

INCIDENTAL HARASSMENT AUTHORIZATION PERMIT APPLICATION

The 34th America's Cup and James R. Herman Cruise
Terminal and Northeast Wharf Plaza

April 2012

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Terminal and Northeast Wharf Plaza

Prepared for: April 2012

America's Cup Event Authority

Port Of San Francisco

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LIST OF ACRONYMS

AC34	34th America's Cup
ACEA	America's Cup Event Authority
ACOC	America's Cup Organizing Committee
ACRM	America's Cup Race Management
asl	above sea level
BA	Biological Assessment
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CSS	America's Cup Challenger Series
dB	decibel(s)
dB RMS	dB root mean square
EFH	Essential Fish Habitat
FESA	Federal Endangered Species Act
FAA	Federal Aviation Administration
GGCR	Golden Gate Cetacean Research
Hz	Hertz
IHA	Incidental Harassment Authorization
MMPA	Marine Mammal Protection Act
µPa	microPascal
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service (also known as National Atmospheric and Oceanic Administration Fisheries)
NMSP	National Marine Sanctuary Program
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
RMS	route mean square
SEL	sound exposure level
SFOBB	San Francisco/Oakland Bay Bridge

USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
YBI	Yerba Buena Island

INCIDENTAL HARASSMENT AUTHORIZATION PERMIT APPLICATION

1) A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals;

This Incidental Harassment Authorization (IHA) Permit Application has been prepared for the proposed 34th America's Cup (AC34) and James R. Herman Cruise Terminal (cruise terminal) and Northeast Wharf Plaza (plaza) projects (collectively, the Project). The Project Sponsors include the America's Cup Event Authority (ACEA), America's Cup Race Management (ACRM), City of San Francisco (City) and Port of San Francisco's (Port). The applicants include the ACEA (Sam Hollis) and the Port of San Francisco (Brad Benson)

On December 31, 2010, San Francisco was selected as the host city for 34th America's Cup (AC34). Mayor Gavin Newsom and the Board of Supervisors for the City and County of San Francisco (City) approved a 34th America's Cup Host and Venue Agreement (Host Agreement)¹ with the America's Cup Event Authority, LLC (Event Authority)² and America's Cup Organizing Committee (ACOC).³

Pier 27-29 will be used as the America's Cup Host Village for the 2013 race events. With the dual cruise terminal and America's Cup proposals for Pier 27, development planning for this site is proposed to be phased to allow initial construction of AC Village uses at Piers 27-29 for the 2013 America's Cup races. The proposed improvements to complete the cruise terminal and plaza will be built out after the AC34 races are concluded.

A series of AC34 yacht races will be held in August and October 2012 and in July through September 2013 (Youth, Louis Vuitton Cup, America's Cup Challenger Series (CSS), potential Defender Selection Series, and Match). A number of project sites, or venues, are planned to

¹ Host and Venue Agreement among the City and County of San Francisco, the America's Cup Event Authority, LLC, and the San Francisco America's Cup Organizing Committee. For a copy, please go to: http://www.oewd.org/Development_Projects-Americas_Cup.aspx. The Golden Gate Yacht Club, which holds the America's Cup, delegated to the Event Authority the right to select the venue for AC34. Capitalized, event-related terms used in this document are defined in the Host Agreement.

² The Event Authority is responsible for organizing and managing AC34, as well as marketing AC34 and selling event sponsorships.

³ The ACOC is a nonprofit volunteer group of local civic leaders who will be responsible for assisting the Event Authority in selling event sponsorships.

accommodate these events. These venues would provide all aspects of AC34 facilities and services, including team bases and operations, support space, media operations, hospitality services, sponsored commercial space, and entertainment and spectator venues. The number and/or use of venues proposed for AC34 events in 2012 will be different from that proposed for AC34 events in 2013. The Project includes the construction of temporary improvements along with some very minor permanent improvements at the proposed venue sites to accommodate the AC34 events. Hereafter, references to all activities associated with the AC34 races in 2012 and 2013, including any associated construction activities leading up to or following each of the events, as well as operational-related activities associated with each of the events, will be categorized as “AC34 2012” and “AC34 2013,” activities, as applicable.

Table 1 provides a summary of the key characteristics of the AC34 2012 and AC34 2013 events. The number and level of facilities proposed to accommodate AC34 2012 will be less than those proposed to accommodate AC34 2013. **Figure 1**⁴ provides a plan view of the overall project area and **Figure 2** exhibits the Race Course Limits and Primary Race Area proposed for the AC34 2012 and 2013 events.

The 2012 races, while a part of AC34, are a separate sailing competition and will not affect the outcome of the 2013 races, whereas the AC34 races will determine the final competitors and winner of AC34. As a consequence, the estimated level of spectatorship for AC34 2012 will be less than for AC34 2013. Similarly, the estimated AC34-related staff required for the AC34 2012 will be less than that required for the AC34 2013.

Several of the venues proposed for the AC34 event consist of areas and facilities under the owned and managed by the Port of San Francisco, including certain piers (Pier 9, Pier 14, Pier 19, Pier 19½, Pier 23, Piers 27-29, Piers 30-32, and Pier 80), water basins/water areas (at Pier 9, Piers 23-27, Piers 29-31, Piers 14 North, and Piers 32-36). Additional venue locations are proposed for spectator-related activities, which are under the jurisdiction of the City of San Francisco (rather than the Port), including Marina Green, Herb Caen Way (from AT&T Park to Fisherman’s Wharf), Civic Center, Union Square, and Justin Herman Plaza.

Construction elements of the Project that may result in the incidental take of marine mammals include installation of piles for floating docks at various venue sites and pile replacement at Pier 19. **Figures 3 through 8** present each location where pile driving for either structures or installation of floating docks will occur along the San Francisco waterfront. Components of the AC34 race events that may result in harassment to marine mammals include helicopter operations and fireworks displays. A comprehensive project description is provided in the Biological Assessment (BA) for the Endangered Species Act (ESA) and Essential Fish Habitat (EFH), with response to comments and supplemental project description information provided as Appendix A (CD enclosed). Project components that may result in impacts to marine mammals are described in the subsequent sections below.

⁴ All figures can be found at the end of this section.

TABLE 1
AC34 2012 AND AC34 2013 SUMMARY

Project Characteristic	AC34 2012	AC34 2013
AC34 Race Series Held	World Series	Youth Series Louis Vuitton Cup, AC34/Challenger Series Defender Selection Series (DSS)- potential The Match
Months AC34 Races Held	August - October 2012	July - September 2013
Total Number of Race Days	Up to 8 race days ^a	up to 44 race days ^b
Estimated Spectatorship		
Peak Weekday Race Day	27,000	45,000
Peak Weekend Day	120,000	296,000
Spectators on Boats^c	Per Day	Per Day
<i>Recreational</i>		
Peak Weekend Day	2,300	5,560
Peak Weekday Race Day	900	900
<i>Commercial Charter</i>		
Peak Weekend Day	1,200	3,000
Peak Weekday Race Day	360	450
<i>Large Private Yachts</i>		
Peak Weekend Day	-	1,800
Peak Weekday Race Day	-	300
Estimated AC34 Staff	4,200	9,200
Location of AC Village	Marina Green	Piers 27-29
Location of Team Bases	Piers 30-32 ^c Pier 80	Piers 30-32 ^c Pier 80
Location of Media Operations	Marina Green and Fort Mason	Pier 23 and Fort Mason (optional)
Pier 27 Cruise Terminal Building Core and Shell for Temporary AC34 use	No	Yes
Barge Helipad Used	Treasure Island helipad	Treasure Island helipad
Construction	Temporary Installations and certain Permanent Improvements	Temporary Installations, and certain Permanent Improvements
Installation of Temporary Spectator Seating Proposed	Marina Green (AC Village)	Piers 27-29 (AC Village) Marina Green
Installation of Temporary Berthing Facilities for AC34 Race/ Support Boats	Yes	Yes
Installation of Temporary Berthing Facilities for Private Spectator Boats	Yes	Yes
Dredging Required	Yes	Yes
Implementation Plans	<ul style="list-style-type: none"> • People Plan • Park Event Operations Plan • Water and Air Traffic Plan • Ambush Marketing Plan • Waste Management Plan • Race Team Operations Plan 	<ul style="list-style-type: none"> • Public Safety Plan • Workforce Development Plan • Advertising Plan • Sustainability Plan • Youth Involvement

^a Two America's Cup World Series may be held in San Francisco, each containing up to six race days.

^b Louis Vuitton Cup, America's Cup Challenger Series and Match races would range between ~44 race days, and could slightly vary depending on number of actual number of teams competing. If a Defender Selection Series is held, it would occur either on non-race days or at different hours between the Louis Vuitton Cup, America's Cup Challenger Series races; up to 6 race days assumed for Defender Selection Series. The Match is a best of nine series. See text for details.

^c Primary team base operations would occur at Piers 30-32 for AC34 2012 and 2013.

Pile Installation

Pile Driving for Floating Docks

Temporary floating docks will be installed utilizing 18-inch steel pipe piles. Floating docks will be located at Piers 80, 30-32, 14 North, 9, 23 North and South, 27 South, 29 and adjacent to Marina Green. The floating docks will be installed at various stages starting in 2012 and extending through the spring of 2013. Installation of each floating dock should not take more than 2 weeks at most locations.

Prevention measures will be implemented to address issues of harbor seals and/or sea lions occupying floating docks. All docks will be removed after 2012 events and stored. Piles will remain in place and the dock segments will be re-installed in late June of 2013 for AC34 events that year. If in the event that during active human use a marine mammal is observed trying to occupy a dock they will implement spraying to deter the pinneped. The Project Sponsors will immediately coordinate and communicate with the NMFS' South West Regional Office for additional guidance. In addition, measures to educate the public pertaining to avoiding conflict with marine mammals will be included in the Water and Air Traffic Plan being developed for this project.

Floating docks will be made of either concrete, aluminum, or lighter-duty timber pre-cast sections with maximum widths of 8-16 feet. The dock system modules will be fabricated off site and shipped to the project area. Typically the dock sections will be delivered to a pier via truck. A crane will be used to offload the dock sections from the trucks and place them on a material barge to be towed to the specific location for each section. The sections will then be assembled and located in the correct positions. Guide piles will be driven through pile guides to fix the dock system in place, more detail on Guide Piles is provided in the National Marine Fisheries Service (NMFS) BA (Appendix A enclosed CD).

As shown in **Figures 3** through 9, floating docks will be installed at Piers 80, 30-32, 27, 29, 23 North and South, 14 North, 9, and offshore of Marina Green.

Pile Driving For Pier Improvements

Pier 19

A site plan for Pier 19 is presented in **Figure 8**. Temporary structures may be constructed at Pier 19 and the existing building will be used. Pier 19 will be used for temporary cafeteria for AC34 staff, media, and volunteers; a volunteer center; and ancillary office and storage. Repairs of the deck and piling repair for the south apron will be conducted. **Table 2** provides a summary of the piles that will be repaired or replaced.

Methods of Construction

Wood piles will be installed using an impact hammer. Piles for all floating docks will be installed with a vibratory pile driver; no impact hammer will need to be used to install these piles.

TABLE 2
SUMMARY OF ANTICIPATED PILE DRIVING WORK

Location	# of Piles	Pile Diameter	Activity	Pile Driver	Max Piles Per Day ^a	Installation/duration	Removal of Temporary Structure/duration
Pier 80	26	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 32 South	27	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 14 North	44	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 9	15	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 19	224	12-inch wood	Replacement Piles for Apron Repairs	Impact	8	4 months	NA
Pier 23 North	21	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 23 South	16	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 27	55	18-inch steel	Floating Dock Installation	Vibratory	8	3 weeks	1 week
Pier 29 East	5	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Pier 29 North	21	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week
Marina Green offshore	14	18-inch steel	Floating Dock Installation	Vibratory	8	2 weeks	1 week

^a Design engineers for AC34 construction and Port engineers provided their estimates for production rates for each pile type and size at each location. These estimated production rates were also provided to NMFS for the Biological Assessment Section 7 consultation and CDFG Biological Assessment.

Depending on the location and logistics, piles will be installed from the existing deck structure using land based pile driving equipment or from a barge. Impact pile driving for this project will not occur concurrently with any other project. Pile driving will be conducted using a “soft start” technique to give fish and mammals an opportunity to move out of the area.

The Project Sponsor (City and Event Authority) will develop a sound monitoring plan, which will be implemented during the pile driving activities. This plan will be reviewed by NMFS and the California Department of Fish and Game (CDFG). The sound monitoring plan will describe a process for establishing the safety zones for observation of marine mammals as described in more detail below under **Question 11**. This plan also will provide detail on the methods used to monitor and verify sound levels during pile driving activities, including proposing certain station locations.

Best management practices associated with the project will include interrupting pile driving activities if marine mammals are observed within the safety zone of the project site to allow them to completely exit the project site before resuming pile driving (project site is define as the pier area where pile driving is occurring; using cushions between top of pile and the hammer; and predrilling or jetting to help ease pile driving when feasible.

Pile Removal

All floating dock piles will be removed after 2013 events in October 2013. The pile removal process consists of approximately 1-2 minutes of initial vibratory use while pulling the pile up about 10 ft to loosen from the sediment. The barge/crane then moves to the next pile to loosen. The operator will do this for 5-8 piles then remove vibratory driver and go back to dead pull the loosened piles and place them on a debris barge for either reuse or disposal. The vibratory use is minimal just to loosen the pile. Bay area projects have been deferring to the Programmatic BO for the U.S. Army Corps of Engineers Proposed Procedures for Permitting Projects that will Not Adversely Affect Selected Listed Species in California. Within this document, vibratory installation and removal of any pile may occur year round typically without significant impacts to biological resources. Being that the San Francisco waterfront is an active industrial area and sound levels have been documented at 150 dB by Caltrans monitoring, it is highly unlikely that the brief period of vibratory use for pulling piles would cause the ambient noise levels to escalate to a detrimental level beyond which the mammals are used to in this industrial waterfront. The Project proponents are not requesting take for pile removal activities.

Race Events

Two World Series events will occur in the San Francisco Bay in August and October of 2012. Each World Series event will run up to 9 days with 4 race days for each series. There will be multiple races per day.

