitigation measure W-3.3, a regular program shall be developed and maintained to train fueling operators on correct fueling methods to minimize spills due to human error or improper use of equipment that would decrease the potential for spills.

(4) Mitigation measure W-3.4 will require that new vessels to be adopted in a ferry expansion program and the equipment to service any new fleets shall include technological designs to avoid fuel spills.

(5) Mitigation measure W-3.5 provides that applicable measures recommended by the Ferry Safety Plan (ABS Consulting 2002) shall be adopted to minimize safety risks and prevent navigational incidents with the potential for spills. Ferry operators must take those new measures into account in their updates to contingency plans and OSRO service agreements.

(6) The California Oil Spill Prevention and Response Administrator would be responsible for reviewing and approving the plan revision required under mitigation measure WW-3.1. Several Oil Spill Response Organizations (OSROs) operate in the Bay and collaborate with the USCG, California Office of Spill Prevention and Response (OSPR), and other organizations in the Unified Command System during drills and spill responses. Ferry operators have retained OSRO services and maintain response equipment on board vessels and at ferry terminals. Review of updates and modifications to plans will be done under the USCG's regular oversight of oil spill contingency plans.

(7) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Biology

Impact B-1: Loss of jurisdictional wetland habitat could occur as a result of dredging and the construction of terminal facilities.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure B-1.1 provides that as part of the environmental studies and documentation prepared for specific projects, wetland areas should be delineated on a site-specific basis. Specific wetland boundary determinations shall be used to avoid disturbance of these resources when specific terminal layout plans are defined. In cases where wetland impacts are unavoidable, suitable compensatory mitigation shall be designed within the same subarea and implemented in consultation with the appropriate regulatory agencies.

The Goals Project (1999) has described habitat restoration goals and 115 potential restoration sites around the Bay, representing tens of thousands of acres of potential habitat restoration. While not all of these sites may be within the same subarea, available, or suitable for the types of mitigation necessary for impacts from terminal construction, a substantial amount of area could potentially be used by the project proponent for compensatory mitigation. The total area of wetland impacts, though not calculated for this SEIR, is expected to be minimal compared to the areas potentially available for mitigation.

(2) The need for dredging of channels has been minimized, with only the Hercules/Rodeo site predicted to potentially require new dredging of an access channel. There is an unknown potential for minor incidental dredging for installation or upgrading of facilities. The Hercules/Rodeo site has not been regionally identified as an area of

wetland habitat, and therefore impacts to wetlands are not expected from any needed dredging activity at that site.

(3) At the regional level of evaluation, mapped wetland areas potentially occur at the Pittsburg/Antioch and Martinez terminal sites. Also, areas of tidal marsh are located in the vicinity of the existing Larkspur terminal. The Proposed Project does not include site-specific plans. Accordingly, the precise locations of future improvements (i.e., dredging, terminals, parking, etc.) are not known at this time. Given this level of detail, the WTA cannot be certain that improvements will not adversely affect this resource. While mitigation measure B-1.1 will require site-specific mitigation measures to be developed and compensatory mitigation to be undertaken, avoidance of all impacts to existing wetlands may be technologically infeasible where there are no siting or design options to building or dredging wetlands in order to accommodate new facilities.

(4) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to drop routes is limited.

(5) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact B-2: Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Pursuant to mitigation measure B-2.1, preconstruction surveys by a qualified biologist/botanist shall be conducted to identify and map areas of smooth cordgrass within potential terminal locations where this species could potentially occur. Identified areas of nonnative cordgrass, if falling within areas of disturbance, shall be removed to the extent feasible prior to construction activities. The methods of removal shall be developed in coordination with the USACE. Eradication of this species at a site shall be done well in advance of construction. However, depending upon the extent, complete removal may be infeasible. In this case, funding of an area-wide cordgrass eradication program would be used as mitigation.

(2) Dredging in areas of nonnative cordgrass infestations could increase the spread of this species by creating root fragments and rhizomes that could disperse with the tides. However, as discussed for Impact B-1, dredging is limited within the Proposed Project to the Hercules/Rodeo site, and regional-level information does not identify this as a site of concern for nonnative cordgrass. Erosion from ferry operations, which could disperse

root fragments and rhizomes, is not expected to be significant when using the prescribed measure discussed under Impact WW-1 (i.e., mitigation measures WW-1.1 through WW-1.4).

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-3: Project construction could result in the disturbance of "Special Aquatic Sites," including eelgrass beds, mudflats, and wetlands.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure B-3.1, disturbance of eelgrass beds and mudflats shall be avoided in the design of project features and the routing of ferries.

(2) Mitigation measure B-3.2 requires that as part of the environmental studies and documentation for specific projects, specific areas of eelgrass beds and mudflats that could be impacted shall be specifically determined.

The general locations of eelgrass beds in the Bay were mapped in the late 1980s. If any project construction were to occur in the vicinity of any of these known beds, updated mapping of the extent of the beds should be conducted. Methods include use of side-scan sonar techniques, possibly in conjunction with other techniques such as visual surveys. In addition, areas that are less than 3 meters deep may have a reasonable potential to support eelgrass while areas less than 1.5 meters deep have a moderate potential to support eelgrass. Areas such as these should be surveyed to determine the current status of eelgrass prior to design and construction, and this information shall be used to avoid or substantially minimize impacts.

(3) Pursuant to mitigation measure B-3.2, in cases where impacts to eelgrass beds or mudflats are unavoidable, suitable compensatory mitigation shall be designed in consultation with the appropriate state and federal agencies such as the USACE, US EPA, DFG, RWQCB, and BCDC. These agencies will exert regulatory control in cases where project implementation triggers the need for permits or certifications.

If impacts to eelgrass are unavoidable or impacts cannot be reduced to an acceptable level, compensation or offsetting mitigation shall be further investigated. Mitigation shall provide enhanced functions and values relative to the impacted special aquatic sites. A mitigation plan shall be prepared that identifies the specific habitat restoration methods, the criteria to be used for monitoring and evaluating the success of the mitigation effort, and a contingency plan if the mitigation fails.

(3) Pursuant to mitigation measure B-3.3, indirect impacts to eelgrass beds from sedimentation shall be avoided or reduced through the use of silt curtains to protect the beds from sedimentation or other methods that would otherwise protect the eelgrass from turbidity plumes generated during dredging. Mitigation for indirect effects would need to be evaluated on a case-by-case basis as the techniques used may differ from site to site. For example, at a given location, the specific dredging requirements and the potential for sediment plume generation and specific areas that may be impacted by the sediment plume should be evaluated. If it appears eelgrass could be affected by sedimentation, then site-specific conditions (depth, etc.) and local tidal currents shall be assessed to determine the best way to deploy mitigation, such as silt curtains.

(4) Wetlands impacts will be at least partially avoided pursuant to mitigation measure B-1.1. Wetland impacts cannot be fully avoided, as discussed in the findings for Impact 3.1, above.

(5) Very little eelgrass mitigation has been done in San Francisco Bay and mitigation of eelgrass impacts may not be feasible or successful in all cases. Reducing the impact on eelgrass may be infeasible due to current technological limitations on restoration techniques.

(6) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact B-7: Dredging could adversely affect fish species near the construction activities.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) As discussed under Dredging, mitigation measures D-4.1 and D-4.2 will limit the types of dredges and techniques of use and apply BMPs to avoid significant impacts.

(2) Construction dredging would only be potentially necessary at the Hercules/Rodeo terminal site. Implementation of site-specific mitigation measures at the project level, as required under mitigation measures D-4.1 and D-4.2, would further reduce Impact B-7 to less than significant levels.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-9: Underwater noise from pile driving and other construction activities could affect nearby fish.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure B-9.1 provides that mitigation for this potential impact shall be evaluated on a site-specific basis. Once specific designs and construction specifications for a particular site are known, sound pressure levels shall be estimated to the extent possible. During initial pile driving efforts, the area around the in-water pile driving activities shall be monitored for signs that fish are being injured (e.g., floating on the surface, birds moving in to prey on dead or injured fish). Measures to reduce sound pressure levels in surrounding waters, such as placing bubble jackets surrounding the piles, shall be deployed if sound pressure levels exceed those that could harm fish.

(2) Fish could be temporarily displaced by noise from construction activities (barges, workboats, etc.), but would return once the construction activities ceased. Recent experience in San Francisco Bay during a pile installation test for the Bay Bridge East Span indicated that the use of large pile drivers can result in the mortality of fish that have swim bladders (Caltrans 2001). Pile driving for the Bay Bridge East Span test resulted in fish deaths. The Bay Bridge project, however, is using large (8-foot diameter, approximately 300-foot) steel piles and some of the largest pile driving hammers available. Fish mortality has also occurred at the construction site of the new Benicia-Martinez Bridge on the Carquinez Strait, again using relatively large-diameter steel piles. Widening of the San Mateo Bridge required the driving of 900-1,200 concrete piles with 2- to 3-foot diameters. No fish kills were reported during this pile driving operation (Morrow 2003). Pile driving for terminal facilities would likely include small diameter concrete piles, such as those used for the San Mateo Bridge and therefore would be unlikely to have the same sorts of impacts as bridge projects using much larger piles.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-10: Construction could result in the loss of habitat for shorebirds and wetland species.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measures B-1.1, B-3.1, B-3.2, and B-3.3, discussed above, would be implemented to reduce the impact below the level of significance. These require the preparation of site-specific mitigation measures including design, avoidance, and habitat replacement or compensation.

(2) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-11: Ferry traffic (primarily in South Bay) could disturb roosting and foraging waterfowl in shallow areas of the Bay.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure B-11.1 provides that ferry routes shall be consolidated within common corridors, travel down deeper channel areas as much as possible, and choose the shortest routes across shallow areas to leave as much undisturbed shallow open-water habitat as possible.

(2) Most routes for the Proposed Project would be in deeper channel areas and areas where ship traffic already routinely travels. The largest number of transects would occur in the Central Bay, where large rafts of birds do not generally occur due to the deeper waters found there. Most of the Proposed Project routes are located in areas where existing ferry and other ship traffic occurs. Only the Hercules/Rodeo terminal location would cross a shallow area not routinely used by vessel traffic. Routes to Oyster Point and Redwood City would also cross shallow areas used by waterfowl. These areas currently experience relatively light vessel traffic, and under the Proposed Project would experience more routine disturbance. This disturbance would not result in a permanent loss of habitat, but rather the area of habitat where disturbance may take place. Waterfowl may use these areas when ferries are not present.

(3) As discussed in the EIR for the Proposed Project (Impact B-11), there is evidence that waterfowl habituate to repeated disturbances and avoid areas that experience routine disturbance. For example, studies in Denmark showed that waterfowl annually redistributed themselves to areas of lesser routine disturbance, depending on which areas of a lake were set up as refuges (Madsen 1994). This suggests that waterfowl may become accustomed to the ferry traffic and avoid the direct path of the vessel routes. If birds avoided the vessel corridors, this would potentially reduce the frequency of disturbance to the birds and lessen the likelihood that birds would be struck by the vessels.

(4) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-13: Underwater pile driving noise could disturb marine mammals.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure B-13.1 provides that an Incidental Harassment Authorization may be needed from NMFS for pile driving activities, particularly if activities are to occur near sensitive areas such as haul-out sites. Redwood City is near a haul-out site. Pre-construction surveys shall be conducted to determine use of the area by marine mammals before pile driving begins. Marine mammal monitoring shall be conducted during construction in conjunction with underwater noise monitoring. A "safety zone" shall be established based on the initial monitoring. Pile driving activities shall not commence until marine mammals are not sighted within the safety zone for approximately 15 to 30 minutes.

(2) NMFS will be responsible for reviewing and approving the Incidental Harassment Authorization request. In granting the request, NMFS is authorized to impose conditions that would reduce the potential for harassment.

(3) The potential for adverse underwater sound pressure levels during construction would depend largely on whether in-water piles are necessary for terminal or docking facilities, the types and sizes of piles necessary, the substrate and depth of the area where piles are needed, and the proximity of pile driving activities to sensitive areas such as haul-out and feeding locations. NMFS considers, as a guideline, underwater sound pressure levels at or above 160 dB re 1 μPa as constituting harassment to marine mammals. As discussed in the EIR (discussion of Impact B-13), Caltrans measured sound pressure levels exceeding this guideline in areas near the installation of a test pile for the Bay Bridge East Span Project. Any work that could result in sound pressure levels exceeding NMFS guidelines would be considered significant. However, as discussed in the EIR (discussion of Impact B-9), pile driving for terminal facilities would involve much smaller (24- to 36-inch-diameter) piles than the piles used for the Bay Bridge project, and sound pressure levels are unlikely to be above the NMFS guideline values. Furthermore, most potential new construction, with the exception of Redwood City, would not occur near major haul-out sites.

(4) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-14: Transiting ferries could disturb marine mammals resting at haul-out sites.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measures B-14.1 and WW-4.1 provide that ferry routes shall be at least 300 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations.

