

San Francisco Bay Area Water Emergency Transportation Authority Central Bay Operations and Maintenance Facility Project Marine Mammal Monitoring Plan

August, 2014

In accordance with the May 2014, San Francisco Bay Area Water Emergency Transportation Authority Incidental Harassment Authorization Request, marine mammal monitoring will be implemented during this project. This project includes vibratory and impact removal of and driving of concrete, plastic and steel piles. For vibratory removal and driving, distances to the ZOIs are described below with additional detail found in Attachment 2 (WETA Pile Driving Underwater Noise Analysis Relative to NOAA Marine Mammal Harassment Criteria):

- Vibratory driving of plastic piles: The distance to the 120 dB contour Level B acoustical harassment threshold due to vibratory pile driving of plastic piles for the Project extends a maximum of 2,154 meters. The ZOI from the project site out to the tip of Breakwater Island will be monitored during construction to estimate actual harassment take of marine mammals (Attachment 1, Figures 1 -5). This calculation is based on vibratory pile driving of 12-inch steel piles, not 18-inch plastic piles, and thus likely overstates the actual level of impact for vibratory driving of plastic piles.
- Impact-driving of steel piles: The distance to the 160 dB contour Level B acoustical harassment threshold due to impact pile driving for the Project extends a maximum of 1,000 meters without an attenuation system and 215 meters with an attenuation system.
- Since WETA has committed to attenuation using a bubble curtain during impact pile driving during the ESA Section 7 process to minimize impacts to listed ESA fish species, the ZOI for marine mammals are the attenuated ZOI distance noted above. The attenuated ZOI will be monitored during construction to estimate actual harassment take of marine mammals.
- Pile removal noise is assumed to be similar to a vibratory hammer due to the potential use for a vibrating extractor. Thus, the ZOI is assumed to be the same as vibratory pile driving described above.

Proposed Monitoring Measures

To estimate project Level B acoustical harassment take levels in the ZOIs WETA proposes the following Marine Mammal Monitoring Plan:

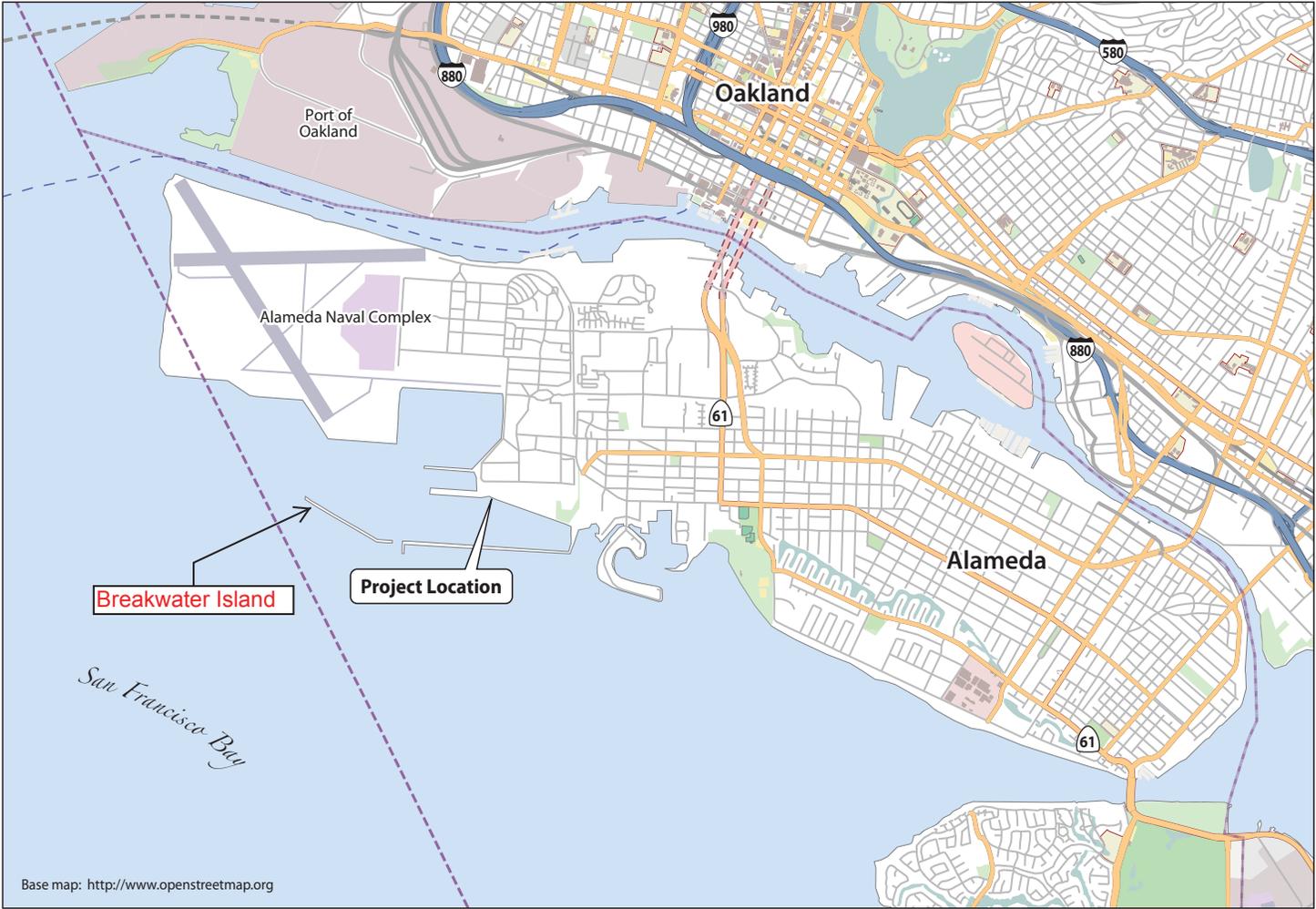
- WETA shall provide a NMFS-approved qualified (defined below) Protected Species Observers (PSO) on site at all times during pile removal and driving for the Central Bay Operations and Maintenance Facility Project.
- The PSO shall record marine mammal behavior, overall numbers of individuals observed, frequency of observation, and the time corresponding to the daily tidal cycle.
- Marine mammal visual monitoring shall be conducted from the best vantage point available, including the pier, breakwater, adjacent docks within the harbor, to maintain an excellent view of the exclusion zone and adjacent areas during the survey period.
- If marine mammals are observed, their location within the ZOIs, and their reaction (if any) to pile-driving activities will be documented.
- Monitors would be equipped with radios or cell phones for maintaining contact with work crews.

- The vibratory Level B acoustical harassment ZOIs will be monitored for the presence of marine mammals 30 minutes before, during, and 30 minutes after any pile driving activity.
- Monitoring will be continuous unless the contractor takes a significant break; then the 30 minutes before, during, and 30 minutes monitoring sequence will begin again.

Minimum Qualifications for PSOs

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance. Use of high-quality binoculars (e.g., Zeiss, 10 x 42 power) will be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher) is preferred, but not required.
- Experience or training in the field identification of marine mammals (cetaceans and pinnipeds).
- Sufficient training, orientation or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area as necessary.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Writing skills to prepare a report that includes number/type of marine mammals observed; marine mammal behavior in the area during construction, dates/times of observations; dates/times when in-water construction was conducted; dates/times when marine mammals were present near or within the ZOIs; dates/times when in-water construction was suspended to avoid SRKW take.

Attachment 1
Figures



Graphics: 0078508 (8-10) km



Figure 1
Project Location



Source: KPFF, 2010.
 Aerial image: Google Inc. 2009. Google Earth Pro, Version 5.2. Mountain View, CA. Accessed: September 24, 2010.