The World Series races will be followed in 2013 by the Louis Vuitton Cup, America's Cup Challenger Series (CCS) to determine which of the challenger teams advances to compete with the defender in the final Match. The overall timeframe for the CCS races will occur over an approximate 81-day duration between July to early September of 2013 with approximately 44 days of racing. The final Match races would occur in mid-September over an approximately two week period.

Racing Yachts

The yachts will be launched from either Pier 80 or Piers 30-32 Team Base locations. The racing yachts will be lifted with the onsite cranes and lowered into the adjacent water. The yachts do not have engines; therefore, they will either be sailed or be towed (by a support vessel such as protector) to and from their launch area and the race area. During racing the race yachts are required under the rules to remain within the race area. Each race is scheduled to last under an hour. These racing yachts are highly engineered in their design and production; they have been specifically designed to be very maneuverable at both high and low speeds. During racing the yachts will only be propelled by the wind. Due to the efficient design of the hulls the yachts are very quiet and leave almost no wake.

Personal Watercraft or Rigid Inflatable Boats

Personal watercraft or rigid inflatable boats will be used for umpiring the races. Two umpires will follow the racing yachts and remain within the course limits during the race. They will launch from either Marina Green or Pier 80 and power to the race course. Umpires will avoid marine mammals and to the extent practicable will not cut off apparent escape paths or trajectories of marine mammals if present.

Procedures During Racing

As proposed by the project sponsors, the Course Marshal would establish a race course for each racing day within the conditions and parameters established under the USCG's Special Local Regulations (SLR), final CEQA and NEPA documents, and various regulatory approvals and permits. Attendants would be at the starting line and each turning mark, umpires (two) and several support boats would be out on the course. All race management personnel are tasked with scanning for debris or other obstructions that could possibly damage or impede fair play. Although unlikely, in the event that a large marine mammal, such as a whale is observed, the Course Marshal would postpone or abandon the race depending on the direction the whale is moving or its presence within or near the race course. These actions would be taken to ensure the safety of the marine mammals as well as the racing boats and crews. Obstructions and debris would also be managed or removed by race management personnel.

Spectator Vessels

San Francisco Bay is host to regular and frequent sailing regattas, and there are no known records of boat strikes by race boats. Most marine mammals present in the Bay avoid boats that are underway that are traveling at high speeds. The high speed ferries that frequent Bay waters, which are predominantly multi-hull boats like the planned AC34 race boats, travel at speeds in excess of 20 knots and regularly transit across the western part of the Central Bay (where AC34 races are proposed to occur at speeds of up to 36 knots). These vessels have not been reported to be involved in any known marine mammal strikes. Spectator vessels would likely be moving at much slower speeds (under 10 knots) while congregated in the western part of the Central Bay to observe the races. NMFS in their recent assessment of the potential affects to marine mammals from firework displays in the Monterey Bay National Marine Sanctuary reviewed monitoring studies done between 1993 and 2001 that observed both firework noise and the interaction of spectator boats with marine mammals. They determined the potential for spectator boats colliding with a marine mammal during highly congested circumstances such as those expected during the AC34 race events was virtually non-existent and classified it as negligible. They based this determination on no observed collisions during multiple events per year over 9 years and the observed avoidance of these congested areas by marine mammals (NOAA 2011). United States Coast Guard regulations are explicit that the operator (captain) of a vessel is responsible for the safe operation of that vessel at all times. Under NMFS regulations, the operator of the vessel could be cited and fined for harassment of any kind to marine mammals under the Marine Mammal Protection Act. A Water and Air Traffic Plan will be created for this Project, which will provide Information for Visiting Mariners to Reduce Impacts on Bay Habitats and Taxa ("Notice to Boaters"). The Notice to Boaters will be distributed to the public and will encourage methods for boaters to avoid any harassment (including collisions) with marine mammals. A comprehensive dissemination plan will coordinate distribution of the Water and Air Traffic Plan to multiple marina's and yacht clubs in California and spectator vessels entering the Bay.

Helicopter Operations

Helicopters will be used for AC34 2012 and 2013 races to serve broadcasting and media operations. The Project Sponsor will be responsible for coordinating with the Federal Aviation Administration (FAA) to ensure compliance with flight regulations within the San Francisco Bay during race events. ACEA TV will use two to three helicopters for the match racing days. The helicopters following each race will fly between 100 and 400 feet above sea level (asl) within the race area. The helicopters will normally perform coverage operations for up to three hours on a tank of fuel and will require refueling once per day. The helicopters will refuel at a secure airport or helipad and be secured there overnight between race days. All helicopter fueling and overnight landing and storage will occur at one or more existing regional airports or approved helipads. Any maintenance will occur at the airport. The coordination of the helicopters during race events will be such that one or two will stay above 400 feet asl and other helicopters will fly between 100-400 feet asl to more closely cover the racing action. The helicopters will be choreographed and move around the racecourse to anticipate the next important stage of each race for filming.

To protect avian sensitive species, the project sponsors will restrict helicopter operations such that they would avoid the air space within at least 1,000 feet (vertically and horizontally) around Alcatraz Island. This air space restriction distance of at least 1,000 feet (vertically and horizontally) will also be applied for race-related helicopter flight patterns above Crissy Beach Wildlife Protection Area. During flight operations, helicopters will minimize impacts to pinnipeds by avoiding low flying (< 100ft asl) over pinniped haul out areas at Pier 39.

An existing helipad on the southeastern corner of Treasure Island is proposed to serve as a temporary staging location for these helicopters, such as between individual races on a race day. Final details of helicopter operations will be provided in the Water and Air Traffic Plan that will be developed and implemented for AC34.

Fireworks

Commercial grade fireworks displays are proposed at the opening and closing ceremonies for the 2013 America's Cup events only. The location of the fireworks barge will be near Piers 27-29 and up to four fireworks displays will occur lasting 30-45 minutes.

It is anticipated that aerial shells would be launched from tubes (called mortars), using black powder charges, to altitudes of 200 to 1,000 feet where they would explode and ignite internal burst charges and incendiary chemicals. Most of the incendiary elements and shell casings burn up in the atmosphere; however, portions of the casings and some internal structural components and chemical residue fall back to the ground or water, depending on prevailing winds.

The Project Sponsors have coordinated and will continue to coordinate with the U.S. Coast Guard (USCG) regarding limitations on the location, frequency and duration of the fireworks to minimize potential environmental impacts. Any proposed fireworks displays would be subject to approval by the USCG through the USCG Marine Event Permit process.

2) The date(s) and duration of such activity and the specific geographical region where it will occur;

The specific geographic locations for the Project are provided in **Figures 1 through 9**. **Table 2** provides approximate durations for pile driving at each location where pile driving will occur. The Race Events will occur in August and October for 2012 and between July and September for 2013 as detailed in **Table 1**. The helicopter operations will take place during the races as described above. The fireworks displays will take place at the opening and closing ceremonies of the 2013 Race Events as described in more detail above.

Construction activities will take place along the San Francisco waterfront. Vibratory pile driving for installation of floating docks will occur June through August 2012 and March through July of 2013, installation of 12-inch wood piles at Pier 19 will occur sometime between July and December 2012. Race events are scheduled in August and October of 2012 and between July and September of 2013.

3) The species and numbers of marine mammals likely to be found within the activity area;

Marine mammal species likely to be found in the activity area include the Pacific harbor seal (*Phoca vitulina richardii*), California sea lion (*Zalophus californianus*), and the harbor porpoise (*Phocoena phocoena*). It is also possible, although unlikely, that elephant seals (*Mirounga angustirostris*) could be present in the Bay. Harbor seals and California sea lion are found within the Bay at multiple sites either resting or foraging. There are no documented haulouts in project vicinity of construction or race events other than Pier 39 for California sea lion and Yerba Buena Island (YBI) for harbor seals. Various sources have observed pinnipeds resting on channel marker buoys throughout the Bay, on the shorelines of Alcatraz or Angel Island and along San Francisco waterfront but these locations are not defined as "haul out" sites by NMFS Southwest Regional office. Marine mammal monitoring results during the San Francisco/ Oakland Bay Bridge (SFOBB) project indicated that occasional sightings of harbor porpoises in the Bay, including near the YBI harbor seal haul-out site were reported (SRS 2004). As indicated by the Southwest Regional Office staff, harbor porpoises have been observed below the Golden Gate Bridge and were observed in some instances displaying mating behavior. Individual juvenile elephant seals have been reported entering the Bay in the past few years between March and August, with an occasional report in October and November. These juveniles have been observed on occasion to haul out on the beach at Crissy Field to rest. A few have been collected and taken to the Marine Mammal Center for treatment of malnutrition prior to being released. Accordingly this IHA concludes that harbor seals and sea lions are the only marine mammal species that have the potential to be consistently present anywhere near proposed construction activities for the Pier 27 Cruise Terminal or AC34 Project.

Typically, there is minimal marine mammal activity in the waters immediately adjacent to San Francisco waterfront facilities where floating docks and associated vibratory pile driving are proposed for the Project. A lack of marine mammal activities in these areas may be due to the

level of human disturbance along the San Francisco waterfront. The primary route for shipping traffic into and out of the Port of San Francisco and Port of Oakland is located between the San Francisco waterfront (project sites) and Angel Island. Tugboat activities occur at Piers 15 and 17, Ferry Traffic around Pier 1 and along the waterfront to Piers 39 and 45, marine shipping and cargo transport to Piers 80 A-D and Piers 92, 94-96 and cruise vessel traffic at Piers 27 and 35 and other water dependant maritime uses frequently occur along the San Francisco waterfront.

Ambient underwater noise for a major harbor like San Francisco is estimated at approximately 150 dB based on sound monitoring conducted for the SFOBB Project (Caltrans 2009). These levels of noise exceed the NMFS threshold for continuous sound levels of 120 dB for marine mammal disturbance under ambient conditions. Furthermore, during Fleet Week (October 6-11, 2011) which is an air show program that consists of four hour air shows daily and increased vessel traffic, there has been no evidence of stranding of or collisions with marine mammals reported to or recorded by NOAA (Pers comm. 2011).

As shown in **Figure 1**, the primary race area will be a small area within the overall race course limits. Racing yachts, spectator boats, and helicopter operations will be located primarily between the Golden Gate Bridge and to a short distance beyond Pier 29. Disturbance related to boating activities would be similar to noise levels seen on an active day in the Bay. Fireworks displays will be launched from a barge in proximity to Pier 27 in 2013.

Figures 10 through 12 provide examples of anticipated Level A and Level B harassment zones for vibratory pile driving from recent monitoring projects. **Figure 12** provides examples of anticipated Level A and Level B harassment zones for impact pile driving at Pier 19.

The following sections describe each species that are expected to be present within either the project site where construction will take place or the race area in general.

Harbor Seal (*Phoca vitulina richardii*)

There are up to 500 haul out sites for the harbor seal distributed along their Pacific coast range. California's population is estimated at 30,196 individuals (NOAA 2011). The harbor seal is a permanent resident in San Francisco Bay. Harbor seals have established haul out sites at Castro Rocks in San Pablo Bay, YBI in the Central Bay, and Mowry Slough in the South Bay (NOAA 2007). The south side of YBI is the nearest haul out area to the Project site. Harbor seals are not listed under ESA or considered strategic under the Marine Mammal Protect Act (MMPA).

The year-round seal haul-out on the south side of YBI is part of the USCG lands on the island and is not identified as a site for use by the Project. Although not historically identified as a pupping site for harbor seals, recent observations suggest that occasional pupping does occur at this location (Green, Grigg, Allen and Markowitz 2006). Pupping season for harbor seals in San Francisco Bay spans approximately March 15th through May 31st, with pup numbers generally peaking in late April or May.

As noted above, the YBI haul-out site is on the south side of the island, on USCG property. Individual seals may occasionally haul out farther to the west and southwest of the main haul-out

site, depending on space availability and conditions at the main haul-out area. San Francisco Bay Pacific harbor seal counts ranged from 524 to 641 seals from 1987 to 1999 (Goals Project 2000). The current Bay-Delta harbor seal population is estimated at between 500 and 700 individuals (Green, Grigg, Allen and Markowitz 2006 as cited in NOAA 2007b). The haul-out area on YBI is within the region of influence but not within the boundaries of the proposed Project. Pier 14 North where floating dock piles will be installed is the closest location to the YBI haul out site and is approximately 1.5 miles south west of the island. YBI is approximately two miles from Pier 19 where impact pile driving of 12-inch wood piles will be conducted. Other locations where vibratory pile driving of 18-inch steel piles for floating docks increase in distance from YBI.

California harbor seals are not listed under the endangered species act (ESA) or considered strategic under the MMPA (NOAA 2011).

*California Sea Lion (*Zalophus californianus*)*

California sea lions reside in the Eastern North Pacific Ocean in shallow coastal and estuarine waters. The most current NMFS stock assessment report estimates the U.S. stock population size at approximately 153,337 individuals (NOAA 2011). A common, abundant marine mammal, they are found throughout the west coast, generally within 10-miles of shore. California sea lions occur within the Bay-Delta in their highest numbers while migrating to and from their primary breeding areas on the Farallon and California Channel Islands, and when Pacific herring and salmon inhabit Bay-Delta waters to spawn or migrate to upriver spawning areas. They haul out on offshore rocks, sandy beaches, and onto floating docks, wharfs, vessels, and other man-made structures in the Bay and coastal waters of the state. Winter numbers of California sea lion in the Bay are generally over 500 animals (Goals Project 2000). In San Francisco Bay, California sea lion have been observed at Angel Island and occupying the docks near Pier 39 which is the largest California sea lion haul-out in San Francisco Bay. Up to 800 sea lions have been historically counted at Pier 39. This group of sea lions has decreased in size in recent years, coincident with a fluctuating decrease in the herring population in the Bay. There are no known breeding sites within San Francisco Bay. Their primary breeding site is in the Channel Islands (USACE 2011). The sea lions appear at Pier 39 after returning from the Channel Islands at the beginning of August (Bauer 1999). No other sea lion haul-out sites have been identified in the Bay and no pupping has been observed at the Pier 39 site or any other site in San Francisco Bay under normal conditions (USACE 2011). Although there has been documentation of pupping on docks in the Bay, this event was during a domoic acid event. It is not anticipated that any domoic events will occur during the AC34 event or construction activities for the event. California sea lions in the U.S. are not listed under the ESA or considered depleted under the MMPA (NOAA 2011). They are also not considered a strategic stock under the MMPA (NOAA 2011).

