UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

LETTER OF AUTHORIZATION

The City of Seattle Department of Transportation (SDOT) is hereby authorized under section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. 1371(a)(5)(A)) to take marine mammals incidental to pile driving activities associated with the replacement of the Elliott Bay seawall in Seattle, Washington, subject to the provisions of the MMPA, the Regulations Governing Taking of Marine Mammals Incidental to the Elliott Bay Seawall Project (78 FR 63396; October 24, 2013) (50 CFR Part 217, Subpart W) (Regulations), and the following conditions:

1. This Letter of Authorization (LOA) is valid from October 22, 2015 through August 31, 2016.

2. This LOA is valid only for pile installation and removal activities associated with the replacement of the Elliott Bay Seawall in Seattle, Washington.

3. This LOA is valid for a maximum of 35 days of in-water work. Any work that occurs beyond this number of in-water work days is not covered by this LOA, and any resulting take through harassment is not authorized under the MMPA.

4. <u>General Conditions</u>

   (a) A copy of this LOA must be in the possession of SDOT, its designees, and work crew personnel operating under the authority of this LOA.

   (b) The species authorized for taking are the harbor seal (*Phoca vitulina richardii*), California sea lion (*Zalophus californianus*), Steller sea lion (*Eumetopias jubatus monteriensis*), harbor porpoise (*Phocoena phocoena vomerina*), Dall's porpoise (*Phocoenoides dalli dalli*), southern resident and transient killer whales (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), and gray whale (*Eschrichtius robustus*). In this document, harbor seals, California sea lions, and Steller sea lions; harbor porpoises and Dall's porpoises; and killer whales, humpback whales and gray whales are collectively referred to as "pinnipeds", "small cetaceans", and "large whales", respectively.

   (c) The taking, by Level B harassment only, is limited to the species listed in condition 3(b). See Table 1 (attached) for numbers of take authorized.

   (d) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this LOA.

(e) SDOT shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, acoustical monitoring team, and SDOT staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

5. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures:

(a) Limited impact pile driving:

(i) All sheet piles shall be installed using a vibratory driver, unless impact driving is required to install piles that encounter consolidated sediments or for proofing load-bearing sections.

(ii) Any impact driver used in conjunction with vibratory pile driving shall employ sound attenuation devices, where applicable.

(iii) Any attenuation devices that become available for vibratory pile driving shall be considered for additional mitigation.

(b) The majority of permanent concrete piles shall be driven behind the temporary containment wall.

(c) In the event that underwater sound monitoring shows that noise generation from pile installation exceeds the levels originally expected, SDOT shall immediately notify NMFS. NMFS will then evaluate the need for implementation of additional attenuation devices or other mitigation measures.

(d) Ramp-up:

(i) Ramp-up measures shall be used at the beginning of each day's in-water pile-related activities or if pile driving has ceased for more than one hour.

(ii) If a vibratory hammer is used, contractors shall initiate sound from vibratory hammers for fifteen seconds at reduced energy followed by a one-minute waiting period. This procedure shall be repeated two additional times before full energy may be achieved.

(iii) If a non-diesel impact hammer is used, contractors shall provide an initial set of strikes from the impact hammer at reduced energy, followed by a one-minute waiting period, then two subsequent sets.

(iv) Ramp-up shall be implemented if pile driving or removal is delayed or shut down for (1) fifteen minutes or longer due to the presence of a small cetacean or pinniped within or approaching the relevant exclusion zone, or (2) thirty minutes or longer due to the presence of a large whale within or approaching the relevant exclusion zone (see condition 4(e)).

(e) The following marine mammal exclusion zones shall be established:

(i) During impact driving of steel sheet piles, a zone of 200 ft (61 m) radial distance shall be established for small cetaceans and pinnipeds;

(ii) During impact driving of concrete piles, a zone of 50 ft (15 m) radial distance shall be established for small cetaceans and pinnipeds;

(iii) During all impact driving, a zone of 3,280 ft (1,000 m) radial distance shall be established for large whales;

(iv) During vibratory driving of steel sheet piles, a zone of 2.5 mi (4,023 m) radial distance shall be established for large whales.

(v) Temporary buoys shall be used, as feasible, to mark the distance to each exclusion zone during in-water pile-related activities.

(f) Monitoring locations shall be established as described in the Marine Mammal Monitoring and Mitigation Plan (Plan; see attached).

(i) Monitoring shall be conducted by qualified observers. Trained observers shall be placed from the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator.

(ii) At the start of in-water pile related activities each day, a minimum of one observer shall be staged on land (or an adjacent pier) near the location of in-water pile-related activities to document and report any marine mammal that approaches or enters a relevant exclusion zone throughout the day.