(2) The National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters. Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Accordingly, the mitigation measure will employ a more conservative distance in order to reduce this impact to a less-than-significant level.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-15: High speed ferries could potentially strike gray whales.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure B-15.1, ferry operators shall be aware of the potential for whales entering the Bay and should know hot to spot whales at the surface. The USCG reports whale sightings and distance to vessels when they receive a report of a whale sighting. Ferry captains shall be made aware of these reports and exercise diligence when a whale sighting has been reported.

The ferry system shall implement a program of informing ferry operators of whale sightings and locations. For example, if one captain sights a whale, it should be reported through a network to all other captains. Operators should be informed or reminded during seasonal periods of heightened whale activities or presence. If whale sightings continue to increase in the Bay, having dedicated lookouts on board or other detection equipment could be warranted. Devices (such as sound-generating equipment) used to scare whales from the area may be considered intentional harassment by NMFS and would not likely be allowed.

(2) Mitigation measure B-15.2 provides that ferries shall be equipped with a whale detection system, such as forward-looking sonar.

(3) Whales are known to visit the San Francisco Bay. Although there have been no recorded collisions between gray whales and any type of vessel, the risk of an accidental encounter between a ferry and a wild animal acting of its own free will cannot be completely avoided. Full mitigation is biologically infeasible.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact B-16: Project construction and/or operation could result in the "take" of state or federally listed species or loss or degradation of critical habitat.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure B-16.1 provides that construction sites shall be reviewed for potential occurrence of listed species and critical habitat using the literature and tools such as the California Natural Diversity Database (CNDDB). Field surveys by qualified biologists shall be conducted in areas of potential occurrence or with suitable habitat for listed species. Areas with listed species should be avoided.

(2) Mitigation measure B-16.2 requires that prior to development in areas where construction is likely to result in a take of a listed species, consultation shall be initiated with the USFWS, NMFS, and DFG as required by the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA). Site-specific mitigation measures will be required as a result of that consultation and must be incorporated into the specific project design or mitigation plan under authority of those agencies. Measures may include redesign of project features to avoid impacts to listed species or critical habitat or include restoration or creation of replacement habitat.

(3) Federal and state agencies (e.g., NMFS, USFWS, and DFG) are authorized to allow construction under regulated circumstances, even where an "incidental take" may occur as a result. The regulatory scheme recognizes that the possibility of "take" cannot be completely avoided. Full avoidance of this impact is infeasible from a regulatory standpoint.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact B-17: Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality, which could, in turn, affect local biological resources.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) As discussed previously under Water Resources, mitigation measures W-1.1 and W-1.2 relating to preventing spills and controlling stormwater runoff will be applied to the Proposed Project to reduce its impact below a level of significance.

(2) Consideration and issuance of NPDES permits is the responsibility of the RWQCB. The RWQCB is authorized to place conditions on the NPDES permits, as discussed above.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-18: Contaminated sediments could potentially become re-suspended during construction and dredging operations and could cause toxicity to Bay organisms.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure D-2.1 relating to preventing the release of sediments during construction and dredging will be applied to the Proposed Project to reduce its impact below a level of significance.

(2) Construction and dredging will be subject to permitting authority of federal and state agencies, as described under Impact D-2.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-19: Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Pursuant to mitigation measures W-3.1 through W-3.5, the Harbor Safety Plan, contingency plans, training methods, new ship design features, and adoption of Ferry Safety Plan measures will be implemented to reduce this impact below a level of significance.

(2) As described under Impact W-3, the California Oil Spill Prevention and Response Administrator would be responsible for reviewing and approving plans.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact B-20: Vessel wakes could potentially cause erosion and loss of wetland habitats, impact special-status species such as the clapper rail and salt marsh harvest mouse, and impact marine mammals through disturbance at or erosion of haul-out sites.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) The facts supporting the findings under Impact WW-3 are incorporated for this impact as well.

(2) Implementation of the measures identified under Impact WW-3 will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact B-21: Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from terminal facilities and associated vehicle parking areas.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure B-21.1, new lighting sources will be directed on project areas and away from surrounding wildlife habitat.

(2) Pursuant to mitigation measure V-1.2, the WTA's established "Intermodal and Architectural Design Guidelines" shall be considered in the planning and design of new and enhanced ferry terminals. The design objectives may include, but are not limited to, making the ferry system more attractive, integrating terminals with the local urban context, and taking advantage of waterfront views. The specific design of each terminal facility would include site-specific studies on the potential impacts of light and glare on wildlife, as may be necessary to determine appropriate mitigations. This would be most relevant for the Hercules/Rodeo site, which is the only proposed new terminal site that would not be in an area having existing maritime uses..

(3) Terminal and parking lot design and construction may fall to other transit agencies that provide ferry service. Approval of land use entitlements for terminals and parking areas would be the responsibility of affected cities, counties, and regulatory agencies such as the San Francisco Bay Conservation and Development Commission. Those agencies will be responsible for applying measures B-21.1 and V-1.2.

(4) Implementation of the measures identified under Impact WW-3 will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Air Quality

Cumulative Impact A-1: Regional cumulative emissions of SO_2 and ROG could increase as a result of the implementation of the Proposed Project.

Finding: The WTA hereby makes finding (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Regional cumulative emissions of NO_x, PM_{10}, and CO from passenger cars, buses, and ferries would decrease with the Proposed Project below those for the No Project Alternative. Emissions of SO_2 and ROG would increase with the Proposed Project, by 0.3 percent and 0.02 percent respectively.

Mitigation of this impact is technologically infeasible at this time. Future engine fuel and/or pollution control technologies that are not at currently used could have an effect on future emission levels. One such engine technology is the use of fuel cells instead of combustion of fossil fuels. While the 2025 emissions are based on current or 2007

technology, it is expected that by 2025, other technologies will be available and cost effective and will further reduce emissions. Emissions could be reduced or eliminated through use of these engine technologies. However, as the cost and effectiveness of future technology cannot be predicted, this impact remains potentially significant.

(2) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to drop routes or otherwise substantially reduce the project scope is limited.

(3) This impact will be significant, as defined by CEQA.

Impact A-2: Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term CO standard.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure A-2.1 provides that cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access could include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.

(2) Mitigation of this impact is technologically infeasible at this time. Future engine fuel and/or pollution control technologies that are not currently used could have an effect on future emission levels. One such engine technology is the use of fuel cells instead of combustion of fossil fuels. While the 2025 emissions are based on current or 2007 technology, it is expected that by 2025, other technologies will be available and cost effective and will further reduce emissions. Emissions could be reduced or eliminated through use of these engine technologies. However, as the cost and effectiveness of future technology cannot be predicted, this impact remains potentially significant.

(3) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Cumulative Impact A-4: **Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water.**

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) As discussed in the EIR under Impact A-4, deposition of nitrates on the Bay from ferry emissions would decrease with the Proposed Project, resulting in a less than significant impact.

(2) Mitigation measure A-4.1 provides that use of a fuel technology that lowers SO_2 emissions would reduce sulfate emissions and subsequent deposition.

(3) Mitigation of this impact is technologically infeasible at this time. The effectiveness of such mitigation that is expected to be available in the future cannot be reasonably quantified, due to the variability of the factors affecting deposition levels. As a result, this is a significant, unavoidable impact.

(4) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to drop routes or otherwise substantially reduce the project scope is limited.

(5) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact A-5: Construction of ferry terminals would create emissions of fugitive dust from excavation and grading, and emissions of NO_x, PM_{10}, CO, SO_2, and ROG from construction equipment exhaust.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure A-5.1 provides that the project proponent(s) shall implement the mitigation measures contained in the BAAQMD CEQA Guidelines (BAAQMD 1999) to control fugitive dust emissions from construction activities. These measures include activities such as watering and covering exposed soil surfaces to minimize dust emissions.

(2) Mitigation measure A-5.2 provides that measures to reduce emissions from vehicles and heavy equipment shall include:

- Using alternative fueled construction equipment when possible;
- Minimizing idling time, for example, 5-minute maximum;
- Properly maintaining equipment; and

- Limiting the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact A-6: Local concentrations of nitrogen dioxide and particulate matter could exceed state and federal standards at the Ferry Building.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure A-6.1 provides that engine exhaust pipes shall be located sufficiently high to reduce localized impacts. Exhaust points shall be located at least 20 feet above the waterline (the height current modeling indicates is necessary to avoid the impact) unless future modeling indicates that lower heights would reduce concentrations of pollutants to acceptable levels.

(2) Mitigation measure A-6.2 provides that project proponents shall minimize dockside idling time at the Ferry Building in order to reduce the opportunity for local concentrations to build.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact A-7: The Proposed Project could result in increases of pollutants from ferry exhaust deposited directly in the Bay.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure A-7.1 provides that engine exhaust pipes shall be located sufficiently high to reduce localized impacts, as required under measure A-6.1. Exhaust points shall be located at least 20 feet above the waterline (the height current modeling indicates is necessary to avoid the impact) unless future modeling indicates that lower heights would reduce concentrations of pollutants to acceptable levels.

(2) The ferry operators whose ferries dock at the Ferry Building will be responsible for compliance with this measure.

(3) Implementation of the measure identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact A-8: Dredging for the Proposed Project would emit criteria air pollutants. These emissions could exceed the significance thresholds of 80 pounds per day for NOx, ROG, and PM_{10} contained in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure A-8.1 provides that dredging is to be minimized during both construction and maintenance of terminals. This will minimize the length of time during which mechanized equipment will be in operation and emitting criteria pollutants.

(2) Mitigation measure A-8.2 provides that dredging contractors will be required to utilize the best available emissions controls on their equipment. This will minimize the level of emissions to the extent feasible.

(3) The ferry operators who will require dredging for construction or maintenance will be responsible for compliance with these measures.

(4) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Land Use and Community Issues

Impact LU-1: The Proposed Project includes ferry terminal locations in developed urban areas that primarily have port or maritime land uses, but do not currently have ferry terminal facilities. The development of new ferry terminals in urban locations could result in the displacement of existing land uses.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure LU-1.1 provides that site-specific projects shall consider project alternatives that avoid displacement of homes or businesses. Displacement impacts to homes and businesses shall be addressed as part of the terminal site selection process, and be avoided through design measures. Proposals for terminals with potentially significant

impacts due to the displacement of homes and/or businesses will likely not be approved without appropriate mitigation. In the unusual circumstance that displacement is unavoidable, project proponents shall prepare and execute mitigation in the form of a relocation assistance plan or equivalent.

(2) Under mitigation measure LU-1.1, if federal transportation funds will be used for a ferry terminal project, compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, shall be required by the applicable federal transportation agency. Relocation plans typically consider:

- Criteria for replacement housing;
- Reimbursement criteria for moving costs and/or differential housing costs (including rents); and
- Reimbursement criteria for businesses, including costs associated with searching for a new space, and business (i.e., patronage) lost due to the relocation.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact LU-2: Construction of new ferry terminals and associated landside facilities could disrupt or divide established neighborhoods. This impact has the potential to be significantly adverse or beneficial, depending on how much the community supports or opposes the location of the terminal.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Pursuant to mitigation measure LU-2.1, local agencies desiring ferry service should identify parcels along their waterfronts that would facilitate a ferry terminal through a waterfront planning process or other type of terminal location study. Any potential terminal site must be analyzed with consideration to the surrounding land uses in order to ensure the terminal will be a compatible use and will minimize land use impacts. Projects should include project design elements that improve terminal accessibility while maintaining community cohesion.

(2) Cities and counties would be responsible for this planning under the authority granted them by the California Planning and Zoning Law (Government Code Section 65100 et seq.).

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact LU-3: Implementation of the Proposed Project could result in disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure LU-3.1 provides that the terminal site selection process shall consider project alternatives to avoid adverse physical impacts to the low-income and minority neighborhoods. This would include site and terminal access design that minimizes residential acquisition. Terminal planning shall also involve local community input to help identify opportunities to avoid adverse impacts and enhance local planning efforts. Depending on the specific site and local land use planning, the project proponent may work with the local, city, or county to develop specific plans that address appropriate land use designations in the vicinity of the terminals.

If federal money will be used for the construction of a ferry terminal, compliance with the National Environmental Policy Act (NEPA) will be required, and the federal lead agency's guidelines for addressing Environmental Justice shall be adhered to. If required, the federal Environmental Justice process will supersede the requirement to comply with adopted WTA criteria.

(2) Pursuant to mitigation measure LU-3.2, mitigation measures LU-1.1 and LU-2.1 relating displacement impacts and land use compatibility to planning processes and relocation services will be implemented.

