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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 25 AND 26, 2009

**DATE:** APRIL 15, 2009

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

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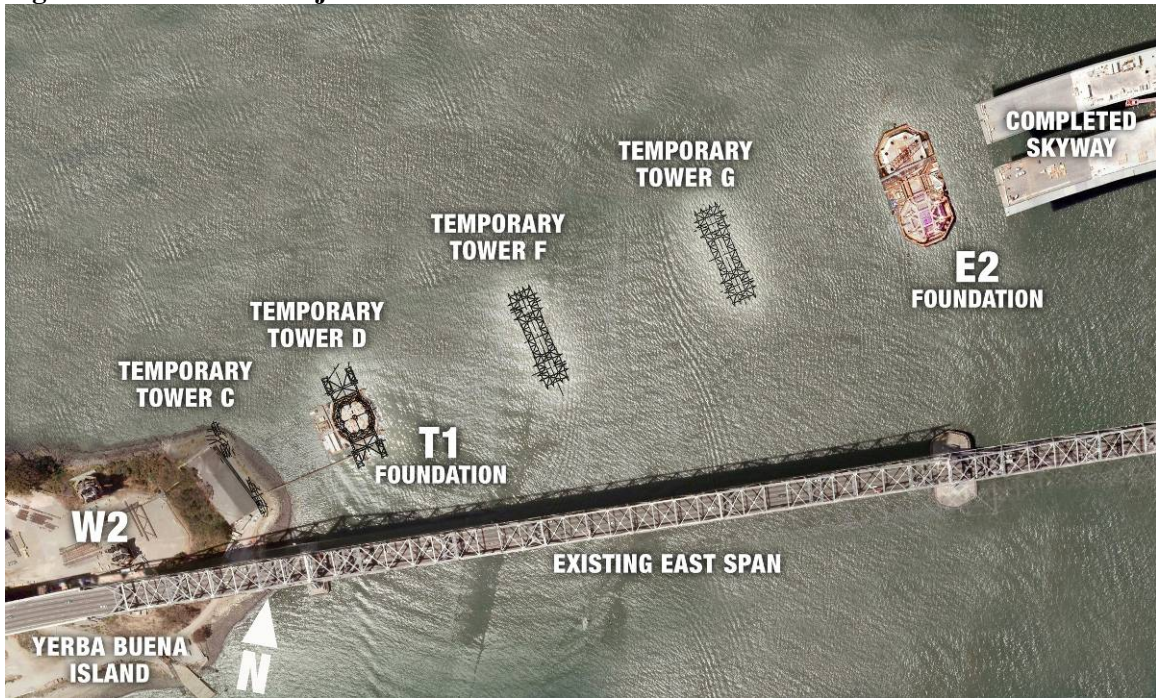
**Introduction**

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 25 and 26, 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 (Figures 3 & 4).

On March 25, 2009: Observers #1 and #2 were located on the pile driving barge at Temporary Tower G and Observer #3 was on the western end of the new Bay Bridge, as shown on Figure 3. Pile driving was conducted on four piles from 1358 to 1748 hours using the diesel impact hammer. Observations were made from 1230 to 1822 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 25, 2009.**



On March 26, 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 four piles from 0816 to 1143 hours using the diesel impact hammer. Observations were made from 0700 to 1220 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 26, 2009.**



## Results

### March 25, 2009

Three harbor seals were observed, two prior to the start of pile driving for the day and one within the MMSZ during pile driving of the second pile.

1252 - 1322: Two harbor seals were observed 250 to 700 meters (820 to 2,297 feet) west of the Temporary Tower G piles. The two seals appeared to have been foraging, sometimes within close proximity of each other, and also by as much as 150 meters (492 feet) apart.

1358 - 1432: Pile driving of the first pile of the day using the diesel impact hammer. No marine mammals were observed.

- 1504: Start pile driving on the second pile using the diesel impact hammer.
- 1519 - 1521: One juvenile harbor seal was observed at a distance of 675 to 750 meters (2,215 to 2,461 feet) north-northwest of the Temporary Tower G piles and was swimming west along the south end of Treasure Island. In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The behavior of the seal seemed to indicate that it was not disturbed by pile driving activities.
- 1539: End of pile driving for the second pile.
- 1612 - 1748: Pile driving of the third and fourth piles with the diesel impact hammer. No marine mammals were observed.

The air temperature ranged from 13.5 to 17.1°C (56.3 to 62.8°F) and the winds were mostly calm to moderate ranging from 8.3 to 15.1 kilometers per hour (5.2 to 9.4 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.

### **March 26, 2009**

No marine mammals were observed before pile driving commenced for the day. One harbor seal was observed within the MMSZ during impact pile driving of both the first and second piles.

- 0816 - 0852: Pile driving began on the first pile of the day using the diesel impact hammer.
- 0841 - 0922: One adult harbor seal was observed 700 to 800 meters (2297 to 2627 feet) southwest of the Temporary Tower G piles in the shoal that runs out from the southeast end of Yerba Buena Island. The seal appeared to be foraging. In accordance with the IHA, once pile driving has commenced, operations can continue uninterrupted despite the fact that a marine mammal is within the MMSZ. The behavior of the seal seemed to indicate that it was not disturbed by pile driving activities.
- 0907 - 0943: Pile driving on the second pile of the day using the diesel impact hammer.
- 1001 - 1143: Pile driving of the third and fourth piles with the diesel impact hammer. No marine mammals were observed.

The air temperature ranged from 11.5 to 15.6°C (52.7 to 60.1 °F) and the winds were mostly calm, ranging from 3.6 to 10.4 kilometers per hour (2.2 to 6.5 miles per hour). Temperature and wind data were acquired from the NOAA National Ocean Service Physical Oceanographic Real Time System.