Pier 27 and Marina Green both less than 1 mile away from Pier 39 are the closest locations where vibratory pile driving will be conducted for floating docks. Pier 19 is also less than 1 mile away from Pier 39 where impact pile driving of 12-inch wood piles will be conducted. California sea lions may forage in the waters of and adjacent to the sites where construction is proposed and where the race events will occur.

Harbor Porpoise (*Phocoena phocoena*)

Harbor porpoise is a near-shore species that inhabits northern temperate and subarctic coastal and offshore waters. In the North Pacific, they are found from Japan (34°N) north to the Chukchi Sea and from Monterey Bay, CA to the Beaufort Sea. They are most often observed in Bays, estuaries, harbors, and fjords less than 650 feet (200 m) deep, like San Francisco Bay-Delta. The San Francisco-Russian River Stock, identified as a unique genetic group, ranges from Point Arena to Monterey Bay. NMFS's most current final stock assessment report for the Northern California/southern Oregon stock estimates this population at approximately 39,581 individuals (NOAA 2010). Harbor porpoises are non-social animals usually seen in groups of 2 to 5 individuals near the Golden Gate Bridge and open water areas of Central Bay. Unlike some of their cousins, harbor porpoises typically avoid boats and humans. Little information is known about their social behavior. Harbor porpoises feed on schooling fish such as herring and anchovies and invertebrates, including squid.

Occasional sightings of harbor porpoises (*Phocoena phocoena*) in the Bay, including near the Yerba Buena Island harbor seal haul-out site, were reported by the revised Caltrans marine mammal monitoring program (SRS 2004 as cited in WRA 2010) and the Golden Gate Cetacean Research (GGCR) Organization suggests that the species is returning to San Francisco Bay after an absence of approximately 65 years (GGCR 2010). This re-immersion is not unique to San Francisco Bay, but rather indicative of the harbor porpoise in general along the west coast. GGCR has begun a NMFS authorized, multi-year assessment to document the population abundance and distribution in the Bay. Recent observations of harbor porpoises have been reported by GGCR researchers off Cavallo Point, outside Raccoon Strait between Tiburon and Angel Island, off Fort Point and as far into the Bay as Carquinez Strait (Perlman 2010). Based on the Caltrans marine mammal monitoring and GGCR observations, the furthest site within the Bay at which harbor porpoises have been observed is Yerba Buena Island where in 2000 a single harbor porpoise was observed (CalTrans 2006). Harbor porpoises have been observed in the central and north Bay and could potentially occur within the race course area. Harbor porpoise in California are not listed under the ESA or considered depleted under the MMPA (NOAA 2011).

Elephant Seals (*Mirounga angustirostris*)

Northern elephant seals spend approximately 9 months out of the year in the ocean. They usually dive underwater to depths ranging between 1,000-2,500 ft for 20-30 minute intervals with only short breaks at the surface. Due to this behavior, they are rarely seen out at sea. Northern elephant seals are found in the eastern and central North Pacific Ocean and range as far north as Alaska and as far south as Mexico, they typically breed in the Channel Islands of California or Baja California in Mexico. Breeding occurs between December and March. While on land they prefer sandy beaches.

There is a paucity of data on the population. NMFS estimates the California breeding stock at 124,000 individuals (NOAA 2010). Elephant Seals do not have any established haul out sites in the San Francisco Bay, but occasional sightings have occurred at Crissy Field. Elephant seals in California are not listed under the ESA or considered depleted under the MMPA (NOAA 2010).

- 4) A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities;

Information provided in response to **Question 3**.

- 5) The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury and/or death) and the method of incidental taking;

Pursuant to the MMPA, ACEA and the Port of San Francisco request authorization from NMFS for incidental take by harassment of small numbers of Pacific harbor seal, California sea lion, Pacific harbor porpoise, and elephant seal resulting from construction elements and race event activities of the Project.

Specific activities associated with the Project that may result in "take by harassment" include:

- a) Acoustic disturbance/harassment only associated with pile driving using vibratory and impact hammers
- b) Harassment only by helicopters during 8 days of World Series in 2012 and 44 days of race events for the 34th America's Cup in 2013
- c) Harassment only by fireworks displays: Four 30 – 45 minute displays for the 2013 events

See the response to **Question 6** below for a detailed description of the anticipated take associated with these three activities.

Based on recent projects with similar vibratory pile driving equipment and pile size (Exploratorium and Pier 36/Brannan Street Wharf) along the San Francisco waterfront; it has been generally shown that Level A harassment thresholds are not reached during vibratory pile driving. Upon review of the Brannan Street Wharf IHA application Section 7 Anticipated Impact of the activity upon the species or stock, the document provides isopleth calculations for 24 and 36 inch steel piles and states that Level A harassment thresholds for pinnipeds would not be exceeded. In addition discussions with the monitoring contractor WRA (Justin Semion, Project Manager) for the Exploratorium Project also stated that they did not exceed level A harassment thresholds for pinnipeds for pile driving (72 to 36-inch steel pile) activities (Semion 2012). These piles are larger than AC34 project piles and made of steel, which typically exhibit greater RMS sound levels.

WRA submitted to NMFS in January 2012 the final pile driving monitoring report for the Exploratorium Project (Pier 15/17 San Francisco). The report stated that monitoring for sound was not conducted due to the fact that impact hammering was not necessary to drive the piles only vibratory driving was implemented. Monitoring reports from the biological observes during vibratory pile driving of 72 inch steel piles and 36 inch steel piles stated that vibratory activities did not influence marine mammals; biological monitoring staff did not observe any avoidance by

California sea lion or harbor seals during pile driving operations. Porpoises, elephant seals or whales were not observed during the pile driving activities (Jan 12th 2011 through July 29th 2011). There was no take from level A or B for the Exploratorium Project located at Pier 15/17 along the San Francisco waterfront. For example, a California sea lion was observed as close as 10 meters from a location where vibratory hammering was occurring and that individual California sea lion did not show distress or abnormal behavior (Semion 2012).

The on land programmed venue sites and public viewing areas associated with the Project will not affect marine mammals. Therefore, no impacts to marine mammals will occur due to installations of temporary structures on the venue sites.

Other activities associated with the Project that will not affect marine mammals and for which take authorization is not being requested include operation of racing and support vessels and spectator boats during the races. In addition, under guidance of NMFS Southwest Regional office, marine mammal attempts to occupy inactive floating docks will be addressed to avoid incidental harassment. The first will be addressed by the USCG's management of the race area (see **Question 7**) and the second by coordination with NMFS to determine appropriate actions as per section 109(h) of the MMPA to avoid marine mammals occupying and damaging the floating docks. These activities have been discussed with NMFS' Southwest Regional Office and all deterrence activities conducted under 109(h) will be coordinated with and reported to the Southwest Regional NMFS office.

6) By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in paragraph (a)(5) of this section, and the number of times such takings by each type of taking are likely to occur;

Incidental harassment may occur as a result of noise from pile driving during construction, helicopter operation during media coverage of race events, and during fireworks displays.

Table 4 provides a summary of the requested take coverage by activity.

The age, sex, and reproductive condition of individuals of each species that may potentially be taken is difficult to estimate given the lack of information on the class distribution of these species within the project area and greater San Francisco Bay. Provided below are estimates for each species potentially affected.

Pacific Harbor Seal and California Sea Lion

As previously described, the nearest known haul out site (Yerba Buna Island) for the Pacific harbor seal ranges in distance between 1.5 to 4.2 miles to the locations where floating docks will be installed and is more than 2 miles Pier 19 where wood piles will be impact driven.

Pier 19 is the closest site where impact pile driving will occur and is less than a mile from the haul out site for the California sea lions at Pier 39. These species may use the waters adjacent to the piers for foraging or for daily migrations between foraging and haul out locations.

California sea lions breed and give birth in spring, primarily in the Channel Islands, and Pacific harbor seals in San Francisco Bay generally pup March through May. The impact pile

driving activities at Pier 19 will avoid the majority of the pupping season (March – May) for these species. Therefore, it is expected that only adults, juveniles, and weaned pups would be the age classes impacted.

Daily movements of and foraging by harbor seals and California sea lions have been observed at various locations along the San Francisco waterfront. Monitoring data collected by Caltrans for the SFOBB project presents the most recent data that can be used to approximate density of these species. The monitoring work by Caltrans was located in the vicinity of the YBI haul out site, whereas most of the sites where construction or race activities will occur are in areas of high commercial shipping and boat activity. Pier 19, where impact hammering will occur is located more than 2 miles from YBI. The eastern edge of the proposed primary race course (see **Figure 2**) area is approximately 3 miles from YBI. Proposed fireworks displays would be 2 to 3 miles from YBI depending on the final selected location.

The eastern edge of the proposed primary race course (see **Figure 2**) area is less than 1 mile from Pier 39. Proposed fireworks displays would be 1 to 2 miles from Pier 39 depending on the final selected location.

Monitoring for the SFOBB project over 22 days between Jan-August 2006 exhibited 33 harbor seals and 2 California sea lions that were observed during pile-driving at Piers E2 and T1. Using this data an estimation of the density of harbor seals and California sea lions can be calculated; 1.5 seals/day and 0.09 sea lions/day. In comparison, monitoring during the eastbound Skyway structure pile-driving showed 63 pinnipeds were observed during 31 days (2.0 pinnipeds/day). These results may be skewed higher due to two days of herring runs during the eastbound monitoring resulting in 20 sea lions and 21 harbor seals observed within and outside of the marine mammal safety zone (MMSZ). There were no observed herring runs during monitoring for the SFOBB project. If data regarding the two days when herring runs occurred are excluded in overall density calculations then only 22 pinnipeds (0.8 pinnipeds/day) were observed during the eastbound structure pile-driving.

The numbers of individual pinnipeds counted for the SFOBB project are likely higher than those where pile driving or race activities will occur. In order to estimate take for this Project associated with Level B Harassment from pile driving the SFOBB data of 1.5 seals/day and 0.9 sea lions/day were rounded up to 2 harbor seals per day and 1 sea lion per day of pile driving activities.

Harbor Porpoise

Most harbor porpoise calves are born between May and August (Bjorge and Tolley 2008). Sightings of harbor porpoise greater than $\frac{1}{2}$ mile inside the Golden Gate Bridge are infrequent (NOAA 2009). Of those harbor porpoises regularly seen just inside of the San Francisco Bay few venture far into the Bay. As previously stated, only one harbor porpoise was sighted near the vicinity of the SFOBB site, near Yerba Buena Island during the Caltrans monitoring (Caltrans 2006). In order to estimate take for this Project associated with Level B Harassment from pile driving the SFOBB data of 1 porpoise per day will be used per day of pile driving activities.

Elephant Seal

As stated previously, elephant seals breed between December and March and have been rarely cited in the Bay. It is anticipated that if an elephant seal is encountered at all during

pile driving or race activities it would be either an adult or juvenile. Estimates for elephant seals were based on anecdotal information from National Parks Service staff that observed an elephant seal at Crissy Field once. To address agency concerns and to be highly conservative take of two elephant seals that could potentially be present during all construction activities and race events of the project will be requested.

Pile Driving

A vibratory hammer will be used to accomplish the majority of the pile driving required for the project. The disturbance to marine mammals is likely to only be due to avoidance behavior and potential reduction in foraging. A production rate for pile driving is estimated at 8 piles per day as shown in **Table 3**. An impact hammer will be used to drive 12-inch wood piles at Pier 19.

Details regarding the pile driving are explained in response to **Questions 1 and 5** above.

Vibratory pile driving for installation of floating docks will occur June through August 2012 and March through July of 2013. Impact pile driving activities at Pier 19 will be conducted for up to four months (June – December and completing in March 2013 if construction delays occur).

Coordination with CDFG and NMFS has been ongoing and biological assessments were submitted to both agencies. Final concurrence of the Biological Assessment that was submitted to CDFG is pending as well as the final Biological Opinion for ESA and EFH from NMFS.

To be conservative, presence of marine mammals within each area when pile driving is occurring is estimated to be 2 harbor seals and 1 California sea lion per day, 1 porpoise per day of pile driving and 1 elephant seal per year. These animals could come within the Level B harassment threshold isopleth. A total of 468 piles are proposed to be driven for the AC34 construction in 2012 and 2013. Pile driving activities have the potential to incidentally take marine mammals through harassment due to acoustic disturbance. The project will utilize different types of piles but will predominantly use 18-inch steel piles, 12-inch wood piles. **Table 2** above provides a detailed overview of the number and type of piles proposed for each construction site area as well as estimated construction days to drive piles. Additional detail on construction methods and pile driving is provided in Appendix A. To calculate estimates for take request, **Table 3** provides the maximum number of potential construction days that a marine mammal may be exposed to sound impacts related to pile driving. Based on these pile driving production rates a maximum of 59 days will be used to estimate take request for each species.

The take requested due to pile driving a maximum of 59 days for each species is listed below:

- 2 harbor seals per a pile driving day over the project timeline
- 1 California sea lion per a pile driving day over the project timeline
- 1 harbor porpoise per a pile driving day over the project timeline
- 2 elephant seals over project timeline (To be extremely conservative the Project Sponsors are requesting take for elephant seals based on recent occasional sightings).

TABLE 3
SUMMARY OF PILE DRIVING FOR EACH AREA AND
ESTIMATED NUMBER OF ASSOCIATED CONSTRUCTION DAYS

Location and Type of Pile		# of Piles	Piles/day	Construction Days	Type of Pile Driver
Floating Docks 18" Steel Piles		244	8	31	vibratory
Pier 19	Apron Replaced Piles	12" Wood Piles	224	8	28
Totals			468	59	

Helicopter Noise

Take will be limited to incidental behavioral harassment of California sea lions and harbor seals within the immediate vicinity of a helicopter covering the race event in western Central Bay. It is anticipated that California sea lions would be present within the race area and flight patterns of the helicopters since their haul out area is at Pier 39 and closer to the race activities. Only minor instance of harbor seals would be expected in the range of helicopter noise. Avoidance and minimization measures will be implemented for flight operations of the helicopters as detailed in response to **Question 7**.