(3) The Proposed Project would operate from existing terminals and marinas, a number of which are not currently supporting ferry service. The extensive permitting process applicable to the creation of terminals and marinas in new locations where none exist today, makes mitigation of this impact below the level of significance infeasible. Based on the number of agencies that would be involved in permitting new locations (e.g., USACE, US EPA, NMFS, USFWS, RWQCB, DFG, State Lands Commission, BCDC, etc.), the number of permits likely necessary (Section 404 wetlands, Section 401 water quality certification, incidental take, streambed alteration, state lands lease, BCDC permit, etc.), the requirement for completion of CEQA and NEPA analyses, there is a high level of uncertainty involved in permitting projects that would result in dredge and fill of the Bay. Accordingly, these cannot be assured of being successfully completed in a reasonable period of time.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact LU-4: New or modified ferry terminals would be located along the shoreline, and could affect and/or enhance existing public use and access to and along the Bay Shoreline.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure LU-4.1 provides that planning for terminal locations or expansion will incorporate public access to and/or along the Bay shoreline. This could include trails, parking for shoreline users, viewpoints, and disabled access.

(2) Pursuant to mitigation measure LU-4.2, the WTA's established "Intermodal and Architectural Design Guidelines" shall be considered in the planning and design of new and enhanced ferry terminals. The design objectives include providing Shoreline Access for pedestrians and bicyclists and scenic viewpoints.
(3) Mitigation measure V-1.1 provides that, when feasible, the following shall be included in ferry terminal design:

- Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares;
- Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways; and
- Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay.

(4) The design and construction of terminals will be the responsibility of the ferry operators and could be subject to land use entitlements from the affected cities, counties, and regulatory agencies such as BCDC.

(5) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Aesthetics

Impact V-1: The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San Francisco Bay or degrade the visual character of the Bay.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure V-1.1 provides that, when feasible, the following shall be included in ferry terminal design:

- Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares;
- Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways; and
- Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay.

(2) Pursuant to mitigation measure V-1.2, the WTA's established "Intermodal and Architectural Design Guidelines" shall be considered in the planning and design of new and enhanced ferry terminals. The design objectives may include, but are not limited to, making the ferry system more attractive, integrating terminals with the local urban context, and taking advantage of waterfront views. The specific design of each terminal facility should be developed at a local level to ensure compatibility with the surrounding visual environment. In addition, site-specific studies on the potential impacts of light and glare on wildlife may be necessary to determine appropriate mitigations. This would be most relevant for the Hercules/Rodeo site, which is the only proposed new terminal site that would not be in an area having existing maritime uses.

(3) Environmental factors make the full mitigation of this impact infeasible. New and enhanced ferry terminals will, by their nature as transportation hubs requiring prominent structures, docking facilities, and parking facilities, change the visual environment of the area in which they are located. Although careful design of the terminal structures and associated facilities will reduce this impact, it cannot be completely avoided. The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to eliminate terminals is limited.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact V-5: Expanded and enhanced ferry terminals and services throughout San Francisco Bay could result in light and glare impacts.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure V-5.1, ferry terminal designs will be required to develop site-specific lighting plans. Outdoor lighting shall be focused and directed to the specific location (e.g., roads, walkways), be shielded to avoid the production of glare, and minimize up-light and light spill. Fixtures shall be located, aimed or shielded to minimize stray light to or across property boundaries. Light design shall use down-cast, low glare, shields, or equivalent designs to minimize light and glare on surrounding land uses.

(2) Environmental factors make the full mitigation of this impact infeasible. New and enhanced ferry terminals will, by their nature as transportation hubs requiring lighting of passenger areas, docking facilities, and parking, change the visual environment of the area in which they are located. Although careful design of the structures and limits on new sources of light and glare will reduce this impact, it cannot be completely avoided. The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to eliminate terminals is limited.

(3) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Cultural

Impact CUL-1: Dredging of new channels or for pier retrofit or installation could impact submerged and sub-bottom cultural resources in San Francisco Bay.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure CUL-1.1 requires that in order to avoid or mitigate impacts to cultural resources, the resources must be evaluated against the adopted federal and state significance criteria. Prior to project construction, a focused literature search shall be conducted to identify any known resources. For sites that cannot be adequately characterized by existing literature or available site history information, marine archaeological surveys may be necessary to detect any previously unknown submerged or sub-bottom resources. Depending on the proposed project undertaking and the geographic or bathymetric setting, appropriate remote sensing field surveys could include deployment of a side-scan sonar, sub-bottom profiler, and magnetometer to help detect these resources. Follow-up diver survey, high-resolution side-scan sonar, sub-bottom

profiler, magnetometer survey, or Remote Operated Vehicle (ROV) investigations might be required to positively identify the targets.

If resources are detected, they shall be identified and evaluated against the NRHP/CRHR significance criteria, and as a "unique archaeological resource" under CEQA. If the resources are not eligible for—or already on—the National Register of Historic Places/California Register of Historic Resources (NRHP/CRHR) and do not qualify as a "unique archaeological resource" under CEQA, then no further consideration of these resources is required. If the resources are eligible for, or currently on, the NRHP/CRHR or qualify as a "unique archaeological resource" under CEQA, then impacts could occur to those resources. If a resource is found to be significant, then the resource shall be avoided through alterations in project design, when feasible.

Preservation in place for archaeological resources may be accomplished by, but not necessarily limited to, a suite of approaches such as:

- Planning construction activities to avoid archaeological sites;
- Incorporation of sites within parks or other open spaces;
- Covering the archaeological site with a layer of chemically stable soil before building facilities on top of the site; and/or
- Deeding the site into a permanent conservation easement.

In the event that avoidance of cultural resources is not possible via project design modifications, appropriate mitigation shall be required. This could include further recordation or data recovery, in accordance with Section 106 of the National Historic Preservation Act. This could include a record of the resource, such as a wharf, pier, building or structure in a Historic American Building Survey/Historic American Engineering Record (HABS/HAER) at a level compatible with National Park Service standards. Adequate recordation of a built-environment resource shall include the following:

- The development of site specific history and appropriate contextual information regarding the particular resource, in addition to archival research and comparative studies;
- Accurate mapping of the noted resources, scaled to indicated size and proportion of the structures;
- Architectural descriptions of the structures;
- Photographic documentation of designated resources; and
- Recordation using measured architectural drawings.

Mitigation of impacts to a built-environment resource may also take place in the form of preservation or reuse of a wharf, pier, building, or structure. The preservation or reuse of an eligible structure would include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. If the building is considered a historic resource under CEQA, the local building inspector must grant code alternatives under the State Historic Building Code.

In some cases, HABS/HAER documentation might not provide an adequate mitigation to reduce impacts to a less than significant level, and might not be a sufficient mitigation measure for some resources. Mitigation should capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the pier/building/structure cannot physically be retained, then it is incumbent on the lead agency to pursue ways that the memory of the resource is retained and made easily available. To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. Often, it might be possible to incorporate the resource into the project as one means of resource mitigation.

The CEQA lead agency will be responsible for coordinating all necessary mitigation measures. This might include coordination with a federal lead agency, where federal permitting, land ownership, or other federal-level issues affect a specific project action.

(2) Responsibility for compliance with mitigation measure CUL-1.1 will be shared by the WTA and the local cities and counties and other agencies that would permit terminal construction.

(3) An adverse effect on a cultural resource is the equivalent of a significant effect under CEQA. Although the above mitigation measure will limit impacts on cultural resources, it cannot completely avoid potential losses that would be considered a significant effect. Complete avoidance would only be possible through elimination of portions of the Proposed Project. Complete mitigation of this impact is infeasible because it would conflict with the objective of providing an expanded water transit system, including a terminal at Hercules/Rodeo.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact CUL-2: **Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.**

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure CUL-2.1 would reduce this impact to a less-than-significant level.

(2) Disposal at sites that have not previously been evaluated for cultural resources could pose a potentially significant impact to resources, should they exist. Under mitigation

measure CUL-2.2, impacts could be mitigated by avoidance of the particular disposal site.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact CUL-3: **Project actions such as retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources and historic built environment resources.**

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Implementation of mitigation measure CUL-2.1, described above, would reduce this impact to a less-than-significant level.

(2) Implementation of the measure identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact CUL-4: Project actions such as construction and related activities could impact previously unknown resources.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Implementation of mitigation measure CUL-2.1, as described above, would reduce this impact, but not below the level of significance.

(2) The full mitigation of this impact is economically and practically infeasible. Full cultural resource evaluations of the existing and proposed terminal sites would be expensive; involving detailed site surveys, records searches, cultural research resulting in a site record report, and test excavations. The practical success of such research would be limited by the fact that final locations and designs of terminal facilities are unknown – meaning that their level of impact on any resources encountered could not be fully evaluated. Until final locations and designs are known, the impact on unknown cultural resources cannot be determined.

(3) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its ability to eliminate terminals is limited.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Geology

Impact G-2: Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Mitigation measure G-2.1 requires that terminal facilities shall be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 4. Additionally, to satisfy the provisions of the 1998 California Building Code, these facilities shall be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedence in 50 years). For design purposes, site-specific ground motions shall be calculated for all project sites.

(2) Implementation of the measure identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact G-3: Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Pursuant to mitigation measure G-3.1, a program of site-specific exploratory borings and accompanying laboratory testing will be required to delineate any potentially liquefiable materials underneath potential terminal sites. These geotechnical investigations will also be required for consideration prior to foundation design. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction potential.

(2) This mitigation approach has been performed with success within areas of liquefaction risk in the Bay Area. For example, densified fill material in areas of Foster City and Redwood Shores survived the 1989 M_w 6.9 Loma Prieta earthquake without liquefying. The commercial and residential developments situated on these areas of engineered fill suffered no major structural damage during the earthquake.

(3) Implementation of the measure identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact G-7: Erosion due to wind and water action could lead to the deterioration of terminal structures.

Finding: The WTA hereby makes finding (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Finding:

(1) Pursuant to mitigation measure G-7.1, the erosion potential of each site will have to be determined on a site-specific basis. Once this has been determined, appropriate mitigation measures, if necessary, could be adopted.

If erosion is determined to be a significant threat at a terminal location, the specific location of the terminal could be changed and/or terminal design could be changed to minimize the potential for impacts from erosion. As a last resort, the shoreline could be armored with rip-rap or concrete seawalls. Defensive measures such as groins that modify or deflect flow and circulation patterns are not desirable as they can merely transfer erosion problems elsewhere.

(2) Implementation of the measure identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Noise

Impact NOI-3: Noise-sensitive human receptors could be exposed to significant increases in ambient noise from proposed ferry terminal operations.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure NOI-3.1 provides that siting and planning of new ferry terminals shall include planning to locate terminal areas away from noise-sensitive land uses.

Compliance with existing zoning ordinances should be sufficient to mitigate any potential impacts of ferry terminal operations.

(2) Determining and enforcing compliance with zoning and other local ordinances will be the responsibility of the cities and counties within whose jurisdiction the existing and proposed terminals are located.

(3) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

Impact NOI-4: Wildlife could be exposed to noise from proposed ferry operations.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure NOI-4.1 provides that the exact route from San Francisco to Treasure Island shall be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-out or to other wildlife (birds and fish), could be significant.

(2) Mitigation measure B-14.1 will require transiting ferries to maintain setbacks greater than those recommended by NMFS from seal haul-out areas. These setbacks will help reduce the sound of the ferries through distance-related attenuation.

(3) Reduction of this impact on the Treasure Island seal haul out to below the level of significance may be physically infeasible. The proximity of the haul out to the anticipated terminal location may not allow sufficient distance to attenuate the elevated noise levels from ferry operations.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Transportation

Impact T-1: At the regional level, expansion of the ferry service would result in a decrease of the total automobile VMT. However, at the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure T-1.1, once terminal locations are selected, site-specific traffic analyses shall be conducted to compare predicted traffic with applicable local level of service (LOS) standards. Traffic mitigation measures would depend on site-specific conditions, including design of vehicular access to terminals, major access routes, parking availability, and traffic patterns. For example, impacts that were predicted to occur at intersections could be mitigated by addition of turning lanes. For some cases, where access is problematic or presents serious community concerns, the viability of the terminal location would need to be further evaluated.

(2) Reduction of this effect below the level of significance is physically infeasible because a majority of ferry users will rely upon automobiles to access the terminals. The Metropolitan Transportation Commission's 2001 Regional Transportation Plan estimates that by the year 2025 approximately 82.2 percent of the daily trips (both work and non-work related) will be by automobile, 10.3 percent will be by walking, and 6.2 percent will be by transit. This dependence upon automobiles to access the Proposed Project's new terminals and expanded service will necessarily result in an increase in traffic on adjoining roads. Widening roads in urbanized areas brings its own set of impacts, including relocation of businesses and residences and noise, that make impractical the level of improvements necessary to accommodate new traffic.

(3) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services and related ground transportation terminal access services," so its ability to eliminate terminals or parking areas is limited.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Impact T-2: Additional automobiles accessing existing and new ferry terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure T-2.1 provides that the project proponent(s) and ferry terminal authorities, in conjunction with local and regional transit agencies, shall study and develop terminal-specific plans to ensure that potential driving ferry patrons can be adequately served by transit in locations with limited parking and currently insufficient transit access.