Figure 2
Project Site

Graphics: 0095008 (3-8-11)tm



Figure 3 – Impact driving steel pile 160 dB contour Level B 215 meter ZOI with an attenuation system



Figure 4 – Impact driving steel pile 160 dB contour Level B 1,000 meter ZOI without an attenuation system



Figure 5 – Vibratory driving plastic pile 120 dB contour Level B 2,154 meter ZOI without an attenuation system

Attachment 2
Tables

WETA Pile Driving Underwater Noise Analysis Relative to NOAA Marine Mammal Harassment Criteria. (3-19-14)								Level B (Behavioral) impulse sound 160 dB RMS	Level B (Behavioral) continuous sound 120 dB RMS	
Pile ID	Pile Type	Installation Method	Total Installed	Distance Attenuation Rate per Doubling of Distance	Corresponding Attenuation Factor	Reference Distance (m)	RMS	Data source	Distance to 160 dB RMS (meter)	Distance to 120 dB RMS (meter)
Fixed Pier Pile	24" steel pipe (no attenuation)	impact hammer	11	4.5	15	10	189	Caltrans 2009. Table I.2-3. Rodeo Dock repair 24" steel pipe.	858	NA
Float Guide Pile	24" steel pipe (no attenuation)	impact hammer	16	4.5	15	10	189	Caltrans 2009. Table I.2-3. Rodeo Dock repair 24" steel pipe.	858	NA
Dolphin Pile	30" steel pipe (no attenuation)	impact hammer	26	4.5	15	10	190	Caltrans 2009. Table I.2-3. R5BR 30" steel pipe.	1,000	NA
Fender Panel Pile	18" steel pipe (no attenuation)	impact hammer	8	4.5	15	20	180	Caltrans 2009. Table I.2-3. R5BR 14" steel pipe.	431	NA
Fender Piles	18" plastic	vibratory driver	24	4.5	15	10	155	Caltrans 2012. Table I.2-2. 12" steel pipe (vibratory driver) ¹	NA	2,154
Various	24" to 30" steel pipe (no attenuation)	vibratory driver	NA	4.5	15	10	170	Caltrans 2012. Table I.2-2. 36" steel pipe (vibratory driver) ¹	NA	NA
Fixed Pier Pile	24" steel pipe (with attenuation)	impact hammer	11	4.5	15	10	179	Caltrans 2009. Table I.2-3. Rodeo Dock repair 24" steel pipe. 10 dB attenuation of source levels for bubble curtain	185	NA
Float Guide Pile	24" steel pipe (with attenuation)	impact hammer	16	4.5	15	10	179	Caltrans 2009. Table I.2-3. Rodeo Dock repair 24" steel pipe. 10 dB attenuation of source levels for bubble curtain	185	NA
Dolphin Pile	30" steel pipe (with attenuation)	impact hammer	26	4.5	15	10	180	Caltrans 2009. Table I.2-3. R5BR 30" steel pipe. 10 dB attenuation of source levels for bubble curtain	215	NA
Fender Panel Pile	18" steel pipe (with attenuation)	impact hammer	8	4.5	15	20	170	Caltrans 2009. Table I.2-3. R5BR 14" steel pipe. 10 dB attenuation of source levels for bubble curtain.	93	NA
Fender Piles	18" plastic (with attenuation)	vibratory driver	24	4.5	15	10	145	Caltrans 2012. Table I.2-2. 12" steel pipe (vibratory driver) ¹	NA	464
Various	24" to 30" steel pipe (with attenuation)	vibratory driver	NA	4.5	15	10	160	Caltrans 2012. Table I.2-2. 36" steel pipe (vibratory driver) ¹	NA	NA

Note: Attenuation system such as a bubble curtain is assumed to provide 10 dB of noise reduction.

¹ No data is available on vibratory driving of plastic piles. However, data in Table I.2-1 of Caltrans 2012 for impact driving suggests that underwater noise levels generated by plastic piles are at least 15 dB less than noise levels generated by steel piles.

² Source data from vibratory driving of a 12" steel pile is used to represent vibratory driving of an 18" plastic pile and is considered to be conservative.

³ No data available on vibratory driving of 24" and 30" steel pipe piles. However, data on vibratory driving of a 36" steel pipe pile is available in Table I.2-1 of Caltrans 2012 and is used here to be representative of both the 24" and 30" steel piles.

References:
Caltrans. 2009. Technical guidance manual for the assessment of the hydroacoustic effects of pile driving on fish. Sacramento, CA.
Caltrans. 2012. Compendium Update for the Technical guidance manual for the assessment of the hydroacoustic effects of pile driving on fish. Sacramento, CA.