Estimates of the number of California sea lions that could be present during helicopter operations were based on information from the Goals Project Baylands ecosystem species and community profiles: life histories and environmental requirements of key plants, fish, and wildlife of the San Francisco Bay Area (Goals Project 2000). The following is an excerpt from this reference:

"In San Francisco Bay, California sea lions occur year round, but with a dynamic difference from that of the adjacent outer coast. Greatest numbers are present during the winter herring run (Dec-Feb; Hanni, pers. comm.). Following the winter peak, numbers decline to just a few animals by June and July. Numbers then increase gradually before a sudden increase in December. Known haul-out spots in San Francisco Bay are rare, and include only Pier 39, occasionally at Angel Island, and at Seal Rock just outside the Golden Gate. The largest number haul out at Pier 39, but the phenomenon is only a recent one (unlike Seal Rock, which has been used by sea lions for at least the last 100 years; Sutro 1901). At first, in winter 1989-90, only a few individuals hauled out at Pier 39, but the next year they reached an average 500 (+ 100 SD) per day (February 1991); since then peak numbers during winter declined and now average about 200-300 animals per day (Marine Mammal Center, unpubl. data)"

Rapid and direct helicopter approaches have the potential to initiate stampedes or subgroups temporarily departing into the water. A flushing event can include an active departure of a haul-out site, slow displacement into the water, or a stampede which occurs when a large proportion of the pinnipeds in a group enter the water defensively (NOAA 2010b). An initial helicopter approach at Pier 39 may have the potential to cause a significant portion of the sea lions hauled out on "K" dock at Pier 39 to depart into the water. In order to mitigate for the potential of sea lions temporarily vacating the dock, helicopters will implement approach and timing techniques

that are least disturbing to marine mammals. For example, the project sponsor will be responsible for coordinating with the FAA and helicopter operators to ensure compliance with flight regulations and to enforce the flight restrictions identified in the AC34 Water and Air Traffic Plan. Helicopters will descend/ascend vertically for landing and take-off at the helipad on Treasure Island. Helicopters will not skim the surface of water (<100 feet) during the race events nor during landing and takeoff operations.

In order to estimate take from helicopter operations the Goals Project report maximum average of 500 was used. Then to be extremely conservative for assessing potential Level B Take, it was assumed that 50% of the individuals might flush either due to sound, shadow, or presence from helicopter operations. Based on an estimated number of 500 California Sea Lions at Pier 39 that could be resting at any time; it will be assumed that 50% of these will be disturbed in some fashion by helicopters. Therefore, to estimate take, 250 California sea lions per day during helicopter operations will be requested for take for each day when helicopters are in operation.

Estimates of the number of harbor seal that may be present during helicopter operations were based on Caltrans monitoring data and local observations. Caltrans (2006) reported 0-4 seals per day during pile driving. Anecdotal information from monitoring of fleet week, NPS staff, and local sailors reported observing anywhere from 10-15 seals per day while out on the water. Monitoring data tracking foraging in the Central Bay has not been found. Therefore to be conservative we set a maximum of 20 harbor seals out of all that could be in the race area and might be disturbed by helicopters covering the race activities. We anticipated that restricting helicopters from flying below 100ft would assist in reducing disturbance.

Level B Harassment of take requested due to helicopter operations (8 race days in 2012 for the World Series and 44 race days in 2013 for the AC34 events) during 52 days of operation for each species is listed below:

- 20 harbor seals per day of helicopter operations over the project timeline
- 250 California sea lion per day of helicopter operations over the project timeline
- A total of 2 elephant seals for all project construction and race activities (as stated previously).

Fireworks

Take will be limited only to the incidental behavioral harassment of California sea lions and harbor seals within the vicinity of the fireworks barge and display due to temporary evacuation of usual and accustomed haul-out sites, such as Pier 39 or at Angel Island. The primary causes of disturbance are light flashes and sound effects from exploding fireworks. As a fireworks presentation progresses, most marine mammals generally evacuate the impact area. Increased recreational use (terrestrial and marine) in the fireworks display area during the hours immediately prior to the show may also prompt wildlife to temporarily evacuate the area. NMFS has monitored marine mammal responses to fireworks in Monterey Bay National Marine Sanctuary and presented results in a Fireworks Assessment Report (NOAA 2001). This report

was submitted previously to the NMFS Office of Protected Resources and is one of the few sources for information related to effects from fireworks.

The fireworks display will occur in the northern portion of the waterfront near Pier 27 in 2013. The four fireworks display events combined may result in behavioral harassment (Level B harassment). However, the firework displays are expected to be similar to and of the same noise intensity as the annual 4th of July fireworks show currently occurring in the Bay.

Level B Harassment of take requested due to four fireworks displays in 2013 for the AC34 events for each species is listed below. The estimated numbers of individuals for take is based on the same assumptions for helicopter flights:

- 20 harbor seals per each firework display over the project timeline
- 250 California sea lion per each firework display over the project timeline
- A total of 2 elephant seals for all project construction and race activities (as stated previously).

Table 4, below, provides a summary of the take requested for the entire Project timeline.

7) The anticipated impact of the activity upon the species or stock;

Project construction and Race Event activities may temporarily impact marine mammal species by disrupting foraging behavior as a result of construction and race activities. However, this type of harassment would be temporary in nature and would only affect those marine mammals within the immediate vicinity of the Project. Accordingly, no long term impacts to the species or stocks are expected to occur as a result of the Project.

Pile Driving

Pile driving for installation of floating docks and repairs may impact marine mammal species through temporary avoidance and disruption of foraging behavior, but no long term impacts to the species or stock are expected to occur as a result of the project. Federal Register Notice (Vol. 70, No. 7, pp. 1871-1875) establishes thresholds for acoustic impacts to marine mammals. These regulations set standards for behavioral harassment ("Level B" criteria) of marine mammals at 120 dB _{RMS} for "continuous" source vibrations, and 160dB _{RMS} for impact sources. The regulations also set the criteria for physical injury ("Level A" criteria) from an impact source at 190 dB _{RMS} for pinnipeds, such as Pacific harbor seal and California sea lion.

As stated previously, typically there is minimal marine mammal activity in the waters immediately adjacent to waterfront facilities where floating docks and associated vibratory and impact pile driving are proposed. A lack of marine mammal activities in these areas may be due to the level of human disturbance along the San Francisco waterfront as described above in **Question 3**. The primary route for shipping traffic into and out of the Port of San Francisco and Port of Oakland is located between the San Francisco waterfront (project sites) and Angel Island. Tugboat activities occur at Piers 15 and 17, Ferry Traffic around Pier 1 and along the waterfront to Piers 39 and 45, marine shipping and cargo transport to Piers 80 A-D and Piers 92, 94-96 and

TABLE 4
**NUMBER OF INDIVIDUALS REQUESTED FOR LEVEL B HARASSMENT
TAKE OVER THE ENTIRE PROJECT TIMELINE**

Number of individuals requested for Level B Harassment take over the entire Project Timeline							Harbor Seals			California Sea Lion			Harbor Porpoise			Elephant Seal		
Activity	Harbor Seals			California Sea Lion			Harbor Porpoise			Harbor Porpoise			Elephant Seal					
	Individual per day or event	TOTAL Event and Days in 2012-2013	Total Take Requested	Individual per day or event	TOTAL Event and Days in 2012-2013	Total Take Requested	Individual per day or event	TOTAL Event and Days in 2012-2013	Total Take Requested	Individual per project	Total Take Request							
Pile Driving	2	59	118	1	59	59	1	59	59	2	2							
Helicopter Operations	20	52	1,040	250	52	13,000	NTR	NTR	NTR	2	2							
Fireworks Displays	20	4	80	250	4	12,500	NTR	NTR	NTR									
<i>US or California Stock population estimate</i>	<i>30,196</i>			<i>153,337</i>			<i>39,581</i>			<i>124,000</i>								

NOTE: Total Take Requested - based on a total of all days or events multiplied by the potential numbers of individuals that may be present within the area. An individual may be harassed on multiple days or events. For example, up to 250 individual sea lions at Pier 39 would be harassed on multiple occasions due to helicopter and these same individuals may be harassed by fireworks displays. Take is requested for each potential occurrence.

cruise vessel traffic at Piers 27 and 35 and other water dependant maritime uses frequently occur along the San Francisco waterfront. Ambient underwater noise for a major harbor like San Francisco is estimated at approximately 150 dB based on sound monitoring conducted for the SFOBB Project (Caltrans 2009). These levels of noise exceed the NMFS threshold for continuous sound levels of 120 dB) for marine mammal disturbance under ambient conditions. During Fleet Week (October 6-11, 2011), an air show program which consists of four hour air shows each day and increased vessel traffic, there were no strandings nor collisions of marine mammals reported to or recorded by NOAA (Pers comm. 2011).

Noise Effects from Pile Driving

Steel pilings for temporary race infrastructure (18-inch steel pile), such as floating docks will be installed using a vibratory pile driver. Piles to be replaced at Pier 19 (12-inch wood pile) will be driven with an impact hammer.

Concrete, wood, and steel piles that are driven within the water column can produce high-intensity noise resulting in damage to soft tissues, and/or result in harassment of fish and marine mammals such that they alter swimming, sleeping, or foraging behavior or abandon temporarily forage habitat. Based on the sound calculations, mitigation measures, and recent monitoring results from the Exploratorium Project, fish kills or injuries are not anticipated during pile driving activities. Sound monitoring will be implemented to confirm that noise levels remain below established thresholds. Generally, underwater noise generated by driving wood piles is significantly less intensive than for comparable steel piles (see **Table 5**). The striking of a pile by a pile-driving hammer creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses, as a function of time are referred to as a waveform. Peak waveform pressure underwater is typically expressed in decibels (dB) referenced to 1 micro Pascal (μPa). Sound levels are generally reported as peak levels (peak) and sound exposure levels (SEL). In addition to the pressure pulse of the waveform, the frequency of the sound, expressed in Hertz (Hz) is also important to evaluating the potential for sound impacts. Low frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high frequency sounds.

Vibratory pile drivers work on a different principal than pile-driving hammers and produce a different sound profile. A vibratory driver works by inducing particle motion to the substrate immediately below and around the pile causing liquefaction of the immediately adjacent sediment, allowing the pile to sink downward or to be removed. Vibratory pile driving is only suitable where soft substrate is present. The noise produced by vibratory drivers driving concrete and steel piles in water range between 165-195 dB (Peak) and 150-180 dB (SEL), as illustrated in **Table 5** above (Caltrans 2009). These sound levels are typically 10-20 dB lower in intensity relative to the higher, pulse-type noise produced by an impact hammer (Caltrans 2009).

Table 5 provides a summary of underwater noise levels from pile driving projects within the San Francisco Bay area for pile types similar to those proposed for the project. These sound levels were obtained from the pile driving compendium (Illinworth & Rodkin 2007) and are utilized by NMFS.

TABLE 5
EXAMPLES OF MONITORING DATA OF NEAR-SOURCE UNDERWATER
NOISE LEVELS FROM PILE DRIVING

Pile Size/Type	Relative Water Depth	Distance from Piling Measurement Taken	Average Sound Pressure			Attenuation Device
			Peak (dB)	RMS	SEL ^a (dB)	
Vibratory Hammer^b						
12-inch Steel	5 meters	10 meters	165-171	150-155	150-155	None
36-inch Steel	5 meters	10 meters	185	175	175	None
Impact Hammer						
12-14-inch timber	2-4 meters	10 meters	180	170	160	None

^a SEL – sound Exposure Level (SEL) for 1 second of continuous driving.

^b Caltrans 2009.

SOURCE: Cal Trans 2009, Illinwork & Rodkin 2007

No underwater sound level measurements for using a vibratory hammer 18-inch steel piles in sediments comparable to those in San Francisco Central Bay are currently available. The nearest size pile CalTrans reported sound levels for were 12-inch and 36-inch steel piles from multiple projects; sound levels ranged between 150 to 165 dB RMS at 10 meter distances when driving as shown in **Table 5** (Illinworth & Rodkin 2007).

To estimate isopleths distances for each pile size and type (18-inch steel vibratory and 12-inch wood impact) the sound levels from pile driving the closest pile size and type from the existing monitoring data were used to provide a potential dB RMS range that pinnipeds may encounter (**Tables 6 and 7**). **Tables 6 and 7** exhibit these sound monitoring results and associated isopleths distances for various NMFS thresholds were calculated using the compendium data.

A sound monitoring plan will be developed for the AC34 pile driving activities to ensure thresholds are not exceeded (**Question 11** provides greater detail).

TABLE 6
EXAMPLES OF SOUND LEVELS AND EXPECTED NMFS THRESHOLD ISOPLETHS DISTANCES
FOR VARIOUS SIZE PILES FROM VIBRATORY DRIVING

Width/ Diameter	Pile Type	Water Depth	Average Sound Pressure in dB			Calculated Distances in meters to thresholds				
			(m)	Peak	RMS	SEL	120 dB	160 dB	180 dB	190 dB
12	Steel pipe pile	5		171	155	155	1,000 ^a	5	0	0
36	Steel pipe pile	5		185	175	175	1,000 ^a	100	5	1

^a Calculated threshold distance was greater than 1,000m.

TABLE 7
SOUND LEVELS AND EXPECTED NMFS THRESHOLD ISOPOLETHS DISTANCES FOR
VARIOUS SIZE PILES FROM IMPACT HAMMER DRIVING

Width/ Diameter	Pile Type	Water Depth (m)	Average Sound Pressure in dB			Calculated Distances in meters to thresholds			
			Peak	RMS	SEL	120 dB	160 dB	180 dB	190 dB
12	Wood pile	10	180	170	160	1,000 ^a	46	2	0

^a Calculated threshold distance was greater than 1,000m.