(2) Cities and counties will apply their land use planning and zoning authority to designate areas for terminals and for parking.

(3) Reduction of this effect below the level of significance is physically infeasible because a majority of ferry users will rely upon automobiles to access the terminals. The Metropolitan Transportation Commission's 2001 Regional Transportation Plan estimates that by the year 2025 approximately 82.2 percent of the daily trips (both work and non-work related) will be by automobile, 10.3 percent will be by walking, and 6.2 percent will be by transit. This dependence upon automobiles to access the Proposed Project's terminals will necessarily require the provision of new parking spaces either at the terminals or in their vicinity. Creating additional parking in urbanized areas brings its own set of impacts, including relocation of businesses and residences, loss of aesthetic quality, and light/glare.

(4) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services and related ground transportation terminal access services," so its ability to eliminate terminals or parking areas is limited.

(5) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Energy

Impact E-2: The Proposed Project could result in higher energy-per-passenger-miles-traveled value than other transit modes.

Findings: The WTA hereby makes findings (a)(1), (a)(2), and (a)(3), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Mitigation measure E-2.1 will require WTA to continue investigating the feasibility and applicability of using energy sources other than fossil fuels and using different engine technologies. One promising technology is the use of fuel cells. The WTA has investigated the use of alternative fuels for ferries in: *New Technologies and Alternative Fuels Working Document* (JJMA 2002). Alternative energy sources and engine

technologies will become available and will be incorporated as they become feasible and cost-effective.

(2) Reduction of this impact below a level of significance is technologically infeasible. The limitations of existing technology, including ship and engine design, keep the energy cost of ferry transportation per passenger-miles-traveled close to that of automobiles. Ferries do not enjoy the level of energy efficiency per passenger-miles-traveled offered by rail and bus transit. While future technologies are expected to improve ferry energy efficiency, the same engine technologies will be used to increase the efficiency of other transit modes as well.

(3) The WTA is legally obligated by its enabling legislation (Government Code Section 66540.20) to "provide new or expanded water transit services," so its has no ability or authority to operate a different mode of transit that would use less energy per passenger miles traveled.

(4) Implementation of the measures identified above will reduce this potentially significant impact, however, it will nonetheless result in a significant effect as defined by CEQA.

Growth Inducement

Impact GRO-1: The Proposed Project proposes to expand ferry service at existing terminals and add new ferry terminals primarily at developed waterfront areas. This could be growth-inducing for areas near the terminals.

Findings: The WTA hereby makes findings (a)(1) and (a)(2), as stated in State CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to the above-identified effect.

Facts supporting the Findings:

(1) Pursuant to mitigation measure LU-1.1, site specific projects shall consider alternatives that avoid the displacement of homes or businesses. Displacement impacts shall be addressed in the site selection process and avoided through design measures. If displacement is unavoidable, project proponents must execute a relocation assistance plan or its equivalent.

(2) Mitigation measure LU-2.1 provides that local agencies desiring ferry service should identify parcels along their waterfronts that would facilitate a ferry terminal through a waterfront planning process or other type of terminal location study. Any potential terminal site must be analyzed with consideration to the surrounding land uses in order to ensure the terminal will be a compatible use and will minimize land use impacts. Projects should include project design elements that improve terminal accessibility while maintaining community cohesion

(3) Cities and counties are responsible for planning and regulating land use under the authority granted them by the California Planning and Zoning Law (Government Code Section 65100 et seq.). Control of future growth in areas surrounding new or expanded terminals would be the responsibility of the city or county in which the terminals are located or adjoin.

(4) While the Proposed Project may result in growth near terminals in order to take advantages of clustering development near transit opportunities, that growth will be localized. Because the Proposed Project is intended to augment existing travel modes within the Bay Area through the provision of an expanded ferry system, and will not substantially affect travel times to and from terminals, it would not remove obstacles to regional growth and is not expected to be growth-inducing at the regional level. .

(5) Implementation of the measures identified above will reduce this potentially significant impact to a less-than-significant level as defined by CEQA.

FINDINGS FOR THE PROJECT ALTERNATIVES

In the initial draft EIR, Alternatives 1 (Augmented Blue Ribbon System), 2 (Expanded System), and 3 (Enhanced Existing Service) were all considered to be feasible ferry service alternatives. Since that time, the WTA has determined that Alternatives 1 and 2 do not meet the CEQA requirement that alternatives substantially reduce or avoid project impacts. Both of these alternatives describe larger systems and would have more severe impacts than the Proposed Project.

In the revised Draft EIR and the Final EIR for the Proposed Project, WTA disclosed that Alternatives 1 and 2 are not considered feasible and have been eliminated from further consideration. Additional discussion of these rejected alternatives is contained in Section 2 of the Final EIR. The following findings address Alternatives 3 and 4 (No Project). No findings are necessary under CEQA Guidelines Section 15091 for alternatives that were considered, but eliminated from further evaluation in the EIR.

Alternative 3 – Enhanced Existing Service Alternative

Six ferry routes currently serve the San Francisco Bay Area. Alternative 3 would increase and improve service along these routes by adding or substituting new vessels to increase the number of trips and decrease the headways between trips. Improvements may also be made to existing passenger terminal facilities.

Finding: The WTA hereby makes finding (a)(3), as stated in CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to this alternative.

Facts supporting the Finding:

(1) Alternative 3 is legally infeasible. This alternative does not fully meet the requirement of Government Code Section 66540.20(b) which states that: "[t]he plan shall investigate *and plan for* terminal locations *throughout* the San Francisco Bay Area." (emphasis added) Alternative 3 is based on expanded operations within the existing terminals. It does not plan for new terminal locations in either Suisun Bay or the South Bay. Both of those areas are part of the San Francisco Bay Area.

Alternative 4 – No Project Alternative

Alternative 4 consists of existing ferry service, with minimal improvements. Ferry service would continue to operate on the six existing routes at about the same frequency. Future changes or improvements of service would depend upon the availability of funding allocated through the Metropolitan Transportation Commission.

Finding: The WTA hereby makes finding (a)(3), as stated in CEQA Guidelines Section 15091 and as required by Public Resources Code Section 21081, with respect to this alternative.

Facts supporting the Finding:

(1) Alternative 4 is legally infeasible. This alternative does not meet the requirements of Government Code Section 66540.20(b) which states that: "[T]he plan shall investigate *and plan for* terminal locations throughout the San Francisco Bay Area." (emphasis added) Alternative 4 is based on continued operations at existing terminals. It does not plan for terminal locations in either Suisun Bay or the South Bay Area.

(2) In addition, Alternative 4 does not meet the requirements of Government Code Section 66540.20(e) which states, in part, that: "[t]he primary focus of the [Water Transportation] authority and the plan shall be to provide *new or expanded* water transit services and related ground transportation terminal access services that were not in operation as of June 30, 1999." (emphasis added) This alternative is based on continued operations at existing terminals with modernization as time passes. It does not plan for new or expanded services beyond that incidental to modernization of existing facilities.

(3) The WTA is legally obligated by its enabling legislation (Government Code Section 66540 et seq.) to "prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan." This plan is the Proposed Project. Selecting the No Project alternative, which does not meet the requirements of Government Code Section 66540.20, as described above, would violate the WTA's statutory responsibility.

STATEMENT OF OVERRIDING CONSIDERATIONS

As described in the Draft EIR and Revised Draft EIRs prepared for the Proposed Project, the Proposed Project would result in a number of significant environmental impacts that cannot be reduced to a less-than-significant level by feasible mitigation measures. These significant, unavoidable impacts include:

- increased potential for collisions with other water craft;
- inundation of clapper rail nests by inundation from increased wave wash;
- loss of jurisdictional wetland habitat as a result of terminal construction;
- disturbance of "special aquatic sites" by construction;
- increased potential for high-speed ferries to strike gray whales;
- potential "take" of special-status species as a result of construction and operation;
- cumulative contribution to regional cumulative emissions of sulfur dioxide and reactive organic gases (ROG);
- cold-start emissions from motor vehicles leaving terminals during the evening commute could lead to localized violation of the short-term carbon monoxide (CO) standard;
- cumulative contribution to air pollutants that would be deposited in the Bay, increasing sulfate deposition;
- homes or businesses could be displaced in low-income and minority communities;
- construction and operations of new and enhanced ferry terminals could impact land and water views of the Bay;
- expanded ferry service could increase light and glare impacts;
- dredging could impact cultural resources in the Bay;
- construction could impact previously unknown cultural resources at terminal locations;
- wildlife could be exposed to noise from proposed ferry operations;
- expansion of ferry service could result in traffic impacts in the vicinity of terminals;
- expansion of ferry service could result in localized parking problems and conflicts in the vicinity of the terminals; and
- the Proposed Project could result in higher energy-per-passenger-miles-traveled than other transit modes; and

The WTA finds that the significant, unavoidable adverse impacts identified in the EIR for the Proposed Project are outweighed by the following benefits of the Proposed Project:

(1) The Proposed Project offers environmental benefits in the form of regional air quality improvements over the year 2025 air pollutant emissions projected to occur without the Project. The Bay Area is in compliance with State and Federal air quality standards for most criteria pollutants. However, it is not in compliance for ozone and PM_{10} emissions.

As described in Section 3.6 (Air Quality) of the EIR for the Proposed Project, regional cumulative emissions of NOx, PM_{10}, and CO from passenger cars, buses, and ferries would decrease under the Proposed Project. Reactive organic gases (ROG) and SO_2 emissions would increase. The Bay Area would remain in compliance for SO_2 emissions even with the increase resulting from the Proposed Project. While the potential increase in ROG is of concern, the sum of ROG and NOx emissions (ozone precursors) in the year 2025 is projected to be 1,589 pounds/day less with the Proposed Project than without it.

(2) The Proposed Project would provide the social benefit of reducing congestion on other modes of transportation to and from the City of San Francisco. Both the BART heavy rail and the freeway systems are highly congested at this time and expected to remain so into the future.

According to BART's draft "FY03 Short Range Transit Plan and Capital Improvement Plan Update," the Bayfair (San Leandro) to Daly City line is currently the system's most congested. The Transbay link is reaching capacity and has limited ability to accommodate additional commute trips. While the Advanced Automatic Train Control System currently being installed (expected to be on line in 2004) will enable BART to run trains through the Transbay tube at shorter intervals (thereby increasing capacity), the system cannot reach full potential because of the constraints imposed by the four downtown San Francisco stations. The close proximity of the stations to one another requires longer intervals between trains to provide each train with sufficient time to enter, exchange passengers, and exit the station. The Proposed Project would increase ferry transit service from the East Bay (particularly from new terminals in Berkeley and Richmond) to San Francisco. This would relieve demands on the BART system to some extent.

The freeway approaches to the Bay Bridge include three of the 10 most congested points on the Bay Area freeway system, as identified in the 2001 Regional Transportation Plan adopted by the Metropolitan Transportation Commission. Two points on the eastern approach are ranked 1 and 9; a point on the western approach is ranked 4 on the list. Again, the Proposed Project would provide an alternative means to travel to and from San Francisco from the East Bay. This would relieve congestion on the Bay Bridge to some extent.

(3) The Loma Prieta Earthquake of 1989 severely damaged the Bay Bridge, destroyed sections of I-880, and interrupted service along other parts of the Bay Area freeway network. Ferry service to and from San Francisco was expanded on a temporary basis immediately following the earthquake and made a substantial contribution to the ability of other transportation modes to take up the slack created by damage to the freeway system. The diversity of transportation modes, including ferry and rail transit, reduced the earthquake's economic impact on the Bay Area by allowing employees alternative means of getting to work.

The Proposed Project contributes to the economic benefits a diversified transportation system can provide in times of emergency or other situations where one mode of transit becomes inaccessible.

(4) The Proposed Project offers the social benefit of potentially encouraging new development to cluster at ferry terminals. Increasing the density of development at transit nodes, including multi-modal ferry terminals, reduces the need for nearby residents to use their automobiles to make trips to areas served by the ferry and other transit services. It also reduces the need to use automobiles to access commercial or retail development at the transit node. This reduces vehicle miles traveled by residents of transit nodes and their associated contributions to vehicular congestion, encourages pedestrian and bicycle trips which avoid contributing air pollution emissions, and provide opportunities for social interaction not found in less-dense areas.

Encouraging development at transit nodes is a recognized component of "smart growth" that channels investment and population growth to infill locations within urbanized areas for more efficient use of services and reduced cost of providing services. Indirectly, this type of smart growth reduces to some extent the need for new development at the urban fringe where provision of services is more expensive (financially and environmentally) in the long-term.

(5) Approval of the Proposed Project meets the legal mandate established by the Governor and State Legislature through passage of the enabling legislation that created the San Francisco Bay Are Water Transit Authority (Government Code Section 66540 et seq.). Government Code Section 66540.20 requires the WTA to "prepare and adopt" an Implementation and Operations Plan for San Francisco Bay Area water transit that would "provide new or expanded water transit services and related ground transportation terminal access services." This action allows the WTA to comply with that legal obligation.