(iii) At least two observers shall be positioned on land near the 2.5-mile exclusion zone to monitor for marine mammals during vibratory pile driving activities.

(iv) Additional land-based observers shall be deployed as necessary to ensure the construction area and exclusion zones are adequately monitored.

(v) Land-based visual monitoring shall be conducted during all days of vibratory pile driving.

(g) Monitoring shall take place from thirty minutes prior to initiation of pile driving activity through thirty minutes post-completion of pile driving activity. Pre-activity monitoring shall be conducted for thirty minutes to ensure that the exclusion zones are clear of marine mammals, and pile driving may commence when observers have declared the zones clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the exclusion zone, animals shall be allowed to remain in the zone (i.e., must leave of their own volition) and their behavior shall be monitored and documented. Monitoring shall occur throughout the time required to drive a pile. The exclusion zone must be determined to be clear during periods of good visibility (i.e., the entire zone and surrounding waters must be visible to the naked eye).

(h) If a marine mammal approaches or enters the relevant exclusion zone, all relevant pile driving activities shall be halted. If pile driving is halted or delayed due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or fifteen minutes (for small cetaceans and pinnipeds) or thirty minutes (for large whales) have passed without re-detection of the animal.

(i) In-water pile-related activities shall not occur if any part of the exclusion zones is obscured by fog or poor lighting conditions.

4. Monitoring

The holder of this Authorization is required to conduct marine mammal monitoring during pile driving activity and to conduct acoustic monitoring of background sound and project activities. Monitoring and reporting shall be conducted in accordance with the Monitoring Plan. The following protocols shall be followed:

(a) Visual monitoring

(i) Observers shall use the naked eye, wide-angle binoculars with reticles, and any other necessary equipment to scan the Level B harassment isopleths (see Table 2, attached).

(ii) Observers shall work, on average, eight hours per day and shall be relieved by a fresh observer if pile driving lasts longer than usual (i.e., 12-16 hours).

(iii) The number of observers shall be increased and/or positions changed to ensure full visibility of the Level B harassment isopleths.

(iv) All marine mammal sightings shall be documented by observers on a NMFS-approved sighting form.

(v) At a minimum, observers shall record the following information:

1. Date of observation period, monitoring type (land-based/boat-based), observer name and location, climate and weather conditions, and tidal conditions;

2. Environmental conditions that could confound marine mammal detections and when/where they occurred;

3. For each marine mammal sighting, the time of initial sighting and duration to the end of the sighting period;

4. Observed species, number, group composition, distance to pile-related activities, and behavior of animals throughout the sighting;

5. Discrete behavioral reactions, if apparent;

6. Initial and final sighting locations marked on a grid map; and

7. Pile-related activities taking place during each sighting and if/why a shutdown was or was not triggered.

(b) Acoustic monitoring

(i) Acoustic data shall be collected using hydrophones connected to a drifting boat to reduce the effect of flow noise and an airborne microphone. There shall be a direct line of acoustic transmission through the water column between the pile and the hydrophones in all cases, without any interposing structures, including other piles.

(ii) A stationary two-channel hydrophone recording system shall be deployed to record a representative sample (subset of piles) during the monitoring period. Acoustic data shall be collected one meter below the water surface and one meter above the sea floor.

(iii) Background noise recordings (in the absence of pile driving) shall be collected to provide a baseline background noise profile. The results and conclusions of the study shall be summarized and presented to NMFS with recommendations for any modifications to the monitoring plan or exclusion zones.

(iv) All sensors, signal conditioning equipment, and sampling equipment shall be calibrated at the start of the monitoring period and rechecked at the start of each day.

(v) Prior to monitoring, water depth measurements shall be taken to ensure that hydrophones do not drag on the bottom during tidal changes.

(vi) Underwater and airborne acoustic monitoring shall occur for the first five unobstructed piles, for each pile type and/or driving methodology, for the duration of pile driving. If a representative sample has not been achieved after the five piles have been monitored (e.g., if there is high variability of sound levels between pilings), acoustic monitoring shall continue until a representative acoustic sample has been collected.

(vii) Acoustic data shall be downloaded periodically (i.e., daily or on another appropriate scheduled) and analyzed. Post-analysis of underwater sound level signals shall include the following:

1. RMS values (average, standard deviation/error, minimum, and maximum) for each recorded pile. The 10-second RMS averaged values will be used for determining the source value and extent of the 120-dB underwater isopleths;

2. Frequency spectra for each functional hearing group; and

3. Standardized underwater source levels to a reference distance of 10 m.

(viii) Post-analysis of airborne noise would be presented in an unweighted format and include:

1. The unweighted RMS values (average, minimum, and maximum) for each recorded pile. The average values would be used for determining the extent of the airborne isopleths relative to species-specific criteria;

2. Frequency spectra from 10 Hz to 20 kHz for representative pile-related activity; and

3. Standardized airborne source levels to a reference distance of approximately 15 m (50 ft).

(ix) In the event noise levels surpass estimated levels for extended periods of time, construction shall be stopped and NMFS shall be contacted to discuss the cause and potential solutions.