^b The use of a bubble curtain has been shown to reduce sound levels by 10 dB RMS to 20 db RMS. For this calculation 15 was used to estimate distance in meters to threshold.

SOURCE: Cal Trans 2009

Noise Effects to Marine Mammals

Currently, the National Marine Fisheries Service (NMFS) thresholds for acoustic impacts from impulse sounds to marine mammals are set at the following levels:

- 120 dB RMS for behavioral harassment of marine mammals from continuous source vibrations ("Level B" harassment);
- 160 dB RMS for behavioral harassment of marine mammals from impact source vibrations ("Level B" harassment);
- 180 dB RMS for physical injury of cetaceans (harbor porpoises) ("Level A" criteria); and
- 190 dB RMS for physical injury of pinnipeds, such as Pacific harbor seal and California sea lion ("Level A" criteria).

As previously stated, all piles for installation of floating docks will be driven with vibratory hammer. Wood piles will be driven with an impact hammer. Only one pile type is expected to be driven on any given day. All impact pile driving will employ a "soft start" technique. **Table 6** summarizes pile size and associated sound levels (in dB RMS) expected at approximately 10 meters from the source.

Harassment threshold isopleths for pile driving were based on the sound level produced at the source and the expected attenuation rate of sound with distance from the source. Based on the anticipated sound levels given in **Tables 6** and **7**, the expected distance from the source sound to the NMFS thresholds for acoustic impacts to marine mammals was calculated.

In its recent issuance of an Incidental Harassment Authorization (IHA) for the pier improvements at the Exploratorium (Piers 15-17) in which 72-inch steel pilings were installed using vibratory and impact hammers, NMFS determined that through the implementation of the measures outlined in the programmatic consultation, that Level A harassment (Acute barotraumas) could occur to marine mammals in San Francisco Bay within 65 feet of the sound source (WRA 2010). NMFS further determined for the Exploratorium Project that Level B harassment could occur

from vibratory hammer installation of steel pilings out to 1.3 miles and from impact hammers out to 354 feet from the sound source. The piles used in the Exploratorium are four times larger than those proposed for this Project.

Figures 10 through 12 provide calculated NMFS Threshold isopleths for each anticipated pile to be driven either by vibratory or impact hammers for AC34 construction activities. The Bay waters adjacent to locations where pile driving will occur can be used by harbor seals and California sea lions for foraging and transit to and from colonies and/or haul-out locations within the Bay and nearshore coastal waters. The potential for disturbance exists. However, the implementation of a sound monitoring plan as detailed in **Question 11** as required in the NMFS programmatic review for pile driving activities in San Francisco Bay is expected to further reduce the potential for noise effects on marine mammals (NMFS 2007).

The sound monitoring plan will describe a process for establishing Level A marine mammal safety zones (MMSZs) and Level B buffer zones (collectively ‘safety zones’) based on the 190 dB threshold and 120 dB isopleth thresholds for marine mammals, respectively. Note that the Project proponent is only requesting take for Level B harassment and does not anticipate sound levels exceeding level A harassment based on past monitoring data and calculated isopleths related to each project activity. Predicting audibility (or detectability) with any certainty at distances beyond 1,000 meters is not possible (CalTrans 2009). Therefore, the maximum safety zone distance will be at 1,000 meters, but is likely to be smaller. Monitoring sound within an active maritime waterfront such as San Francisco includes these ambient noise and monitoring at greater distances from the source (>1,000ft) can cause uncertainty in determining if the sound level recorded is strictly attributable to only the pile driving. As previously stated, ambient sound levels have been reported at 150 dB, which exceeds the NMFS threshold for continuous sound levels of 120 dB.

To address the potential conflict with ambient noise conditions, the sound monitoring plan will recommend sound monitoring stations, which could be located at 10 m, 100m, and 300m. For illustrative purposes in the isopleths figures, the maximum distance of a threshold isopleth was limited to 1,000 meters (3,281 feet). **Figure 10** provides NMFS threshold isopleths for vibratory pile driving (using the 12-inch steel pile driving monitoring data) at Pier 14, which is closest to YBI. **Figure 11** provides NMFS threshold isopleths for vibratory pile driving of 12-inch steel piles at Pier 27. **Figure 12** provides potential NMFS threshold isopleths from impact hammer driving of wood piles at Pier 19. As stated above, safety zones will be established and finalized through implementation of the sound monitoring plan.

Marine mammal monitors will be present during pile driving activities (as further described in **Question 11**). The monitors will record observations of marine mammals within the safety zones before, during, and after pile driving activities. Should a marine mammal come within or approach a safety zone prior to the start of pile driving, pile driving activities will be delayed until the mammal is either seen exiting the safety zone or if the marine mammal has not been observed within the area for a period of 15 minutes or more.

Helicopters

A paucity of data exists that quantitatively provide sound levels related to marine mammal responses to aircraft. Some studies have reported that aircraft flying at low altitudes and close lateral distances and above shallow water elicit stronger responses than aircraft flying higher, at greater lateral distances and over deep water (Luksenburg and Parsons 2008). Sensitivity to aircraft noise may also differ among species. Luksenburg and Parsons (2008) noted that in the Alaskan Beaufort Sea, beluga whales reacted more frequently to noise than bowhead whales.

A recent Environmental Assessment (EA) conducted by the Navy for its Naval Base in Coronado, CA monitored sound exposure levels from helicopter operations (US Navy 2011). Helicopter operations for the Naval Air Station North Island (NASNI) EA reported SELs ranging from 65 dB to 98 dB for helicopters at lateral distances from the monitoring locations between 0ft and 5,000ft at altitudes between 100 ft to 800ft above sea level (asl). The maximum SEL of 98 dB was recorded for a lateral distance of 0 ft and a height of 100 ft asl. The EA concluded that marine mammals such as the California sea lion and Pacific harbor seal would not be impacted and helicopter flight operations with the Proposed Action would not appreciably change the noise contours. The Navy did not request “take” for this project based on the recorded SELs.

Currently, the NMFS Level B harassment thresholds for acoustic impacts to marine mammals are set at the following levels (primarily determined by altitude).

- In air (re: 20 µPa) RL > 90 dBrms for harbor seals
- In air (re: 20 µPa) RL > 100 dBrms for all other pinniped species

Modeling was conducted for documentation under the National Environmental Protection Act for this Project in relation to impacts on birds. The Integrated Noise Model, Version 7.0b, was used to quantify maximum noise levels generated by race-sponsored helicopters at Pier 39 platforms where sea lions are known to regularly gather. Modeled flight tracks for helicopter operations followed the race course and included a 1,000-foot buffer from the Crissy Field shoreline to reflect the restrictions on helicopter flights associated with the Project as identified above and in the Water and Air Traffic Plan. The Long Ranger helicopters were modeled at 100 feet above sea level (ASL) and the Robinson-44 at 300 feet ASL at an average speed of 30 knots while in flight and including 15 minutes of hovering time per race. In order to model the hovering periods, the race course was divided into four equal segments. The helicopters were modeled hovering for 5 minutes at each of these areas. Maximum noise levels estimated by the model at the Pier 39 platforms were 58.8 and 67.6 dBA generated by the Long Ranger and Robinson helicopters, respectfully. Based on this model, Level B harassment due to noise from helicopters is not anticipated to exceed NMFS levels. However, it is anticipated that some disturbance may still be caused to California sea lions and Pacific harbor seals in the area of operations either due to shadow or presence of helicopters. To be extremely conservative, the Project Sponsors are requesting Level B harassment take for presence/shadow or in the event noise levels may be exceeded.

Fireworks

Marine mammals can be impacted by fireworks displays by light and sound. The primary causes of disturbance are light flashes and sound effects from exploding fireworks. Direct impacts include, but are not limited to, immediate physical and physiological impacts such as abrupt changes in behavior, flight response, diving, evading, flushing, cessation of feeding, and physical impairment or mortality.

Marine mammals and other wildlife may avoid or temporarily depart the impact area during the hours immediately prior to the beginning of the fireworks display due to increased human recreational activities associated with the overall celebration event (noise, boating, kayaking, fishing, picnicking, etc.), and as a fireworks presentation progresses, most marine mammals generally evacuate the impact area. In particular, a flotilla of recreational and commercial boats usually gathers in a semi circle within the impact area to view the fireworks display from the water. As per the Special Local Regulations issued by the USCG for this project, USCG and/or other government agencies will patrol the waters of the impact area to keep vessels a safe distance from the fireworks launch site.

NMFS recently assessed the potential impact of aerial fireworks displays in the Monterey Bay National Marine Sanctuary (MBNMS) on marine mammals in preparation for issuance of an Incidental Harassment Authorization permit under the MMPA. This assessment of the potential effects of firework noise on marine mammals included all of the species observed in Central San Francisco Bay (NOAA 2011). In their assessment NMFS determined that for injury to occur to marine mammals from fireworks, they would need to generate in-air sounds in excess of 128 db at a reference (re) 20 µPa. Noise studies done at Vandenberg Air Force Base (VAFB) following missile launches reported that behavioral changes in marine mammals were observed at sound levels of 90-100 db re 20 µPa. Sound monitoring conducted between 1993 and 2001 offshore of Monterey, California during annual 4th of July events, reported firework displays generating peak sound levels of 82 dB re 20 µPa at a 0.5-mile distance and average sound levels of 78 dB re 20 µPa, which is below the noise level determined to cause either injury or behavioral responses in marine mammals. Ambient noise levels were recorded at 58 dB re 20 µPa. Both the VAFB and MBNMS monitoring studies reported that when marine mammals left their haul out and entered the water because of noises exceeding 90-100 dB, they would return within 4-15 hours (NOAA 2011). In conclusion, NMFS determined that any impact to marine mammals from firework displays would be negligible.

Past monitoring by the MBNMS has shown that fireworks displays result in only short-term behavioral harassment of animals, at most (NOAA 2001). Most animals depart affected haul-out areas at the beginning of the display and return to previous levels of abundance within 4-15 hours following the event. For past projects, NMFS determined that fireworks displays would result in no more than Level B harassment of small numbers of California sea lions and harbor seals. In a 2001 consultation with the National Marine Sanctuary Program (NMSP), NMFS, the Southwest Region, concluded that a fireworks display was not likely to adversely affect federally listed species under NMFS' jurisdiction. NMFS determined that any take would have a negligible impact on the affected species and stocks. Furthermore, the potential for AC34 2013

firework displays to result in impact to marine mammals is extremely small or negligible since the closest established haul-outs (Pier 39 and YBI) range between 0.5 and 3.5 miles respectively from Piers 27-29. No take by injury and/or death is anticipated from the AC34 fireworks, and harassment take will be at the lowest level practicable. The effects of the fireworks displays will be limited to short term and localized changes in behavior, including temporarily vacating haul outs to avoid the sight and sound of fireworks.

Race Activities: Racing Yachts, Race Support Vessels and Spectator Boats

The Project Proponent is not requesting take associated with racing yacht, race support vessels and spectator boat operations due to management of the race course. In recent discussions, NMFS staff confirmed that they did not anticipate impacts to marine mammals from the operation and racing of sailing boats during the racing events. There is some concern related to the spectator boats and the potential that the viewing area could present issues for escape routes of marine mammals traveling through the area. However, it is not anticipated that any collisions or harassment would occur due to the operation or sailing of vessels within the race area to marine mammals due to management procedures implemented by USCG and ACRM. If an unanticipated event (such as a collision) occurs the ACRM would immediately contact the NMFS office and coordinate with NMFS staff.

Due to the size and the speed of the racing catamarans, USCG intends to create a managed safety zone on the water during the races, to separate spectators from the race course - while providing safe viewpoints to watch. They will do this through a formal rulemaking process which includes notifying the public via the Federal Register, incorporating input from public comment, and then issuing a Special Local Regulation in tandem with the Marine Event Permit. The Special Local Regulation will address the location of the event and how the waterway will be managed, including the movement of commercial vessel traffic and recreational boaters. It will give the Captain of the Port the flexibility she needs to execute all CG missions during the event.

Managed Safety Zones on the Water

Managing spectator traffic on the water will require close coordination and planning with Project Sponsors and other agency maritime responders, including the SF Police & Fire Departments, Customs and Border Protection, and state and other local agency maritime units. USCG will supervise all on-water safety and security during the Event using an Incident Command System (ICS) structure with a command and control for maritime at an Incident Command Post on Yerba Buena Island. It will communicate with SFPD through interagency liaisons in its command post. Experience with the limited races in 2012 will provide USCG a chance to refine its operational plan before the 2013 races.

As an added measure, the AC34 project sponsors are developing a Water and Air Traffic Plan which will provide for adequate and safe access to the race course area and details for use of the race course area. The Water and Air Traffic Plan will include the Notice to Boaters identified above for visiting boaters, which will identify sensitive habitats and species in the Bay and

measures to avoid impacts to marine resources. Federal and state regulations prohibiting the harassment of marine mammals will be included in the notice.

The notice will also include information on environmentally sound boating practices and where to access environmental services to ensure employment of clean boating habits. The notice at a minimum, will target the marinas within San Francisco County and Marin County, and provide information about the locations of environmental services that boaters in these marinas are most likely to need. Educational materials will clearly address, in multiple languages, common sources of pollution from boats and marinas and outline relevant regulations and clean boating policies.

The Water and Air Traffic Plan includes a separate dissemination plan that describes the method for disseminating the notice to visiting boaters to target areas that may host invasive species to San Francisco Bay, in particular, marinas and yacht clubs in Southern California. Dissemination methods include: coordination with USCG standard procedures and notices, brochures or pamphlets, AC34 websites, boating, cruising, and newspaper periodicals, social media, and area yacht clubs and marinas.

Based on all of the above reasons, the proposed Project, in particular, pile driving, helicopter operations and fireworks displays, are not anticipated to cause any long term impact on the four marine mammal species (California sea lion, Pacific harbor seal, harbor porpoise and elephant seal) as a whole or their stock.

8) The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses;

Marine mammals in San Francisco Bay are not harvested for subsistence use. Therefore no impact would occur to subsistence uses.

9) The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat;

No permanent impacts are expected to marine mammals. Impacts related to installation of temporary floating docks and noise disturbances from pile driving helicopters, and fireworks are temporary and would not require restoration. Site conditions are anticipated to be substantively unchanged from existing conditions for marine mammals following project implementation and completion.