(6) Approval of the Proposed Project is one step toward the WTA receiving statutory authority to operate the water transit system. Pursuant to Government Code Section 66540.23, the WTA cannot operate the system until the Implementation and Operations Plan is approved by statutory action of the California Legislature. Receiving this approval would offer the benefits of efficiency in operations of the water transit system, through establishment of a Bay Area-wide authority that can operate a comprehensive regional public system in coordination with other agencies, and eligibility for financing of planned system improvements from regional, state, and federal funding sources through the WTA.

(7) The Proposed Project offers environmental benefits in the form of a very small reduction in the regional vehicle miles traveled (VMT) projected for the Bay Area in the year 2025 without the Project. As described in Section 3.12 (Transportation) of the EIR for the Proposed Project, this would be as much as a 0.4 to 0.5 percent reduction in San Francisco, Marin, and San Mateo Counties. While a small improvement, this would nonetheless contribute to efforts to reduce automobile traffic congestion in the Bay Area.

Mitigation Monitoring Plan

The California Environmental Quality Act (CEQA) requires that when a public agency approves a project on the basis of an Environmental Impact Report (EIR), the agency must adopt a program of monitoring or reporting on the mitigation measures it has imposed to reduce or avoid significant environmental impacts. The purpose of the Mitigation Monitoring Plan (MMP) is to ensure that the mitigation measures are implemented. This MMP has been prepared for the EIR for Expansion of Ferry Transit Service in the San Francisco Bay Area, pursuant to State CEQA Guidelines Sections 15091(d) and 15097 of CEQA.

The San Francisco Water Transit Authority (WTA) was created by the California Legislature as a regional agency with the directive to evaluate options for improving and expanding ferry service in the Bay Area, and to prepare and adopt a San Francisco Bay Area Water Transit Implementation and Operations Plan (IOP) for consideration by the Legislature. (Government Code Section 66540 et seq.) The primary focus of the WTA is to provide, in cooperation with existing transit service providers, new or expanded water transit services and related ground transportation terminal access services that were not in operation as of June 30, 1999. (Government Code Section 66540.20) The WTA is required to prepare, and has certified, a programmatic EIR analyzing the impacts of the IOP. (Government Code Section 66540.22)

Unlike most public agencies that prepare an EIR for their planned activities, the WTA is not currently authorized to undertake the activities described in the IOP. The Legislature must consider and approve the IOP by statute before the WTA will be empowered to implement it. (Government Code Section 66540.23) The powers of the WTA may be further refined in that future statute.

The IOP prepared by the WTA defines a program to improve and expand ferry service in the greater San Francisco Bay Area but does not address the specific details of future water transit projects (i.e., location new ferry terminals or ferry routes, ground transportation connections). The EIR for the IOP has been prepared as a program EIR pursuant to State CEQA Guidelines Section 15168 since it is anticipated that the individual actions conducted as part of the IOP constitute logical parts in the chain of action necessary to improve and expand Bay Area ferry service. Future projects that are conceptually described in the IOP would require additional compliance with CEQA (and the National Environmental Policy Act [NEPA], if applicable) at such time as they are being considered for approval.

Although the mitigation measures presented in the EIR would be applicable to all actions taken as part of new or expanded ferry service, WTA has determined that its prospective authority to implement these measures will be limited to projects related to new ferry service. The WTA would be the lead agency with responsibility for implementing the IOP and, in accordance with this authority, would be directly responsible for carrying out new water transit projects, or would have approval authority over new water transit projects carried out by local sponsors or authorities (i.e., municipalities, ferry service operators, transit agencies).

Expansion of the existing water transit would be the responsibility of local authorities (i.e., existing ferry service operators) and, unless WTA involvement is initiated by the local authority, such actions would be outside the jurisdiction of WTA. As future projects are approved under the IOP EIR, local authorities will be responsible for adopting their own MMPs for the mitigation measures that fall within their responsibility to implement.

WTA responsibilities for *new water transit projects* would include the following:

- For projects undertaken by WTA, WTA would comply with CEQA (and NEPA, if necessary) in analyzing the site-specific environmental impacts of each project. Site-specific CEQA analyses would tier off the IOP EIR, including adoption of all necessary and appropriate mitigation measures.
- For projects undertaken by local authorities, WTA would require local project authorities to comply with CEQA (and NEPA, if necessary), prior to project approval by WTA. As part of compliance WTA would require local authorities to incorporate the mitigation measures contained in the IOP EIR, as appropriate to the specific action.

WTA responsibilities for projects related *expansion of existing water transit* would include the following:

- WTA would work with local authorities to ensure that projects are implemented consistent with the goals and objectives of the IOP.
- WTA would encourage local authorities to preparing project-specific environmental documents that tier off the IOP EIR;
- WTA would, through comments on environmental compliance documents, recommend that the local authority incorporate mitigation measures from the IOP EIR into the project-specific environmental documents.

Impact	Mitigation Measure
Dredging	
Impact D-2: Dredging of new channels could locally reduce water quality by exposing and suspending contaminated sediment.	**Mitigation D-2.1:** As part of the DMMO dredging permit requirements, proposed dredging locations shall be sampled and tested to determine the existence and extent of any contamination. Whenever contaminated materials are to be dredged, negative impacts on water quality shall be minimized through the use of the most appropriate dredge type and dredging techniques for each site. Engineering included in the plans and permits for dredging projects shall include the use of BMPs described above to reduce potential impacts to less than significant levels. The DMMO permit requirements also include a Section 401 Water Quality Certification from the RWQCB, which will require implementation of appropriate BMPs if they are necessary to protect water quality. Individual project proponents shall incorporate appropriate BMPs for dredging plans and specifications.
Impact D-4: Dredging could adversely impact threatened, endangered, or protected species.	**Mitigation D-4.1:** Negative impacts on threatened, endangered, or protected species shall be minimized through use of dredge types and techniques and implementation of BMPs. BMPs could include use of silt curtains and adhering to dredge windows for special status species. Use of BMPs and appropriate dredging techniques will be part of the DMMO recommendation and incorporated as conditions for regulatory approval of the permit application.
	Mitigation D-4.2: Individual projects would undergo consultation with the resource agencies. Several mitigation measures have been utilized in previous projects to reduce or avoid impacts to biological resources related to dredging operations. These include the use of physical barriers such as silt curtains to contain the turbidity plume; selection of dredging equipment to reduce suspension of materials; and, if construction sequencing permits, restricting dredging in shallow water to between June 1 and November 30. During the preparation of the LTMS EIS/EIR, the LTMS agencies consulted with U.S. Fish and Wildlife Service, National Marine

Impact	Mitigation Measure
	Fisheries Service, and the California Department of Fish and Game regarding potential impacts of dredging and dredged material disposal on sensitive biological resources. These resource agencies, in conjunction with LTMS agencies, developed a list of restrictions specific to San Francisco Bay to protect critical habitat for special status and important commercial and recreational species. Figure 3.1.5 shows areas and times of restricted dredging activity related to these species. Dredging shall be conducted in conformance to applicable seasonal restrictions to minimize impacts to biological resources.
Impact D-5: Dredging for construction of access channels to new ferry terminals could result in loss or disturbance of jurisdictional wetlands.	Implement Mitigation Measure B-1.1 and B-1.2
Navigation	
Mitigation NAV-1: With expansion of water transit service there is a potential for an increase in incidents such as collisions, allisions, and groundings.	**Mitigation NAV-1.1:** Implementation of best practices to meet or exceed USCG requirements as recommended by the preliminary risk assessment prepared by ABS (2002) will serve to minimize navigation-related risk. These practices are listed below: Design and implement a preventive maintenance system that meets or exceeds manufacturer's service requirements. Require a licensed master to complete an extended familiarization training program aboard the hull and route before being qualified as master-in-charge. (Note: Program training should meet or exceed the requirements in the USCG National Maritime Center Policy Letter 06-01 subj.: "Qualification for Issuance of Type Rating Endorsements Authorizing Service on High-Speed Craft.") Design the terminal to facilitate docking under both prevailing and seasonal environmental conditions. When conditions make it difficult for the master-in-charge to

Impact	Mitigation Measure
	effectively maintain situational awareness, assign another person to the bridge watch (i.e., another licensed master or a senior deckhand) to share the workload and serve as a safety double check. Design and install gangway systems (1) that help steady the ferry and hold it firmly to its dock, (2) that can be adjusted to accommodate changing environmental forces, and (3) that can be manipulated by crew having different physical abilities. Install, operate, and maintain technology (e.g., portable pilot units, and/or automatic identification system tracking and display) to facilitate communication of intent and to audit conformance with navigational protocols. Install, operate, and maintain a backup radar and separate power supplies for radars. Train/certify all bridge watchstanders in radar operation. Periodically survey the water depth in the vicinity of a terminal to identify shoaling, and set and maintain private markers to identify shoal water. Conduct periodic electrical safety inspections and daily check of ground faults. Install a bridge alarm/indicator that alerts the licensed master of the location of electrical shorts. Install and maintain a fixed fire suppression system that has sufficient capacity to flood the engine room twice with CO_2 or equivalent fire suppression agent. Eliminate or minimize hazardous materials used in maintenance and repair. Use a closed gauging system for checking fuel levels. Develop company policy and standard procedures for emergencies and adverse weather and normal operating conditions. Implement

Impact	Mitigation Measure
	and enforce procedures through training and company communications. Audit conformance. Provide job aids for critical procedures. Note: Policy and procedures manual and an operational training program should be developed using the guidance in the USCG Navigation and Vessel Inspection Circular 5-01 subj.: “Guidance for Enhancing the Operational Safety of Domestic High-Speed Vessels.” Develop, communicate, and enforce standard operating procedures for ferry startup and shutdown. Develop, communicate, and enforce navigational protocols for routes. Identify areas/conditions in which meeting, crossing, or overtaking may significantly increase the risk of collision and develop/enforce a “no passing” policy for those areas. Develop and exercise vessel mutual assistance plans. Develop and exercise emergency response protocols to facilitate communication and ferry traffic control during emergencies. Determine with emergency care providers (e.g., ambulance services) locations along a route at which the ferry can transfer people in medical distress. Develop, communicate, and enforce a hot work permit program. Develop, communicate, and enforce lock-out/tag-out program. Develop, communicate, and enforce a safe lifting program for deckhands. Develop and enforce standards for emergency training. Establish a frequency for emergency drills that meets or exceeds USCG requirements. Establish criteria for measuring drill performance.

Impact	Mitigation Measure
	Require all shifts and all crew on each shift to participate. Document training.
Mitigation NAV-2: Increased numbers of ferry transits in the Bay may increase the risk of incidents (such as collision and near misses) between windsurfers and ferries.	**Mitigation NAV-2.1:** Appropriate training of crew of ferry vessels servicing new terminals located near existing windsurfing launch sites could reduce the risk of incidents involving ferries and windsurfers. Training shall include awareness of windsurfing locations and specific windsurfing events. The San Francisco Boardsailing Association should be encouraged to participate in the development and delivery of such training.
	Mitigation NAV-2.2: Specific ferry employees shall be designated to stand watch on the bridge of ferries on select routes to watch for navigational hazards (i.e., during periods of high use by windsurfers within the vicinity of selected terminal locations) to reduce the risk of incidents involving ferries and windsurfers.
Mitigation NAV-3: Increased ferry transits may lead to an increased risk of collision between recreational boaters and ferries.	**Mitigation NAV-3.1:** Additional training, education, and public advisory programs for recreational watercraft users related to navigational safety requirements could reduce the risk of incidents associated with expanded ferry service in the Bay. The project proponent could work with the Harbor Safety Committees (which include recreational boaters) and could fund or sponsor new education and advisory training programs and strengthen existing ones. Potentially affected recreational users, especially those docking at marinas located in the vicinity of proposed new ferry terminals, shall be reached through public notices.
	Mitigation NAV-3.2: Specific ferry employees shall be designated on selected ferries/routes to stand watch on the bridge for navigational hazards (i.e., during periods of high recreational use, such as weekends or race events, or when weather hazards exist) could reduce the risk of navigational incidents.
Wake Analysis	
Impact WW-1: Increased frequency of ferry trips across the	**Mitigation WW-1.1:** To meet the criteria evaluated for impact WW-1, ferry routes and service may need to be modified such that:

Impact	Mitigation Measure
Bay could increase the wake energy at some shorelines, causing increased erosion. Service to new areas of the Bay could lead to shoreline impacts from increased wave heights.	ferry routes and service may need to be modified such that: The route alignments are maintained at more than 1,500 meters from potentially sensitive shorelines (e.g., mudflats, unprotected tidal marshes). This should maintain wake impacts at a less than significant level. Operation of the vessels (primarily speeds) are maintained such that predicted wake wave heights at the shoreline would be less than 16 cm. This would also reduce this impact to a less than significant level. Operation of vessels are maintained such that predicted wake waves at the shoreline would be less than 50 percent of the average sustained wind wave height on a monthly basis.
	Mitigation WW-1.2: New ferry routes could potentially be modified to redirect energy away from sensitive habitats, to reduce or eliminate increased wake energy. Adjustment to routes can be used to focus wave energy on rocky or armored shorelines or to direct energy away from sensitive areas. Detailed wave refraction, diffraction, and reflection analysis would be required to predict the efficacy of wave energy focussing. This mitigation measure would only be feasible and effective on portions of routes where the operation of the vessel can incorporate these adjustments. For example, the approach routes to terminals near sensitive areas could be designed such that wake wash is directed away from sensitive tidal marsh environments, and turning movements are not permitted at a speed and/or direction that exceeds criteria 2 or 3, listed above. Route bending could, however, involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.
	Mitigation WW-1.3: Use of existing low-wake vessel technology could reduce both the total wake wash energy and heights of individual waves. As shown in Figure Wake-D-2 (in Appendix Wake-D of the Draft Program EIR) existing light-weight high-speed vessels have 25 percent or better wave height and wave energy

Impact	Mitigation Measure
	characteristics than the 350-passenger high-speed vessels presently operating on the Bay. For example, if a vessel with a wave height profile such as the *Bravest* (Appendix Wake-D) were specified (which has an operating design wave height of 22 cm measured at 300 meters) the 16-cm shoreline wave height criterion would be met at a distance of 780 meters, almost half the 1,500 meter distance for vessels with a 27-cm design wave height. Because wave energy is proportional to the square of wave height, slight reductions in design wave heights are equivalent to significant reductions in wave energy, and hence equivalent to significant reductions in wave heights at distance. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis
	Mitigation WW-1.4: Operational adjustments, such as slowing down vessels, could be implemented to reduce wake energy near sensitive tidal marsh habitat. Note, as shown in Figure Wake-D-2 (in Appendix Wake-D of the Draft Program EIR), a considerable reduction in vessel speed is required with an efficient high-speed vessel before the wake wash height is less than that at design operational speeds. For example, for the Mare Island class of high-speed catamaran currently operating on the Bay, the normal operating speed of 34 knots (40 mph) would need to be reduced to 10 knots (11 mph) or less in order to achieve a reduction in wave height. The change in wave form (and hence wave period) would also need to be considered as high-speed ferries generate a different wave patterns at high (operating) and low (motoring) speeds. At high speed when the vessel is planning, a divergent wave pattern is generated, while at slow speeds, the transverse stern wave dominates the wave pattern. Since speed reduction could have a substantial impact on high-speed routes, this measure would only be practical in specific areas that cannot be mitigated by any of the other measures. However, these mitigation measures could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.
Impact WW-2: Wake wash impacts from increased ferry service could	**Mitigation WW-2.1:** The mitigation measures for impacts to marinas are the same as for Mitigations WW-1.1 through WW-1.4.

Impact	Mitigation Measure
impact surrounding marinas, potentially damaging moored vessels and interfering with recreational users.	are the same as for Mitigations WW-1.1 through WW-1.4.
Impact WW-3: Wake wash impacts from increased ferry service could have an adverse effect on California clapper rail, a listed species, by inundating nests.	**Mitigation WW-3.1:** For any shoreline areas that have potential clapper rail nesting habitat within 50 meters of the edge of a marshland (or within marshland that does not appear healthy and could limit attenuation of wave energy as a result) and are along a proposed ferry route, habitat surveys should be conducted to determine whether nesting sites exist. If nesting sites or suitable nesting habitat do exist within 50 meters of the edge of the marshland, site-specific measurements of wake attenuation should be performed at the potential site to determine whether wash will be an issue. An analysis such as that provided as part of the documentation for the Wave Height Analysis for Flood Insurance Studies (WHAFIS) model could be used to predict wave propagation and decay at high water (FEMA 1988). If the measurements/calculations indicate that nest inundation could potentially occur, one of the following additional mitigation measures may be necessary. For nesting sites more than 50 meters inland from the edge of the marshland, no significant impacts would occur.
	Mitigation WW-3.2: Use of existing low-wake vessel technology could reduce both the total wake wash energy and height of individual waves. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels.
	Mitigation WW-3.3: New ferry routes could be adjusted to redirect energy away from sensitive habitat or to reduce or eliminate increased wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less than significant levels. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.
	Mitigation WW-3.4: Operational adjustments, such as slowing the vessel down near sensitive areas, could be performed during ferry

Impact	Mitigation Measure
	operation to reduce wake energy. Use of this mitigation in areas where clapper rail nests are within 50 meters of the shoreline could reduce impacts to less-than-significant levels. However, this mitigation could involve compromises in service and cost, which would need to be evaluated on a route-by-route basis.
Impact WW-4: Wake wash impacts from increased ferry service could have an adverse effect on Pacific harbor seals at haul-out sites.	**Mitigation WW-4.1:** As discussed in Mitigation B-14.1 in the Biology Section of the Draft Program EIR, the National Marine Fisheries Service (NMFS) currently has guidelines for avoidance of marine mammals to reduce disturbance. For seals and sea lions, the minimum avoidance distance for haul-out sites is 30 meters (this distance, however, does not take vessel speed or wash into account). Distances discussed from the literature show that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Given the site-specific information available for San Francisco Bay (Castro Rocks), it is recommended that ferry routes should be at least 300 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations (see Biology Mitigation B-14.1).
Water Resources	
Impact W-1: Construction and operation of terminal facilities, including parking lots, access roads, and buildings, would increase the amount of impervious surface area, causing increased storm water runoff. If runoff contained pollutants or eroded disturbed soil, discharge could impact receiving water quality.	**Mitigation W-1.1:** Adoption of BMPs during construction to prevent, minimize, and clean up spills and leaks from construction equipment would reduce the potential for impacts to water quality. Examples of BMPs include refueling and maintenance of equipment only in designated lined and/or bermed areas, isolating hazardous materials from stormwater exposure, and preparing and implementing spill contingency plans in specified areas. Any equipment with a fuel tank or other oil tank, such as heavy excavation machinery, must be considered as a potential source of released oil. Storage and parking of such equipment shall take into account oil spill prevention regulations to ensure that the area is free of drains or other avenues though which spills may escape containment.
	Mitigation W-1.2: New terminal facilities shall be designed such that stormwater runoff would be controlled and discharged in an

Impact	Mitigation Measure
	appropriate manner. Construction and industrial stormwater NPDES permits would be required, and BMPs shall be adopted to reduce the chance of pollutants entering surface and groundwater, thereby reducing the potential for impacts to water quality. Typical pollution control measures include BMPs designed to reduce the quantities used of materials that may produce pollutants, changing the way various products and materials are handled or stored, employing various structural devices to catch and restrict the release of pollutants, and establishing appropriate responses to spills and leaks. Examples of BMPs include temporary silt fencing, protection devices such as rock aprons at pipe outlets, stabilized pads of aggregate at points where construction traffic would be leaving an unimproved construction site to enter a public street, temporary drain inlet protection devices such as filter fabric and sand bags, concrete washouts for cement mixers, preservation of existing vegetation, and vehicle and equipment cleaning.
Impact W-3: Increased ferry transits could increase the potential for fuel spills and water quality degradation in the Bay. Although the probability of a spill is low, it still has the potential to occur.	**Mitigation W-3.1:** Although this impact is considered to have a low probability of occurring, a spill still has the potential to occur, and safety and avoidance measures are prudent. The Harbor Safety Committee of the San Francisco Bay Region adopted a Harbor Safety Plan in 1992 for San Francisco, San Pablo, and Suisun Bays. The plan, as mandated by the California Oil Spill Prevention and Response Act (OSPRA) of 1990, is aimed at improving the prevention, removal, abatement, response, containment, and cleanup and mitigation of oil spills in the state's waters. OSPRA also requires an annual review of the harbor safety plans to be submitted to the state Oil Spill Prevention and Response Administrator for comment and approval. The Bay Area ferry operators participate in the Harbor Safety Committee. The safety issues raised by expansion of ferries in the San Francisco Estuary and relevant recommendations and modifications will need to be incorporated into the annual plan review. A strengthened Harbor Safety Plan would reduce the potential for impacts to water resources resulting from expansion of ferry operations.
	Mitigation W-3.2: Ferry operators shall update their contingency plans and continue to use emergency response services for pollution incidents. Several Oil Spill Response Organizations (OSROs)

Impact	Mitigation Measure
	operate in the Bay and collaborate with the USCG, California Office of Spill Prevention and Response (OSPR), and other organizations in the Unified Command System during drills and spill responses. Ferry operators have retained OSRO services and maintain response equipment on board vessels and at ferry terminals. As part of the ferry expansion program, the contingency plans, drill exercises, and emergency response service agreements would be reviewed and modified, if necessary, to reduce potential impacts to water resources resulting from spills. Such modifications would include ensuring that all of the spill response equipment required at new terminals is available. Review of updates and modifications to plans will be done under the USCG's regular oversight of oil spill contingency plans. The work of updating and expanding the spill response plans should be based on NOAA's Environmental Sensitivity Index (ESI). The ESI involves the systematic compilation in a standardized format of information related to coastal shoreline sensitivity, biological resources, and human uses. ESI maps have been prepared for San Francisco Bay and are useful tools for setting protection priorities and cleanup strategies before a spill occurs (www.mapfinder.nos.noaa.gov/m apfinderHTML3/surround/esi/atlas.html).
	Mitigation W-3.3: A regular program shall be developed and maintained to train fueling operators on correct fueling methods to minimize spills due to human error or improper use of equipment would decrease the potential for spills.
	Mitigation W-3.4: New vessels to be adopted in a ferry expansion program and the equipment to service any new fleets shall include technological designs to avoid fuel spills.
	Mitigation W-3.5: Applicable measures recommended by the Ferry Safety Plan (ABS Consulting 2002) shall be adopted to minimize safety risks and prevent navigational incidents with the potential for spills. Ferry operators must take those new measures into account in their updates to contingency plans and OSRO service agreements**.**

Impact	Mitigation Measure
Biology	
Impact B-1: Loss of jurisdictional wetland habitat could occur as a result of dredging and construction of terminal facilities.	**Mitigation B-1.1:** Terminal locations, while having the potential for wetland impacts, have not been specifically surveyed for wetland habitat occurrence with respect to project features because no specific improvements are proposed at this time. Existing mapping of wetlands, discussed in Section 3.5.1 (Environmental Setting), was used to identify areas of known wetlands, but these maps and databases are regional in nature. As part of the environmental studies and documentation for specific projects, wetland areas should be delineated on a site-specific basis. Specific wetland boundary determinations shall be used to avoid disturbance of these resources when specific terminal layout plans are defined. For example, parking lot facilities, typically the largest part of a terminal footprint, could be located in areas away from the shore and associated wetlands. In cases where wetland impacts are unavoidable, suitable compensatory mitigation shall be designed within the same subarea and implemented in consultation with the appropriate regulatory agencies. The Goals Project (1999) has described habitat restoration goals and 115 potential restoration sites around the Bay, representing tens of thousands of acres of potential habitat restoration. While not all of these sites may be within the same subarea, available, or suitable for the types of mitigation necessary for impacts from terminal construction, a substantial amount of area could potentially be used by the project proponent for compensatory mitigation. The total area of wetland impacts, though not calculated for this document, is expected to be minimal compared to the areas potentially available for mitigation.
Impact B-2: Construction of terminals could result in increased potential for the spread of invasive nonnative plant species in disturbed habitats.	**Mitigation B-2.1:** Preconstruction surveys by a qualified biologist/botanist shall be conducted to identify and map areas of smooth cordgrass within potential terminal locations where this species could potentially occur. Identified areas of nonnative cordgrass, if falling within areas of disturbance, shall be removed to the extent feasible prior to construction activities. The methods of removal shall be developed in coordination with the USACE. Eradication of this species at a site shall be done well in advance of