5. Reporting

The holder of this Authorization is required to:

(a) Submit a draft annual report on all marine mammal monitoring completed during the year ending 120 days prior to issuance of any subsequent LOA for this project. The report must be submitted not less than sixty days prior to the issuance of any subsequent LOA for this project. A final report shall be submitted within thirty days following resolution of comments from NMFS on the draft report. The report shall include data collected for each marine mammal species observed in the project area, including descriptions of marine mammal behavior, overall numbers of individuals observed, frequency of observation, any behavioral changes and the context of the changes relative to activities, date and time of marine mammal detections, weather conditions, species identification, approximate distance from the source, and activity at the construction site at the time of observation.

(b) Marine mammal reporting shall include all data described previously, including observation dates, times, and conditions, and any correlations of observed marine mammal behavior with activity type and received levels of sound, to the extent possible.

(c) A report with the results of all acoustic monitoring shall include the following:

(i) Size and type of piles;

(ii) A detailed description of any sound attenuation device used, including design specifications;

(iii) The impact hammer energy rating used to drive the piles, make and model of the hammer(s), and description of the vibratory hammer;

(iv) A description of the sound monitoring equipment;

(v) The distance between hydrophones and depth of water and the hydrophone locations;

(vi) The depth of the hydrophones;

(vii) The distance from the pile to the water's edge;

(viii) The depth of the water in which the pile was driven;

(ix) The depth into the substrate that the pile was driven;

(x) The physical characteristics of the bottom substrate into which the pile was driven;

(xi) The total number of strikes to drive each pile;

(xii) The results of the hydroacoustic monitoring, including the frequency spectrum, ranges and means for the peak and RMS sound pressure levels, and an estimation of the distance at which RMS values reach the relevant marine mammal thresholds and background sound levels;

(xiii) Vibratory driving results, including the maximum and overall average RMS calculated from 30-s RMS values during the drive of the pile; and

(xiv) A description of any observable marine mammal behavior in the immediate area and, if possible, correlation to underwater sound levels occurring at that time.

(d) Reporting injured or dead marine mammals:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this LOA, such as an injury (Level A harassment), serious injury, or mortality, SDOT shall immediately cease the specified activities and report the incident to the Office of Protected Resources (301-427-8475; Zach.Hughes@noaa.gov), NMFS, and the West Coast Regional Stranding Coordinator for Oregon/Washington (206-526-6550; Brent.Norberg@noaa.gov), NMFS. The report must include the following information:

1. Time and date of the incident;

2. Description of the incident;

3. Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);

4. Description of all marine mammal observations in the 24 hours preceding the incident;

5. Species identification or description of the animal(s) involved;

6. Fate of the animal(s); and

7. Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with SDOT to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. SDOT may not resume their activities until notified by NMFS.

(ii) In the event that SDOT discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), SDOT shall immediately report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator, NMFS.

The report must include the same information identified in 5(d)(i) of this LOA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with SDOT to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that SDOT discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the LOA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), SDOT shall report the incident to the Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. SDOT shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

6. The holder of this Authorization is required to comply with the Terms and Conditions of the Incidental Take Statement corresponding to NMFS' Biological Opinion as they pertain to listed marine mammals.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein or contained in Subpart W – Taking of Marine Mammals Incidental to the Elliott Bay Seawall Project (50 CFR 217.220-217.227), or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Donna S. Wieting
Director,
Office of Protected Resources,
National Marine Fisheries Service.

21 October 2015
Date

Table 1. Authorized take numbers, by species

Species	Authorized Take
Harbor seal (*Phoca vitulina*)	700
California sea lion (*Zalophus californianus*)	225
Steller sea lion (*Eumetopias jubatus*)	175
Harbor porpoise (*Phocoena phocoena*)	315
Dall's porpoise (*Phocoenoides dalli*)	70
Killer whale (southern resident; *Orcinus orca*)	16
Killer whale (transient; *Orcinus orca*)	24
Humpback whale (*Megaptera novaeangliae*)	4
Gray whale (*Eschrichtius robustus*)	8

Table 2. Minimum radial distance to Level B harassment zones

Activity	Distance to threshold in meters	
	160 dB	120 dB
Impact driving, steel sheet piles	1,000	n/a
Vibratory driving, steel sheet piles	n/a	6,276