Fireworks displays do not alter ocean areas or haul-out sites used by California sea lions and harbor seals, nor do they impact the availability of prey species.

As described in detail above under **Question 7**, the proposed Project is not anticipated to cause any long term impacts to marine mammal species.

10) The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved;

No habitat loss will occur due to project construction or race related activities, fireworks or helicopter use. The impacts associated with the proposed project are temporary and are not expected to have long term affects on marine mammals or marine mammal habitat.

11) The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance;

The Project is not anticipated to result in Level A impacts to marine mammals, but may result in Level B harassment of Pacific harbor seals, California sea lion, harbor porpoises, and elephant seals. Level B harassment associated with the proposed project would be temporary in duration and is not expected to result in long term effects to marine mammals or their habitat in the region. Avoidance and minimization measures for each related impact are provided below:

Pile Driving

Neither installation of piles using a vibratory hammer nor the use of an impact hammer for installation of 12-inch wood piles are expected to result in Level A Harassment of marine mammals. Level B harassment would be temporary in duration, and is not expected to result in any long term effects to marine mammal stocks or habitat in the region. The vibratory hammers anticipated to be used (see Appendix A) will substantially minimize potential affects to marine mammals. When an impact hammer is used for the wood, a wood cushion block will be used. In addition, a "soft-start" procedure at the start of vibratory hammer activity will be used to allow animals within the area a chance to leave before full energy is reached. The soft-start requires contractors to initiate noise from vibratory hammers for 15 seconds at reduced energy followed by a 1-minute waiting period. The procedure will be repeated two additional times before full energy is achieved. This procedure will be conducted prior to driving each pile if vibratory pile-driving ceases for more than 30 minutes.

Avoidance and Minimization Measures that will be implemented for pile driving include the following:

- Vibratory pile drivers will be used for the installation and removal of all steel pilings (18-inch diameter) for floating docks. Vibratory pile driving will be conducted following the USACE "Proposed Procedures for Permitting Projects that will Not Adversely Effect Selected Listed Species in California". USFWS and NMFS completed Section 7 consultation on this document which establishes general procedures for minimizing impacts to natural resources associated with projects in or adjacent to jurisdictional waters (NMFS 2007).

Under this guidance a vibratory hammer may be used year-round to install steel, wood, or concrete piles of any size and in any number.

- 12-inch wood piles will be installed using an impact hammer. Impact pile driving will be conducted following the USACE “Proposed Procedures for Permitting Projects that will Not Adversely Effect Selected Listed Species in California.” USFWS and NMFS completed Section 7 consultation on this document which establishes general procedures for minimizing impacts to natural resources associated with projects in or adjacent to jurisdictional waters (NMFS 2007).

The following is the excerpt from this programmatic guidance for impact hammer usage.

Use of an impact hammer is limited to projects using only one hammer and less than 50 piles installed per day.

- i. *For wood piles – Any size pile – may occur year-round*
- ii. *For concrete piles – Piles must be 18 inches or less in diameter – may occur year-round*
- iii. *For steel piles – Piles must be 12 inches or less in diameter and hammer must be 3,000 pounds or smaller and must use wood cushion between hammer and pile – may occur year-round.*
- As described above in detail in **Question 7**, the Project Sponsors will develop a NMFS-approved sound monitoring plan prior to the start of pile driving. This plan will provide detail on the methods used to monitor and verify sound levels (air and water) during pile driving activities. The sound monitoring results will be made available to NMFS.
- A NMFS-approved biological monitor will be available to conduct surveys before and during pile driving to inspect the work zone and adjacent Bay waters for marine mammals. The monitor will be present as specified by NMFS during impact pile-driving phases of construction.
 - i) Maintain the safety zones established in the sound monitoring plan around sound source, for the protection of marine mammals in association with sound monitoring station distances, as approved by NMFS.
 - ii) Halt work activities when a marine mammal enters the Level A safety zone and resume only after the animal has been gone from the area for a minimum of 15-minutes.
 - iii) Maintain sound levels below 90 dBA in air when pinnipeds (seals and sea lions) are present (NMFS 2007).

Potential Effects from Helicopter Operations

Approved flight patterns for AC34 contracted and race-affiliated helicopters will be detailed in the Water and Air Traffic Plan. The Project Sponsor will be responsible for coordinating with the FAA to ensure compliance with flight regulations and to enforce the flight restrictions identified in this document to protect listed species. Helicopters will descend/ascend vertically for landing and take-off at the helipad on Treasure Island. Helicopters will not skim the surface of water (<100 feet) during the race events nor during landing and takeoff operations.

The project sponsors will ensure that race-related helicopters maintain a buffer of at least 1,000 feet (vertically and horizontally) around Alcatraz Island and Crissy Beach Wildlife Protection Area. A low (<100 ft asl) fly over zone will be restricted in the vicinity of Pier 39 where sea lions are known to haul out.

Potential Effects during Race Events to Marine Mammals

Question 7 describes the race course management that will be implemented for the race events by the USCG and ACRM. In addition the Water and Air Traffic Plan will provide information related to avoiding marine mammals, appropriate boating procedures as well as other information for mariners. These sections will detail how whales in the race course will be avoided and potential harassment and/or collision prevented.

Restrictions on Fireworks

This measure applies to the AC34 2013 events. Any fireworks displays will be limited in terms of frequency and location as necessary to protect marine mammals. There would be no more than four events, two up to 30 minutes and two up to 45 minutes in duration in 2013. The fireworks barge will be in a similar location to and of the same noise intensity as the annual 4th of July fireworks display conducted by the City of San Francisco for the AC34 ceremonies in 2013. These fireworks displays will be regulated through the USCG Marine Event Permit process.

- 12) Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses;**

The proposed activity would not take place in or near a traditional Arctic subsistence hunting area nor affect the availability of a species or stock of marine mammal for Arctic subsistence uses.

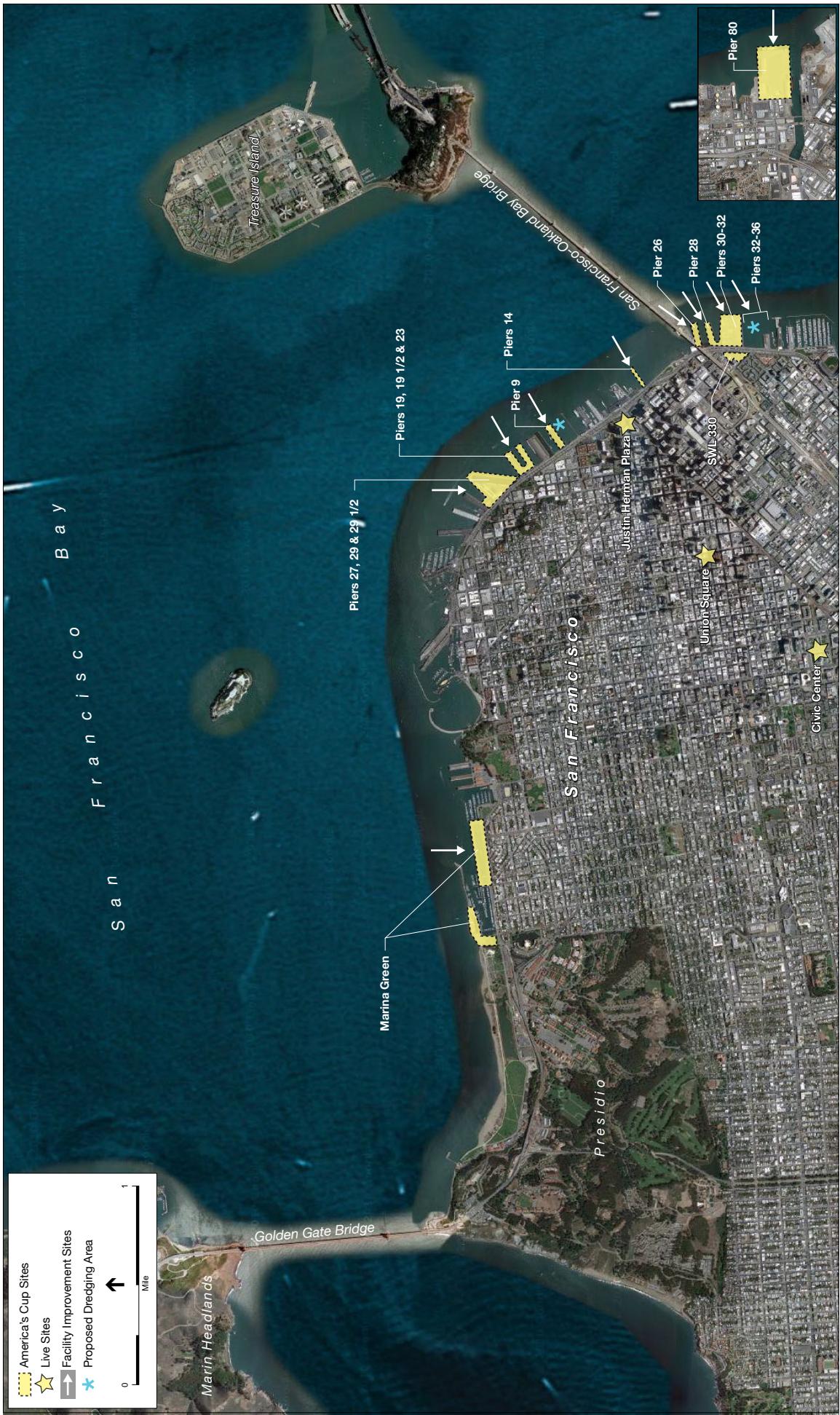
- 13) The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat**

uses, such as feeding. Guidelines for developing a site-specific monitoring plan may be obtained by writing to the Director, Office of Protected Resources; and

Proposed monitoring recommendations are listed in **Question 11** above. All observational monitoring results during construction or race activities will be provided to NMFS. Previous efforts at hydroacoustic monitoring are referenced to establish anticipated levels of effect.

14) Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

To encourage learning and coordinate research opportunities related to incidental taking of marine mammals, any data gathered during construction and operation will be made available to NMFS, researchers and other interested parties. In addition, the Notice to Boaters that is identified in the Water and Air Traffic Plan will help to educate visiting boaters about the marine mammals within San Francisco Bay and methods for avoiding impacts to these species, which will provide a long term benefit to the species.



SOURCE: Google Maps; ESA

Figure 1
Proposed Facility Improvement Sites



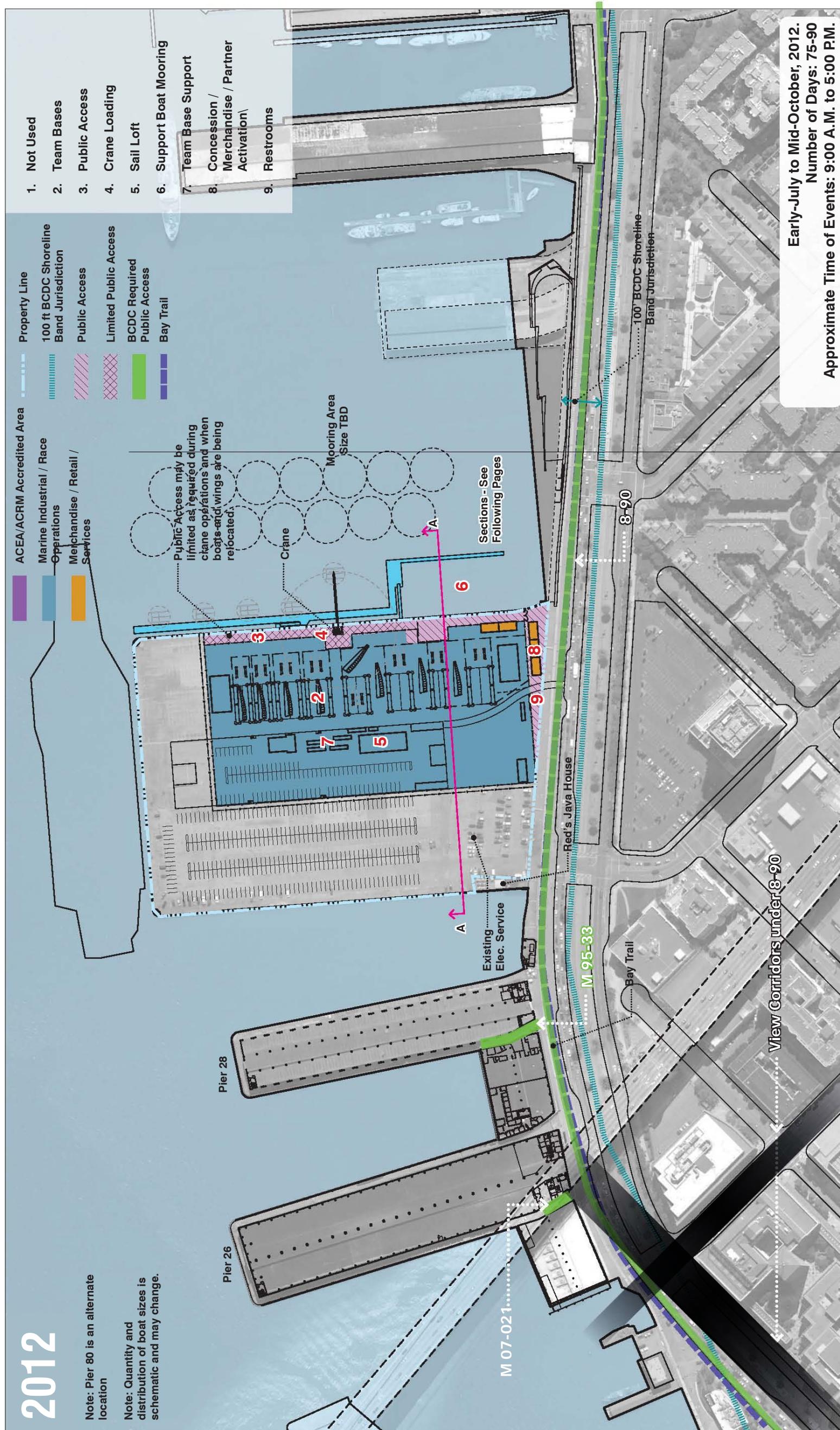
Figure 2
Primary Race Area

SOURCE: Google Maps; ESA

2012

Note: Pier 80 is an alternate location

Note: Quantity and distribution of boat sizes is schematic and may change.