Impact	Mitigation Measure
	construction. However, depending upon the extent, complete removal may be infeasible. In this case, funding of an area-wide cordgrass eradication program would be used as mitigation.
Impact B-3: Project construction could result in the disturbance of "Special Aquatic Sites", including eelgrass beds, mudflats, and wetlands.	**Mitigation B-3.1:** Disturbance of eelgrass beds and mudflats shall be avoided in the design of project features and routing of ferries.
	Mitigation B-3.2: As part of the environmental studies and documentation for specific projects, specific areas of eelgrass beds and mudflats that could be impacted shall be specifically determined. The general locations of eelgrass beds in the Bay were mapped in the late 1980s (see Figures 3.5.15 through 3.5.17). Recent comprehensive mapping of eelgrass beds in the Bay has not been conducted. If any project construction were to occur in the vicinity of any of these known beds, updated mapping of the extent of the beds should be conducted. Methods include use of side-scan sonar techniques, possibly in conjunction with other techniques such as visual surveys. In addition, areas that are less than 3 meters deep may have a reasonable potential to support eelgrass while areas less than 1.5 meters deep have a moderate potential to support eelgrass. Areas such as these should be surveyed to determine the current status of eelgrass prior to design and construction, and this information shall be used to avoid or substantially minimize impacts. In cases where impacts to eelgrass beds or mudflats are unavoidable, suitable compensatory mitigation shall be designed in consultation with the appropriate state and federal agencies such as the U.S. Army Corps of Engineers (USACE), the U.S. Environmental Protection Agency (USEPA), the California Department of Fish and Game (CDFG), the San Francisco Bay Regional Water Quality Control Board (RWQCB), and BCDC. However, it should be noted that very little eelgrass mitigation has been done in San Francisco Bay and that mitigation of eelgrass impacts may not be feasible or

Impact	Mitigation Measure
	successful in all cases. If impacts to eelgrass are unavoidable or impacts cannot be reduced to an acceptable level, compensation or offsetting mitigation shall be further investigated. Mitigation shall provide enhanced functions and values relative to the impacted special aquatic sites. A mitigation plan shall be prepared that identifies the specific habitat restoration methods, the criteria to be used for monitoring and evaluating the success of the mitigation effort, and a contingency plan if the mitigation fails.
	Mitigation B-3.3: Indirect impacts to eelgrass beds from sedimentation shall be avoided or reduced through the use of silt curtains to protect the beds from sedimentation or other methods that would otherwise protect the eelgrass from turbidity plumes generated during dredging. Mitigation for indirect effects would need to be evaluated on a case-by-case basis as the techniques used may differ from site to site. For example, at a given location, the specific dredging requirements and the potential for sediment plume generation and specific areas that may be impacted by the sediment plume should be evaluated. If it appears eelgrass could be affected by sedimentation, then site-specific conditions (depth, etc.) and local tidal currents shall be assessed to determine the best way to deploy mitigation, such as silt curtains.
Impact B-7: Dredging could adversely affect fish species near the construction activities.	**Mitigation B-7.1:** Mitigation for Impact B-7 is the same as discussed under Impact D-4.
Impact B-9: Underwater noise from pile driving and other construction activities could affect nearby fish.	**Mitigation B-9.1:** Mitigation for this potential impact shall be evaluated on a site-specific basis. Once specific designs and construction specifications for a particular site are known, sound pressure levels shall be estimated to the extent possible. During initial pile driving efforts, the area around the in-water pile driving activities shall be monitored for signs that fish are being injured (e.g., floating on the surface, birds moving in to prey on dead or injured fish). Measures to reduce sound pressure levels in surrounding

Impact	Mitigation Measure
	waters, such as placing bubble jackets surrounding the piles, shall be deployed if sound pressure levels exceed those that could harm fish.
Impact B-10: Construction could result in loss of habitat for waterfowl, shorebirds and other birds.	**Mitigation B-10.1:** Implement Mitigation Measures B-1.1 and B-3.1 through B-3.3.
Impact B-11: Ferry traffic could disturb roosting, rafting, and foraging waterfowl in shallow areas.	**Mitigation B-11.1:** Ferry routes shall be consolidated within common corridors, travel down deeper channel areas as much as possible, and choose the shortest routes across shallow areas to leave as much undisturbed shallow open-water habitat as possible.
	Mitigation B-11.2: Response of water fowl to new ferry routes in shallow North and South Bay roosting, rafting and foraging habitats shall be evaluated. Evaluation could include observations of ferry operations and waterfowl responses by an authority such as the Point Reyes Bird Observatory (PRBO).
Impact B-13: Underwater pile driving noise could disturb marine mammals.	**Mitigation B-13.1:** An Incidental Harassment Authorization from NMFS may be needed for pile driving activities, particularly if activities are to occur near sensitive areas such as haul-out sites. Redwood City is near a haul-out site. Pre-construction surveys shall be conducted to determine use of the area by marine mammals before pile driving begins. Marine mammal monitoring shall be conducted during construction in conjunction with underwater noise monitoring. A “safety zone” shall be established based on the initial monitoring. Pile driving activities shall not commence until marine mammals are not sighted within the safety zone for approximately 15 to 30 minutes.
Impact B-14: Transiting ferries could disturb marine mammals resting at haul-out sites.	**Mitigation B-14.1:** Although NMFS does not regulate normal watercraft operations or require Incidental Harassment Authorizations for regular shipping and pleasure craft operations (Fahy 2002), NMFS does have guidelines, outlined below, for avoidance of marine mammals to reduce disturbance.

Impact	Mitigation Measure
	Animal or Sensitive Site – Minimum Distance Whales-91 meters (100 yards) Pinnipeds (seals and sea lions) - 46 meters (50 yards) in water ; 91 meters (100 yards) from haul-out sites Dolphins – 46 meters (50 yards) This guidance, however, does not take potential boat speeds and related wake effects into account. Distances discussed in the literature indicate that, in general, seals tend to flush at greater distances than those in the NMFS guidelines. Site-specific information available for San Francisco Bay (Castro Rocks) showed average disturbance from larger vessels occurring at distances of about 250 meters. Therefore, ferry routes shall be at least 100 to 250 meters from the Castro Rocks and Yerba Buena Island haul-out sites to reduce disturbance to the animals at these locations.
Impact B-15: High-speed ferries could potentially strike gray whales.	**Mitigation B-15.1:** Ferry operators shall be aware of the potential for whales entering the Bay and should know how to spot whales at the surface. The USCG reports whale sightings and distance to vessels when they receive a report of a whale sighting. Ferry captains shall be made aware of these reports and exercise diligence when a whale sighting has been reported. The ferry system shall implement a program of informing ferry operators of whale sightings and locations. For example, if one captain sights a whale, it should be reported through a network to all other captains. Operators should be informed or reminded during seasonal periods of heightened whale activities or presence. If whale sightings continue to increase in the Bay, having dedicated lookouts on board or other detection equipment could be warranted. Devices (such as sound-generating equipment) used to scare whales from the area may be considered intentional harassment by NMFS and would not likely be allowed.
	Mitigation B-15.2: Ferries shall be equipped with a whale detection system such as forward-looking sonar. Such a system is currently

Impact	Mitigation Measure
	under development and being tested on a NOAA vessel in Cape Cod Bay.
Impact B-16: Project construction and/or operation could result in the "take" of state or federally listed species or loss or degradation of critical habitat.	**Mitigation B-16.1**: Construction sites shall be reviewed for potential occurrence of listed species and critical habitat using the literature and tools such as the California Natural Diversity Database (CNDDB). Field surveys by qualified biologists shall be conducted in areas of potential occurrence or with suitable habitat for listed species. Areas with listed species should be avoided. In areas where construction is likely to result in a take of a listed species, consultation shall be initiated with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and CDFG as required by the Federal Endangered Species Act (FESA) and the California Endangered Species Act (CESA). Specific mitigation measures will likely be required as a result of that consultation and must be incorporated into the specific project design or mitigation plan. Measures may include redesign of project features to avoid impacts to listed species or critical habitat or include restoration or creation of replacement habitat.
	Mitigation B-16.2: Fully protected species that may be affected by this project include salt marsh harvest mouse, California clapper rail and California black rail. Proposed terminals and routes would be designed or located to avoid take of these species.
• Impact B-17: Construction and operation of terminal facilities could increase stormwater pollutant discharges and affect receiving water quality. This, could in turn, affect local biological resources.	**Mitigation B-17.1**: Implement mitigations W-1.1 and W-1.2.

Impact	Mitigation Measure
Impact B-18: Contaminated sediments could become resuspended during construction and dredging operations and could potentially cause toxicity to Bay organisms.	**Mitigation B-18.1:** Implement mitigations D-2.1 through D-2.3.
Impact B-19: Increased numbers of ferry transits could bring an increased potential for fuel spills and water quality degradation in the Bay.	**Mitigation B-19.1:** Implement mitigations W-3.1 through W-3.5.
Impact B-20: Vessel wakes could potentially cause erosion and loss of wetland habitats, potentially impact special status species such as the clapper rail and salt marsh harvest mouse, and potentially impact marine mammals through disturbance at seal haul-out sites.	**Mitigation B-20.1:** Refer to potential impacts and mitigations under Section 3.3, Wake Analysis.
Impact B-21: Wildlife behavior and susceptibility to predation may be adversely influenced by an increase in lighting from terminal facilities and associated vehicle parking areas.	**Mitigation B-21.1:** New lighting shall be directed on intended project areas and avoid surrounding wildlife habitat.

Impact	Mitigation Measure
Air Quality	
Impact A-2: Motor vehicles leaving ferry terminals during the evening commute period would produce cold-start emissions that could lead to localized violations of the short-term carbon monoxide standard.	**Mitigation A-2.1:** Cold-start emissions shall be reduced by encouraging non-drive access at the ferry terminals. Techniques for encouraging non-drive access could include fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.
Impact A-4: Air pollutants would be deposited in the Bay, which could increase the levels of nitrates and sulfates in the water.	**Mitigation A-4.1:** Use of a fuel technology that lowers SO_2 emissions would reduce sulfate emissions and subsequent deposition.
Impact A-5: Construction of ferry terminals would create emissions of fugitive dust from excavation and grading, and emissions of ROG, NO_x, CO, SO_2, and PM_{10} from construction equipment exhaust.	**Mitigation A-5.1:** The project proponent(s) shall implement the mitigation measures contained in the BAAQMD CEQA Guidelines (BAAQMD 1999) to control fugitive dust emissions from construction activities. These measures include activities such as watering and covering exposed soil surfaces to minimize dust emissions.
	Mitigation A-5.2: Measures to reduce emissions from vehicles and heavy equipment shall include: 1) Use alternative fueled construction equipment when possible; 2) Minimizing idling time, for example, 5-minute maximum; 3) Properly maintaining equipment; and 4) Limiting the hours of operation of heavy-duty equipment and/or the amount of equipment in use.

Impact	Mitigation Measure
Impact A-6: Local concentrations of nitrogen dioxide and particulate matter could exceed state and federal standards at the Ferry Building.	**Mitigation A-6.1:** Engine exhaust pipes shall be located sufficiently high to reduce localized impacts. During their analysis, BAAQMD staff hypothesized that the location of the exhaust points was an important factor in local concentrations of air pollutants. This was tested with a model scenario wherein all future vessels would have exhaust heights at 20 feet above the waterline. While the BAAQMD's choice of modeling the exhaust location at 20 feet above the waterline was somewhat arbitrary, the results indicate that this height would reduce the potential for unhealthy concentrations of air pollutants1 (Murphy 2003). Therefore, exhaust points shall be located at least 20 feet above the waterline unless future modeling indicates that lower heights would reduce concentrations of pollutants to acceptable levels.
	Mitigation A-6.2: Project proponents shall minimize dockside idling time at the Ferry Building.
Impact A-7: The Proposed Project could result in increases of pollutants from ferry exhaust deposited directly into the Bay.	**Mitigation -7.1:** Implement Mitigation A-6.1 to eliminate the potential for turbulent eddies in the wake from capturing some of the emissions.
Impact A-8: Dredging for the Proposed Project would emit criteria air pollutants. These emissions would exceed the significance thresholds of 80 pounds per day for NO_x, ROG, and PM_{10} listed in the BAAQMD CEQA Guidelines. The exceedences would occur for approximately 12 days every 3 to 6 years.	**Mitigation A-8.1**: Minimize required dredging for construction and maintenance, both in terms of dredge volume and maintenance dredging interval.
	Mitigation A-8.2: Utilize dredging contractors with the best available emission controls on their equipment.

