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**MEMORANDUM**

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**TO:** STEFAN GALVEZ, CALIFORNIA DEPARTMENT OF TRANSPORTATION

**FROM:** PHIL THORSON, MANTECH SRS TECHNOLOGIES

**SUBJECT:** MARINE MAMMAL OBSERVATIONS MEMO

OBSERVATIONS DURING EAST SPAN PROJECT PILE DRIVING AT TEMPORARY TOWER G ON MARCH 19 AND 20, 2009

**DATE:** APRIL 15, 2009

**CC:** IVY EDMONDS-HESS, PARSONS BRINCKERHOFF

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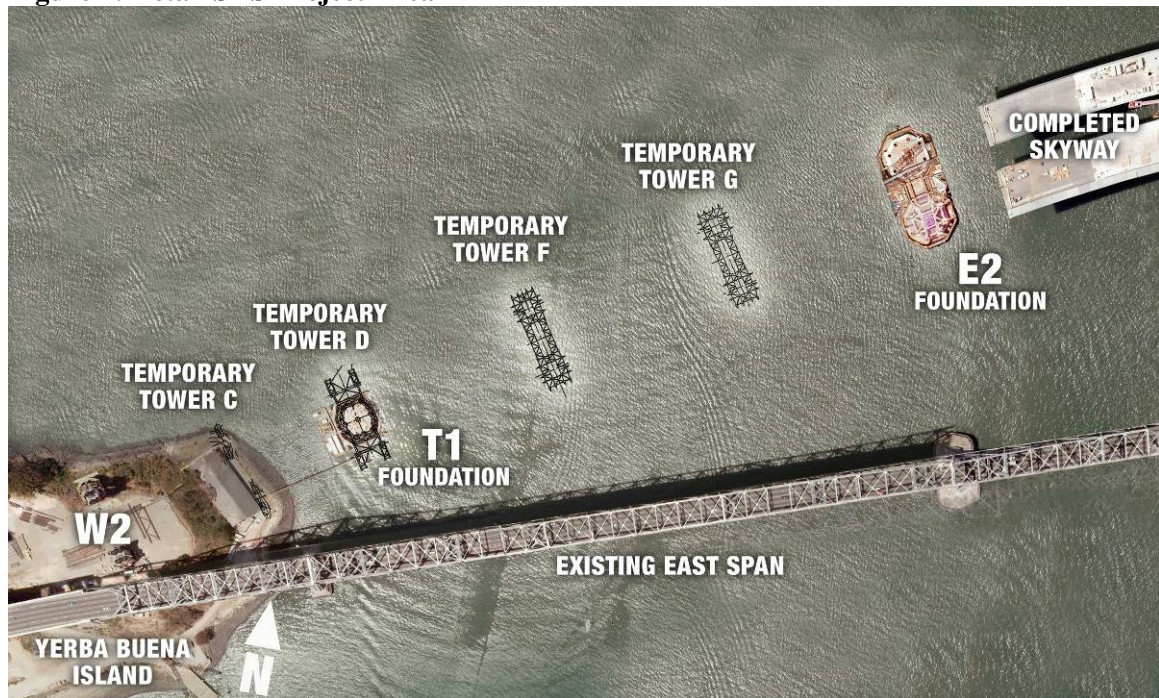
### **Introduction**

The California Department of Transportation (Department) is in the process of replacing the East Span of the San Francisco-Oakland Bay Bridge (SFOBB) with a new bridge immediately to the north of the existing span (Figure 1). Construction of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (SFOBB Project) is a multi-year effort that will involve a number of construction activities on land as well as in San Francisco Bay. As part of the construction for the Self-Anchored Suspension (SAS) portion of the project, it is necessary to build temporary towers. These temporary towers, Temporary Towers D, F and G are marine based and require driving of temporary piles to support the SAS portion of the bridge during construction (Figure 2).

**Figure 1: SFOBB East Span Seismic Safety Project Location Map**



**Figure 2: Detail SAS Project Area**



Pursuant to the Marine Mammal Protection Act, the Department requested and received an Incidental Harassment Authorization (IHA) from the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (NOAA-Fisheries) to incidentally take, by harassment, a small number of California sea lions, Pacific harbor seals, and possibly gray whales and harbor porpoises. A comprehensive Marine Mammal Monitoring Plan for the driving of permanent piles was submitted to NOAA-Fisheries in May 2002, which meets the conditions of Section 5 – Mitigation Requirements (see page 2 of the IHA) and Section 6 – Monitoring Requirements (see page 3 of the IHA).

The latest IHA expired on May 1, 2008. A renewal is expected soon from NOAA-Fisheries. In the interim, the Department agreed to follow the requirements of the previous IHA. NOAA-Fisheries did however, request that the marine mammal safety zones (MMSZs) be more conservative and be based on a 160 dB re 1 microPa @ 1 m RMS isopleth during impact pile driving and a 120 dB re 1 microPa @ 1 m RMS isopleth during vibratory pile driving to ensure that Level B harassment to marine mammals would not occur during pile-driving of the temporary casings.

Hydroacoustic monitors collected underwater sound data during initial impact pile driving events at each of the three marine based temporary towers to determine the distance to the 160 dB RMS isopleth. For Temporary Towers F and G the distance to the 160 dB RMS level varied in different directions from the pile. In all directions the distance was less than 1,000 meters (3,280 feet). Therefore, for the purpose of marine mammal monitoring, the MMSZ was set at 1,000 meters (3,280 feet) in all directions from impact pile driving.