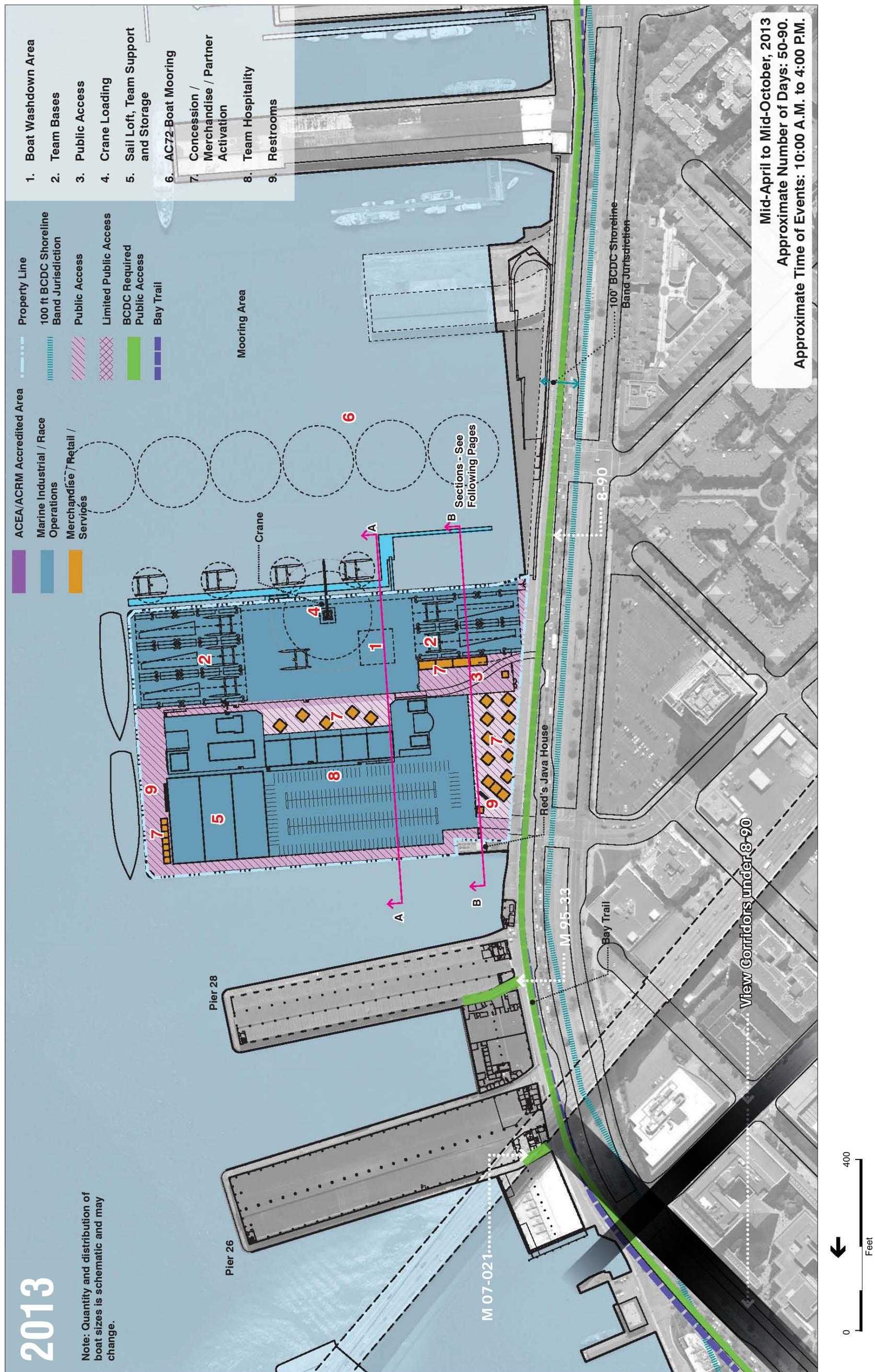


SOURCE: AECOM

Figure 3
AC34 2012 Site Plan for Piers 30-32

2013

Note: Quantity and distribution of boat sizes is schematic and may change.



SOURCE: AECOM

Figure 4
AC34 2013 Site Plan for Piers 30-32

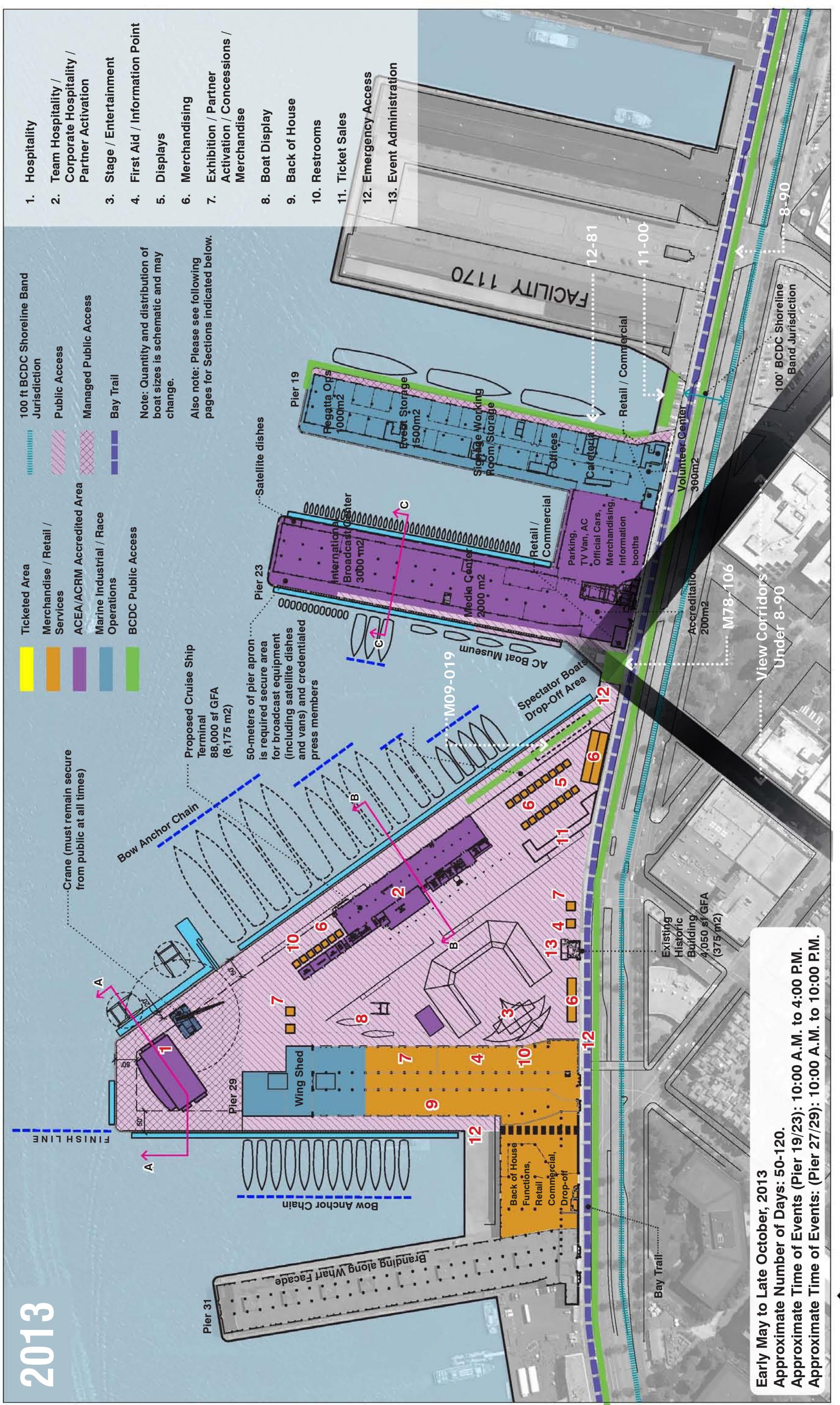
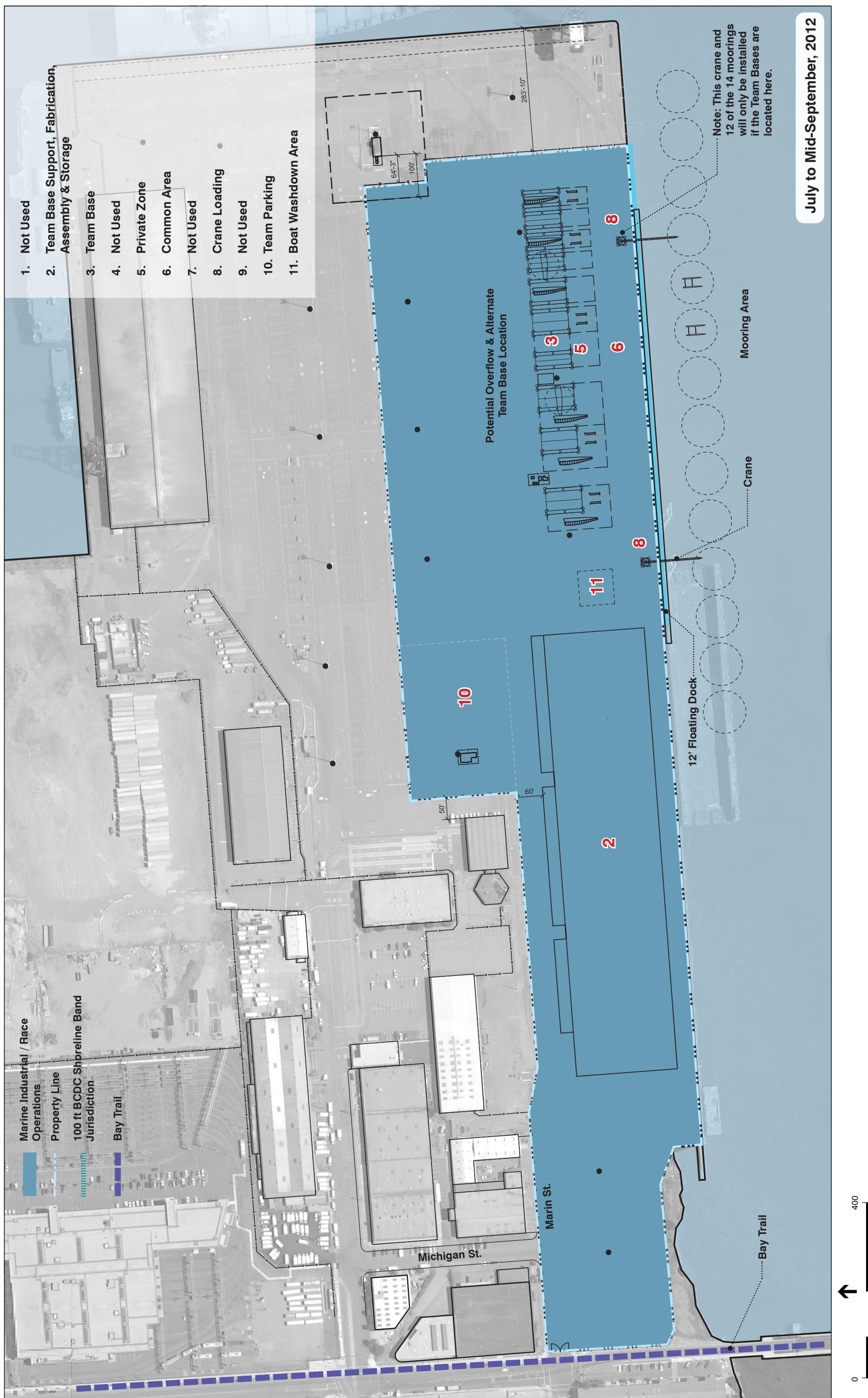
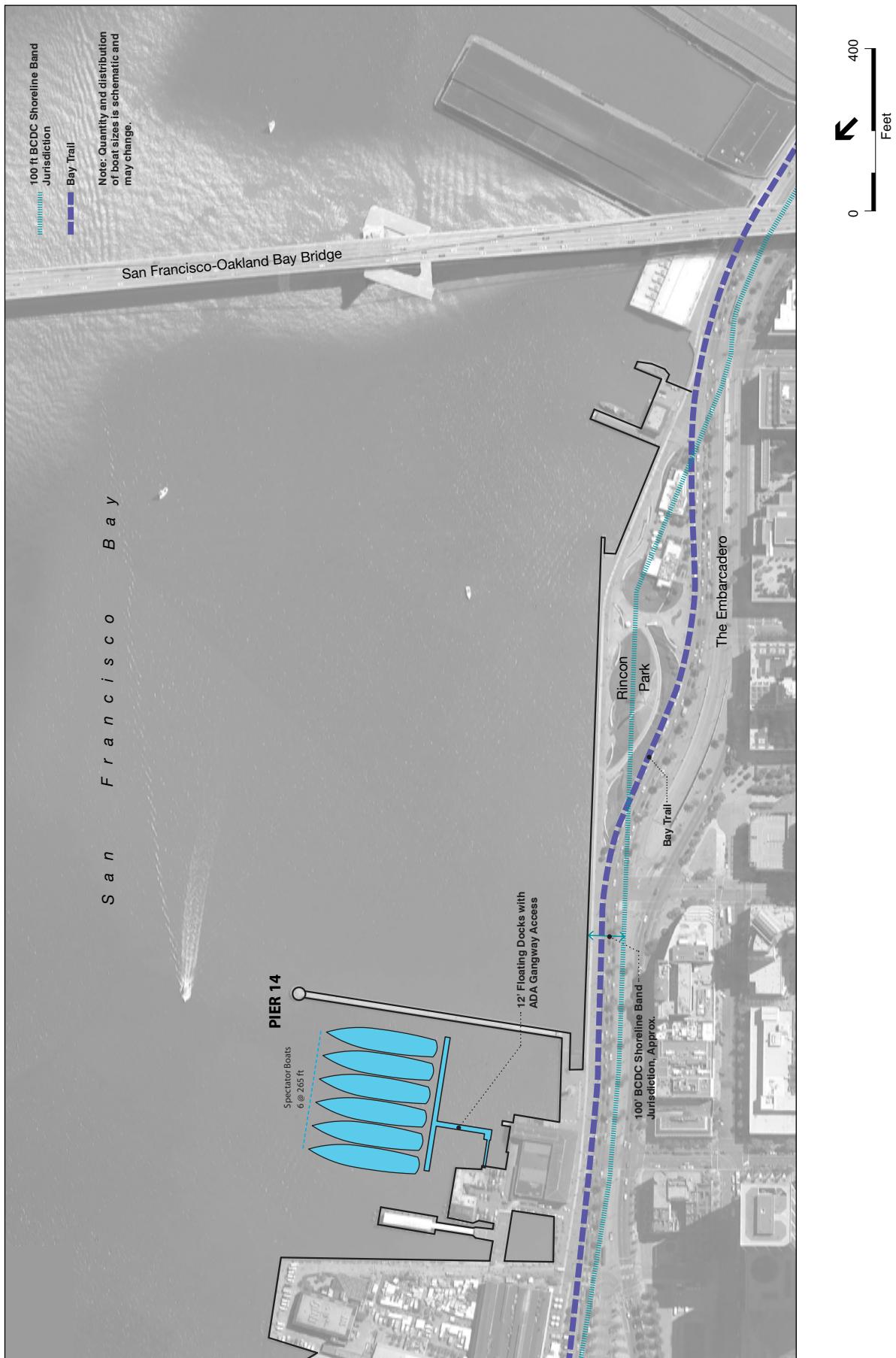


