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To: Stefan Galvez, California Department of Transportation

From: Jason Minton

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RE: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project – Self Anchored Suspension Span, T1 Temporary Access Trestle Pile Driving
Preliminary Results of Daily Bird Predation Monitoring for 10/22/2009

This memorandum provides preliminary results of bird predation monitoring conducted during pile driving for the temporary access trestle on October 22, 2009. The monitoring was conducted in compliance with the requirements outlined in the Final Hydroacoustic Monitoring Plan for Driving of Temporary Access Trestle Piles for the Self-Anchored Suspension Span (October 2009).

Monitoring during pile driving has several goals:

- monitoring to confirm the presence or absence of bird predation as an indicator of fish mortality;
- observing the level of bird predation by quantifying the number of bird strikes per minute and the duration of the event; and
- identifying the species of fish affected.

Methods

The bird predation monitor was located on a boat in the immediate vicinity [within 200 meters (660 feet)] of the temporary access trestle pile driving located between Yerba Buena Island and Pier T1 (Figure 1). The monitor recorded bird feeding activity throughout the monitoring period on standardized data sheets, including during the pile driving events and during the intervals between piles. If feeding was observed, one-minute counts of bird strikes were initiated. Those counts were repeated throughout the duration of the pile driving activity, as needed.

The monitor was prepared to identify the species and sizes of any impacted fish either through observation with binoculars, or by collecting specimens with a dip-net. The survey protocol required the observer to collect any green sturgeon or salmonids observed for transfer to NOAA-Fisheries. In addition, general bird activity and behavior during pile driving and throughout the day were noted and recorded.

Results

Pile Data

On October 22, 2009, a total of two (2) steel pipe piles of 36-inch diameter were driven with the Delmag D 32-30 diesel impact hammer. The driving of all two was monitored, and the piles were identified from Figure 1 as pile numbers 14 and 16. Pile driving occurred in the relatively shallow, rocky shore of Yerba Buena Island. The two access trestle piles located closest to the Yerba Buena Island we installed without attenuation, during low-tide in water less than five meters deep. For the remaining 18 piles, located in water depths greater than five meters, an air bubble curtain sound attenuation system will be used to reduce sound pressure and exposure levels during impact driving.

Driving Data

The monitors were on-site from 0730 to 1139 hours. The piles were driven from 0757 to 0800 hours and 0823 to 0825 hours (16), and 0844 to 0848 hours (14). Table 1 shows the approximate period of the impact pile driving for each pile and the occurrence of bird feeding/activity/predation when they were observed. For each of the piles, the Delmag D 32-30 diesel impact hammer was used for four (4) minutes or less to install each pile. The cumulative duration of pile driving for the two piles was estimated at nine (9) minutes.

Bird Predation Data

One incident of bird predation was observed at 0857 hours. The incident occurred after the final bout of pile driving had ended at 0848 hours. A single western gull (*Larus occidentalis*) landed on the water between the pile driving frame and the shoreline of Yerba Buena Island and appeared to forage on a single prey item. The bird remained on the water, but was not observed to forage again. The prey item was not visible to the observers.

Fish Observations

No dead or injured fish were observed. The presence of one (1) injured fish was inferred from the single observation of a foraging gull.

Throughout the monitoring period, western gulls and California brown pelicans (*Pelecanus occidentalis californicus*) were observed within 400 meters (1,310 feet) of the work area. During initial pile driving at 0757 to 0800 hours up to three (3) gulls circled the pile driver, but were not observed to forage. Subsequent bouts of pile driving did not attract gulls.

Table 1. Pile driving periods for the SAS temporary access trestle on October 22, 2009. Bird strikes are recorded per one-minute interval during impact pile driving, the interval between piles, and at least 20 minutes following the end of driving.

Pile #*	Pile Driving Duration		Air Bubble Curtain (Y/N)	Bird Predation Observed (Y/N)	Strikes per Count Interval	General Bird Activity/Behavior (Gull Numbers)
	Start Time	End Time				
<i>October 22, 2009</i>						
16	7:57	08:00	N	N	0	2 to 3 gulls circling
16	8:23	8:25	N	N	0	None
14	8:44	8:48	N	N	0	One gull perched on T1 footing
None	08:48	11:39	N	Y	1	Gull from T1 foraged on water between piles and shore.

*** Intervals between piles are recorded on separate rows if bird predation was observed.**