The request from NOAA-Fisheries to determine a MMSZ for vibratory pile driving based on 120 dB RMS did not come until pile driving had been completed at Temporary Tower D and was more than halfway complete at Temporary Tower F. During vibratory pile driving at Temporary Towers F and G, hydroacoustic monitors were unable to locate the distance at which vibratory pile driving sound levels dropped to 120 dB RMS. Ambient sound levels in the Bay near the project site often equaled or exceeded 120 dB RMS. At a distance of 1,900 meters (6,234 feet) from the vibratory pile driving, monitors could no longer distinguish the pile driving sound from the ambient noise. The Department notified NOAA-Fisheries of this limitation and for the purpose of marine mammal monitoring, the MMSZ was set at 1,900 meters (6,234 feet) from vibratory pile driving.

### Marine Mammal Monitoring Activities

Monitoring was conducted by NOAA-Fisheries-approved marine mammal observers on March 19 and 20, 2009 in the vicinity of Temporary Tower G of the SAS. A 1,900-meter (6,234-foot) MMSZ was used for the vibratory pile driver and 1,000-meter (3,281-foot) MMSZ was used for the diesel impact hammer to correspond with the 120 dB and 160 dB isopleths described above (Figure 3 & 4).

On March 19, 2009: Observers #1 and #2 were located on the pile driving barge at Temporary Tower G, Observer #3 was located on the southeast end of Treasure Island, and Observer #4 was on the western end of the new Bay Bridge, as shown on Figure 3. Pile driving was conducted on one pile from 1431 to 1447 hours using the vibratory pile driver and on three piles from 1551 to 1817 hours using the diesel impact hammer. Observations were made from 1330 to 1850 hours.

**Figure 3: SAS temporary tower project area with 500 meter (preliminary), 1,000 meter (160 dB impact), and 1,900 meter (120 dB vibratory) MMSZs and marine mammal monitor observation sites for March 19, 2009.**



On March 20, 2009: Observer #1 was located on the pile driving barge at Temporary Tower G, Observer #2 was located on the southeast end of Treasure Island, and Observer #3 was on the western end of the new Bay Bridge, as shown on Figure 4. Pile driving was conducted on three piles from 0805 to 1039 hours using the diesel impact hammer. Observations were made from 0705 to 1115 hours.

**Figure 4: SAS temporary tower project area with 500 meter (preliminary), 1,000 meter (160 dB impact), and 1,900 meter (120 dB vibratory) MMSZs and marine mammal monitor observation sites for March 20, 2002.**



## Results

### March 19, 2009

Three harbor seals were observed within the MMSZ prior to pile driving, but only one observation (see 1415 hours) required a delay in pile driving.

1333: One adult harbor seal was observed approximately 550 meters (1,804 feet) south of the Temporary Tower G piles. The seal was swimming west at the surface for about 15 seconds and then dove. This was the only observation of this seal.

- 1415: A second adult harbor seal was observed 175 meters (574 feet) northwest of the Temporary Tower G piles and was swimming south. This was the only observation of this seal. The Caltrans Engineer on site was notified and pile driving was delayed until the MMSZ had been clear of marine mammals for 15 minutes.
- 1431 - 1447: Pile driving of the first pile of the day with the vibratory pile driver. No marine mammals were observed.
- 1557 - 1629: Pile driving of the first pile with the diesel impact hammer. No marine mammals were observed.
- 1649 - 1718: Pile driving of the second pile with the diesel impact hammer. No marine mammals were observed.
- 1727: A third adult harbor seal was observed approximately 800 meters (2,625 feet) south of the Temporary Tower G piles. The seal was at the surface briefly and then dove. This was the only observation of this seal. Because the time between the end of pile driving of the second and the beginning of the third piles was less than 30 minutes, the observation of this seal did not require a delay in pile driving.
- 1740 - 1817: Pile driving of the third pile with the diesel impact hammer. No marine mammals were observed.

The air temperature ranged from 14.9 to 17.4°C (58.8 to 63.3°F) and the winds were mostly moderate, ranging from 10.1 to 15.1 kilometers per hour (6.3 to 9.4 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.

### **March 20, 2009**

No marine mammals were observed before pile driving commenced for the day. One harbor seal was observed within the MMSZ prior to pile driving of the second pile.

- 0805 - 0835: Pile driving of the first pile with the diesel impact hammer. No marine mammals were observed.
- 0857 - 0911: One adult harbor seal was observed at approximately 500 to 700 meters (1,640 to 2,297 feet) southwest of the Temporary Tower G piles. The seal surfaced briefly and swam south before diving.
- 0906 - 0938: Pile driving of the second pile with the diesel impact hammer. Pile driving resumed before the Caltrans engineer on-site could be contacted to have the contractor delay pile driving for the harbor seal mentioned above. The seal was not seen again after about 5 minutes into the of pile driving.

1004 - 1039: Pile driving of the third pile with the diesel impact hammer. No marine mammals were observed.

The air temperature ranged from 10.3 to 11.8°C (50.5 to 53.2°F) and the winds were mostly calm, ranging from 0.4 to 8.3 kilometers per hour (0.3 to 5.2 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.