Figure 5
AC34 2013 Site Plan for Piers 19-29 Before and After Races

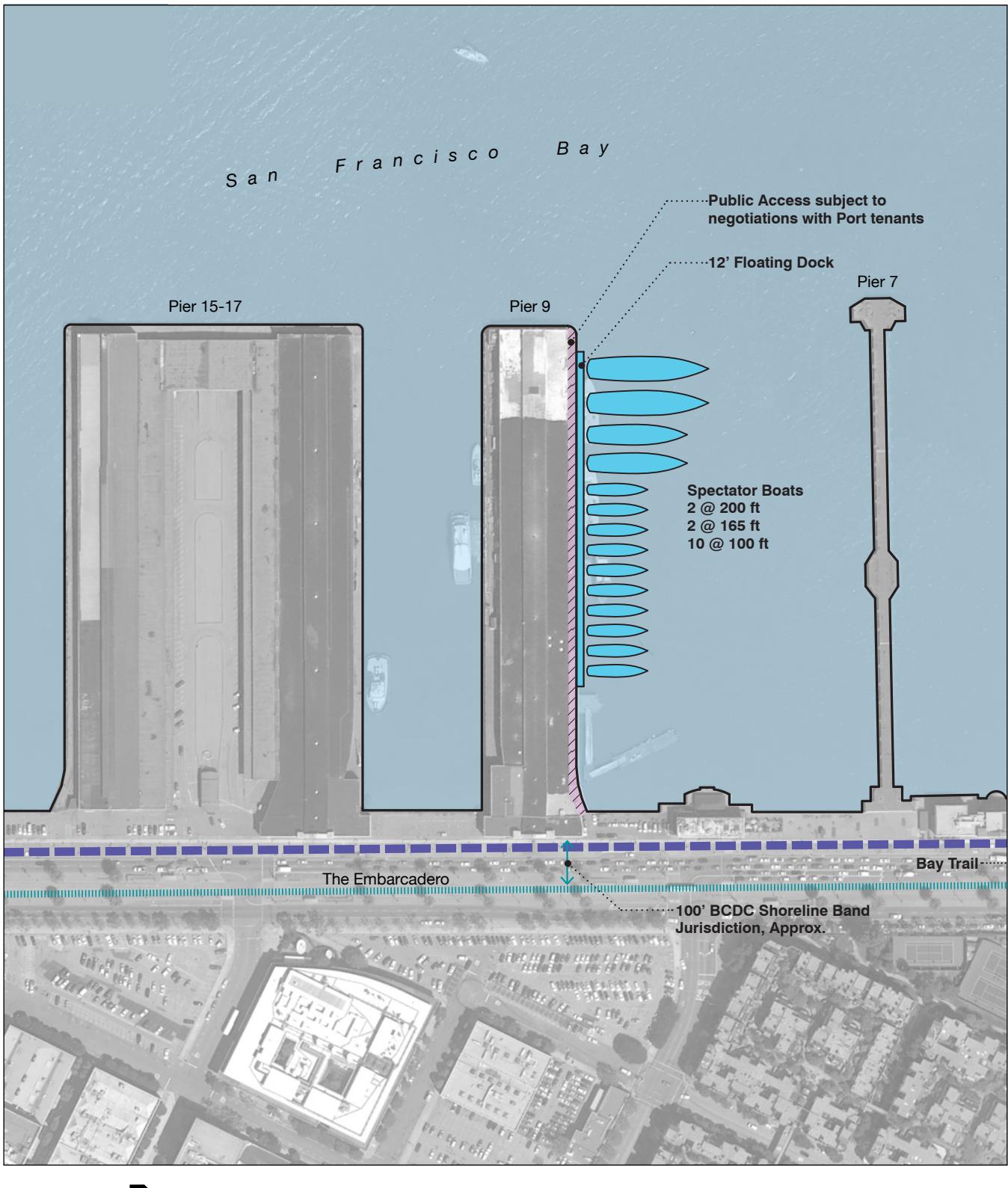
Figure 6
AC34 2012 Site Plan for Pier 80





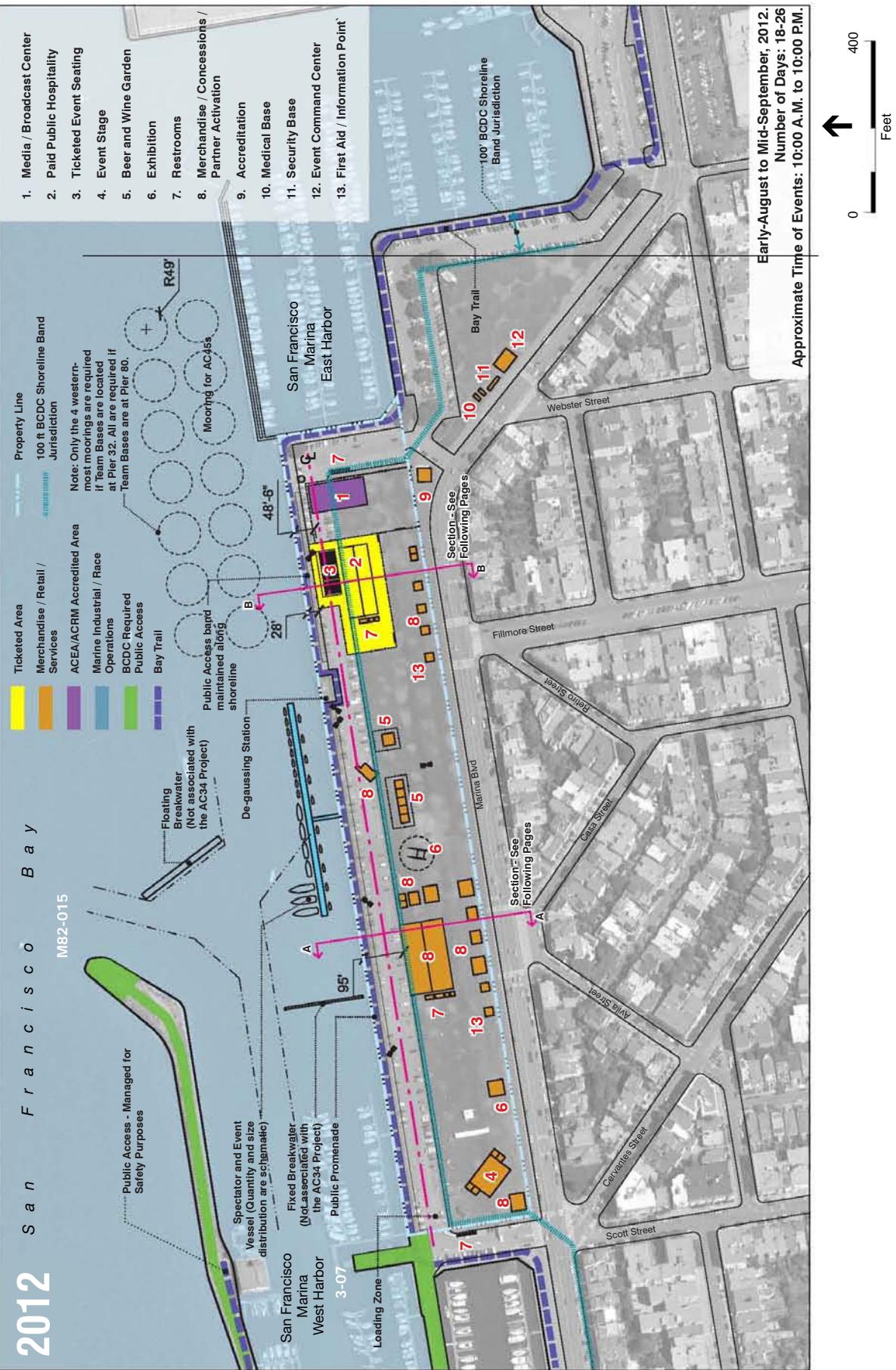
SOURCE: AECON

Figure 7
Pier 14 North Site Plan



SOURCE: AECOM

Figure 8
Pier 9 Venue Plan



SOURCE: AECOM

Figure 9
AC34 2012 Site Plan for Marina Green

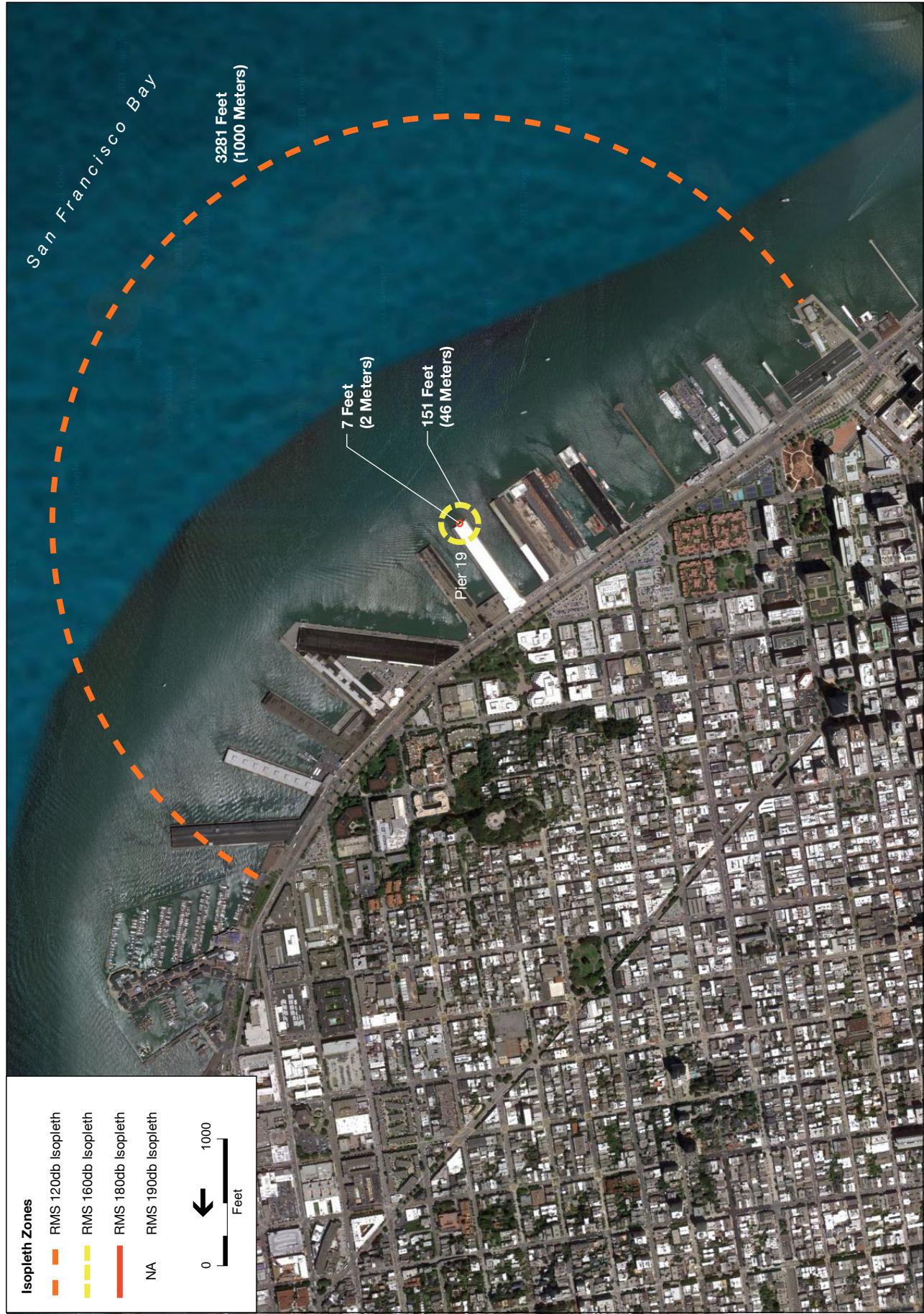


SOURCE: Google Maps; ESA

Figure 10
NMFS Threshold Isopleths for Vibratory
Pile Driving of 12 Inch Steel Pile at Pier 14



Figure 11
NMFS Threshold Isopleths for Vibratory
Pile Driving of 12 Inch Steel Pile at Pier 27



SOURCE: Google Maps; ESA

Figure 12
NMFS Threshold Isopleths for Impact Hammer Pile Driving of 12-inch Wood Piles at Pier 19

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APPENDIX A

Biological Assessment

The Biological Assessment Section 7 consultation is provided on CD.