Impact	Mitigation Measure
Land Use	
Impact LU-1: The Proposed Project includes ferry terminal locations in developed urban areas that primarily have port or maritime land uses, but do not currently have ferry terminal facilities. The development of new ferry terminals in urban locations could result in the displacement of existing land uses.	**Mitigation LU-1.1:** Site-specific projects shall consider project alternatives that avoid displacement of homes or businesses. Displacement impacts to homes and businesses shall be addressed as part of the terminal site selection process, and be avoided through design measures. Proposals for terminals with potentially significant impacts due to the displacement of homes and/or businesses will likely not be approved without appropriate mitigation. In the unusual circumstance that displacement is unavoidable, project proponents shall prepare and execute mitigation in the form of a relocation assistance plan or equivalent. If federal transportation funds will be used for a ferry terminal project, compliance with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended, shall be required. Relocation plans typically consider: Criteria for replacement housing; Reimbursement criteria for moving costs and/or differential housing costs (including rents); and Reimbursement criteria for businesses, including costs associated with searching for a new space, and business (i.e., patronage) lost due to the relocation.
Impact LU-2: Installation of new ferry terminals could disrupt or divide established neighborhoods. This impact has the potential to be significantly negative or positive, depending on how much the community supports or opposes the location of the terminal.	**Mitigation LU-2.1:** Local agencies desiring ferry service should identify parcels along their waterfronts that would facilitate a ferry terminal through a waterfront planning process or other type of terminal location study. Any potential terminal site must be analyzed with consideration to the surrounding land uses in order to ensure the terminal will be a compatible use and will minimize land use impacts. Projects should include project design elements that improve terminal accessibility while maintaining community cohesion.
Impact LU-3: Implementation of the Proposed Project could result in	**Mitigation LU-3.1:** The terminal site selection process shall consider project alternatives to avoid adverse physical impacts to the low-

Impact	Mitigation Measure
disproportionate adverse impacts to low-income and minority communities. These impacts would occur primarily as a result of the displacement of homes or businesses in low-income and minority communities, or substantial disruption of those neighborhoods.	income and minority neighborhoods. This would include site and terminal access design that minimizes residential acquisition. Terminal planning shall also involve local community input to help identify opportunities to avoid adverse impacts and enhance local planning efforts. Depending on the specific site and local land use planning, the project proponent may work with the local, city, or county to develop specific plans that address appropriate land use designations in the vicinity of the terminals. If federal money will be used for the construction of a ferry terminal, compliance with NEPA will be required, and the federal lead agency's guidelines for addressing Environmental Justice shall be adhered to. If required, the federal Environmental Justice process will supersede the requirement to comply with adopted WTA criteria.
	Mitigation LU-3.2: Implement mitigations LU-1.1 and LU-2.1.
Impact LU-4: New or modified ferry terminals would be located along the shoreline, and could affect and/or enhance existing public use and access to and along the Bay shoreline.	**Mitigation LU-4.1:** Incorporate public access to and/or along the Bay shoreline in the planning for terminal locations or expansion. This may include trails, parking set aside for shoreline users, viewpoints, disabled access, etc.
	Mitigation LU-4.2: Incorporate the shoreline access guidelines described in: *Terminal Architecture and Engineering – Terminal Design Guidelines* prepared for the WTA. The guidelines include Shoreline Access for pedestrians and bicycles, and viewpoints to provide views of the shore, bay, and the loading/ unloading of the ferries
Aesthetics	
Impact V-1: The construction and operation of new and enhanced ferry terminals along the Bay shoreline could potentially impact land and water views of San	**Mitigation V-1.1:** When feasible, the following shall be included in ferry terminal design: Locate terminal facilities so as not to obstruct or detract from views of the Bay from nearby public thoroughfares;

Impact	Mitigation Measure
Francisco Bay or degrade the visual character of the Bay.	the Bay from nearby public thoroughfares; Design terminal facilities to provide new or enhanced point access areas or view areas such as piers, platforms and walkways; and Design and site terminals so as to maintain and enhance the visual quality of the shoreline and visual public access to the Bay.
	Mitigation V-1.2: The WTA established Intermodal and Architectural Design Guidelines that shall be considered in the planning and design of new and enhanced ferry terminals (Parsons Brinckerhoff 2002). The design objectives may include, but are not limited to, making the ferry system more attractive, integrating terminals with the local urban context, and taking advantage of waterfront views. The ideal terminal facility will serve as a catalyst to ferry service expansion in the Bay Area. The specific design of each terminal facility should be developed at a local level to ensure compatibility with the surrounding visual environment. In addition, site-specific studies on the potential impacts of light and glare on wildlife may be necessary to determine appropriate mitigations. This would be most relevant for the Hercules/Rodeo site, which is the only proposed new terminal site that would not be in an area having existing maritime uses.
Impact V-5: Expanded ferry service, including new terminals and additional ferries, could result in light and glare impacts.	**Mitigation V-5.1:** Ferry terminal designs be required to develop site-specific lighting plans. Outdoor lighting shall be focused and directed to the specific location (e.g., roads, walkways), be shielded to avoid the production of glare, and minimize up-light and light spill. Fixtures shall be located, aimed or shielded to minimize stray light to or across property boundaries. Light design shall use down-cast, low glare, shields, or equivalent designs to minimize light and glare on surrounding land uses.
Cultural	
Impact CUL-1: Dredging of new channels, maintenance dredging, dredging for pier retrofit or installation, or dredging/related	**Mitigation CUL-1.1:** To avoid or mitigate impacts to cultural resources, they must be evaluated against the federal and state significance criteria previously described. Prior to project construction, a focused literature search shall be conducted to

Impact	Mitigation Measure
activities for buoy placement could impact submerged and sub-bottom cultural resources in the Bay.	identify any known resources. For sites that cannot be adequately characterized by existing literature or available site history information, marine archaeological surveys may be necessary to detect any previously unknown submerged or sub-bottom resources. Depending on the proposed project undertaking and the geographic or bathymetric setting, appropriate remote sensing field surveys could include deployment of a side-scan sonar, sub-bottom profiler, and magnetometer to help detect these resources. Follow-up diver survey, high-resolution side-scan sonar, sub-bottom profiler, magnetometer survey, or Remote Operated Vehicle (ROV) investigations might be required to positively identify the targets. If resources are detected, they shall be identified and evaluated against the NRHP/CRHR significance criteria, and as a "unique archaeological resource" under CEQA. If the resources are not eligible for—or already on—the NRHP/CRHR and do not qualify as a "unique archaeological resource" under CEQA, then no further consideration of these resources is required. If the resources are eligible for—or currently on—the NRHP/CRHR or qualify as a "unique archaeological resource" under CEQA, then impacts could occur to those resources. If a resource is found to be significant, then the resource shall be avoided through alterations in project design, when feasible. Under CEQA, preservation-in-place is the preferred manner of mitigating impacts to archaeological sites. Preservation in place for archaeological resources may be accomplished by, but not necessarily limited to, a suite of approaches such as: Planning construction activities to avoid archaeological sites; Incorporation of sites within parks or other open spaces; Covering the archaeological site with a layer of chemically stable soil before building facilities on top of the site; and/or Deeding the site into a permanent conservation easement. In the event that avoidance of cultural resources is not possible via

Impact	Mitigation Measure
	project design modifications, appropriate mitigation shall be required. This could include further recordation or data recovery, in accordance with Section 106 of the NHPA. This could include a record of the resource, such as a wharf, pier, building or structure in a Historic American Building Survey/Historic American Engineering Record (HABS/HAER) at a level compatible with National Park Service standards. Adequate recordation of a built-environment resource shall include the following: The development of site specific history and appropriate contextual information regarding the particular resource, in addition to archival research and comparative studies; Accurate mapping of the noted resources, scaled to indicated size and proportion of the structures; Architectural descriptions of the structures; Photographic documentation of designated resources; and Recordation using measured architectural drawings. Mitigation of impacts to a built-environment resource may also take place in the form of preservation or reuse of a wharf, pier, building, or structure. The preservation or reuse of an eligible structure would include abiding by the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. If the building is considered a historic resource under CEQA, the local building inspector must grant code alternatives under the State Historic Building Code. In some cases, HABS/HAER documentation might not provide an adequate mitigation to reduce impacts to a less than significant level, and might not be a sufficient mitigation measure for some resources. Mitigation should capture the history of a resource and share it with the public so that the public can continue to feel a connection with common heritage. If the pier/building/structure cannot physically be retained, then it is incumbent on the lead agency to pursue ways that the memory of the resource is retained and made easily available.

Impact	Mitigation Measure
	To this end, educational resources such as web media, static displays, interpretive signs, use of on-site volunteer docents, or informational brochures can supplement HABS/HAER. Often, it might be possible to incorporate the resource into the project as one means of resource mitigation. The CEQA lead agency will be responsible for coordinating all necessary mitigation measures. This might include coordination with a federal lead agency, where federal permitting, land ownership, or other federal-level issues affect a specific project action.
Impact CUL:-2: Deposition of dredge spoils for upland reuse or wetland restoration could impact submerged or terrestrial cultural resources.	**Mitigation CUL-2.1:** Same as CUL-1.1.

Impact	Mitigation Measure
	Mitigation CUL-2.2: Impacts could be mitigated by avoidance of the particular disposal site.
Impact CUL-3: Project actions such as retrofitting, expansion, or improvement of existing facilities, or construction of new facilities, could impact terrestrial historic and prehistoric cultural resources, and historic built environment resources.	**Mitigation CUL-3.1:** Same as CUL-1.1.
Impact CUL-4: Project actions such as construction and related activities could impact previously unknown resources.	**Mitigation CUL-4.1:** Same as CUL-1.1.
Geology	
Impact G-2: Potential new terminals and other facilities could be exposed to strong ground shaking. There is a potential for substantial damage to facilities and risk of injury or loss of life at incorrectly designed or constructed facilities.	**Mitigation G-2.1:** Terminal facilities shall be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 4. Additionally, to satisfy the provisions of the 1998 California Building Code, these facilities shall be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedence in 50 years). For design purposes, site-specific ground motions shall be calculated for all project sites.
Impact G-3: Potential new terminals are in areas of potentially liquefiable soils. There is a potential risk for destruction of structures.	**Mitigation G-3.1:** A program of site-specific exploratory borings and accompanying laboratory testing will be required to delineate any potentially liquefiable materials underneath potential terminal sites. These geotechnical investigations will also be required for consideration prior to foundation design. Potentially liquefiable deposits will either have to be removed or engineered (dewatered or densified) to reduce their liquefaction potential. This has been performed with success within areas of liquefaction risk in the Bay Area. For example, densified fill material in areas of Foster City and Redwood Shores survived the 1989 M_w 6.9 Loma

Impact	Mitigation Measure
	Prieta earthquake without liquefying (Benuska 1990). The commercial and residential developments situated on these areas of engineered fill suffered no major structural damage during the earthquake.
Impact G-7: Erosion due to wind and water action could lead to the deterioration of terminal structures.	**Mitigation G-7.1:** The erosion potential of each site will have to be determined on a site-specific basis. Once this has been determined, appropriate mitigation measures, if necessary, could be adopted. If erosion is determined to be a significant threat at a terminal location, the specific location of the terminal could be changed and/or terminal design could be changed to minimize the potential for impacts from erosion. As a last resort, the shoreline could be armored with rip-rap or concrete seawalls. Defensive measures such as groins that modify or deflect flow and circulation patterns are not desirable as they can merely transfer erosion problems elsewhere.
Noise	
Impact NOI-3: Noise-sensitive human receptors could be exposed to significant increases in ambient noise from proposed ferry terminal operations.	**Mitigation NOI-3.1:** Siting and planning of new ferry terminals shall include planning to locate terminal areas away from noise-sensitive land uses. Compliance with existing zoning ordinances should be sufficient to mitigate any potential impacts of ferry terminal operations.
Impact NOI-4: Wildlife could be exposed to noise from proposed ferry operations.	**Mitigation NOI-4.1:** The exact route from San Francisco to Treasure Island shall be determined in consultation with federal and state resource agencies. These agencies may require site-specific studies to determine whether impacts to the seals at the nearby haul-out or to other wildlife (birds and fish), could be significant.
Transportation	
Impact T-1: At a regional level, expansion of the ferry service would	**Mitigation T-1.1:** Once terminal locations are narrowed down, site-specific traffic analyses shall be conducted to compare predicted

Impact	Mitigation Measure
result in a decrease of the total automobile VMT. At the local level, expansion of the ferry service could facilitate changes in traffic patterns at new and existing ferry terminals. This could potentially result in localized increases in traffic in the vicinity of the terminals.	traffic with applicable local level of service (LOS) standards. Traffic mitigation measures would depend on site-specific conditions, including design of vehicular access to terminals, major access routes, parking availability, and traffic patterns. For example, impacts that were predicted to occur at intersections could be mitigated by addition of turning lanes. For some cases, where access is problematic or presents serious community concerns, the viability of the terminal location would need to be further evaluated.
Impact T-2: Additional car access to terminals would require parking. This could result in potential localized parking problems and conflicts in the vicinity of the terminals.	**Mitigation T-2.1:** The project proponent(s) and ferry terminal authorities, in conjunction with local and regional transit agencies, shall study and develop terminal-specific plans to ensure that potential driving ferry patrons can be adequately served by transit in locations with limited parking and currently insufficient transit access.
	Mitigation T-2.2: Non-drive access could be encouraged through measures such as charging fees for parking, provision of preferential parking for carpools and vanpools, comprehensive shuttle access, land use scenarios that encourage non-drive access, and encouraging bicycle and pedestrian access.
Energy	
Impact E-2: The Proposed Project could result in higher energy per passenger miles traveled value than other transit modes.	**Mitigation E-2.1:** The WTA is planning to continue investigating the feasibility and applicability of using energy sources other than fossil fuels and different engine technologies. One promising technology is the use of fuel cells. The WTA has investigated the use of alternative fuels for ferries in: *New Technologies and Alternative Fuels Working Document* (JJMA 2002). Alternative energy sources and engine technologies will become available and will be incorporated as they become feasible and cost-effective.