

Request for an Incidental Harassment Authorization

Ketchikan Dock Company, LLC

Ketchikan Berth IV Expansion Project

Tongass Narrows, Ketchikan, Alaska

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APPENDICES

Appendix A. Project Permit Drawings

Appendix B. Marine Mammal Monitoring and Mitigation Plan

ACRONYMS AND ABBREVIATIONS

dB	decibels
DPS	distinct population segment
DTH	down-the-hole
EDPS	eastern distinct population segment
EFH	Essential Fish Habitat
ESA	Endangered Species Act
Hz	hertz
IHA	Incidental Harassment Authorization
KDC	Ketchikan Dock Company
kHz	kilohertz
LOA	Letter of Authorization
MMPA	Marine Mammal Protection Act
m	meter
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PSO	Protected Species Observer
rms	root mean square
PTS	permanent threshold shift
PW	phocids in water
USFWS	United States Fish and Wildlife Service
WDPS	western distinct population segment

1 DESCRIPTION OF SPECIFIC ACTIVITY

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 OVERVIEW

The Ketchikan Dock Company, LLC (KDC) proposes to expand Berth IV, its dock adjacent to downtown Ketchikan, Alaska, located in East Tongass Narrows, in order to accommodate a new fleet of large cruise ships that are expected to reach Alaska in the summer of 2019.

The expansion would include the removal of some existing piles and structures and the installation of new piles and structures. All pile driving and removal would take place at the existing dock facility and is expected to occur on 20 days (not necessarily consecutive). The proposed project would occur in marine waters that support several marine mammal species. Pile driving and pile removal may result in auditory injury (Level A harassment) and behavioral harassment (Level B harassment) of select marine mammal species.

The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; take is defined as to “harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill,” except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an Incidental Harassment Authorization (IHA), provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals.

The KDC is requesting an IHA for Level B take of eight marine mammal species that may occur in vicinity of the project area extending through Tongass Narrows and into Revillagigedo Channel. The species for which Level B take is requested are: humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Dall’s porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and Steller sea lion (*Eumetopias jubatus*).

As set out by 50 CFR 216.104, Submission of Requests, the specific items required for this application are provided in Sections 1 through 14 of this application.

1.2 DETAILED DESCRIPTION OF SPECIFIC ACTIVITIES

1.2.1 Location

Berth IV is located within the Ketchikan Gateway Borough on Revillagigedo Island in Southeast Alaska; T75S, R90E, S25, Copper River Meridian, USGS Quadrangle KET B5; Latitude 55.344 and Longitude -131.656 (Figure 1 and Sheet 1). The project is located within Tongass Narrows. Major waterbodies include Clarence Strait to the north, Revillagigedo Channel to the south, Nichols Passage to the west, and George Inlet to the east.

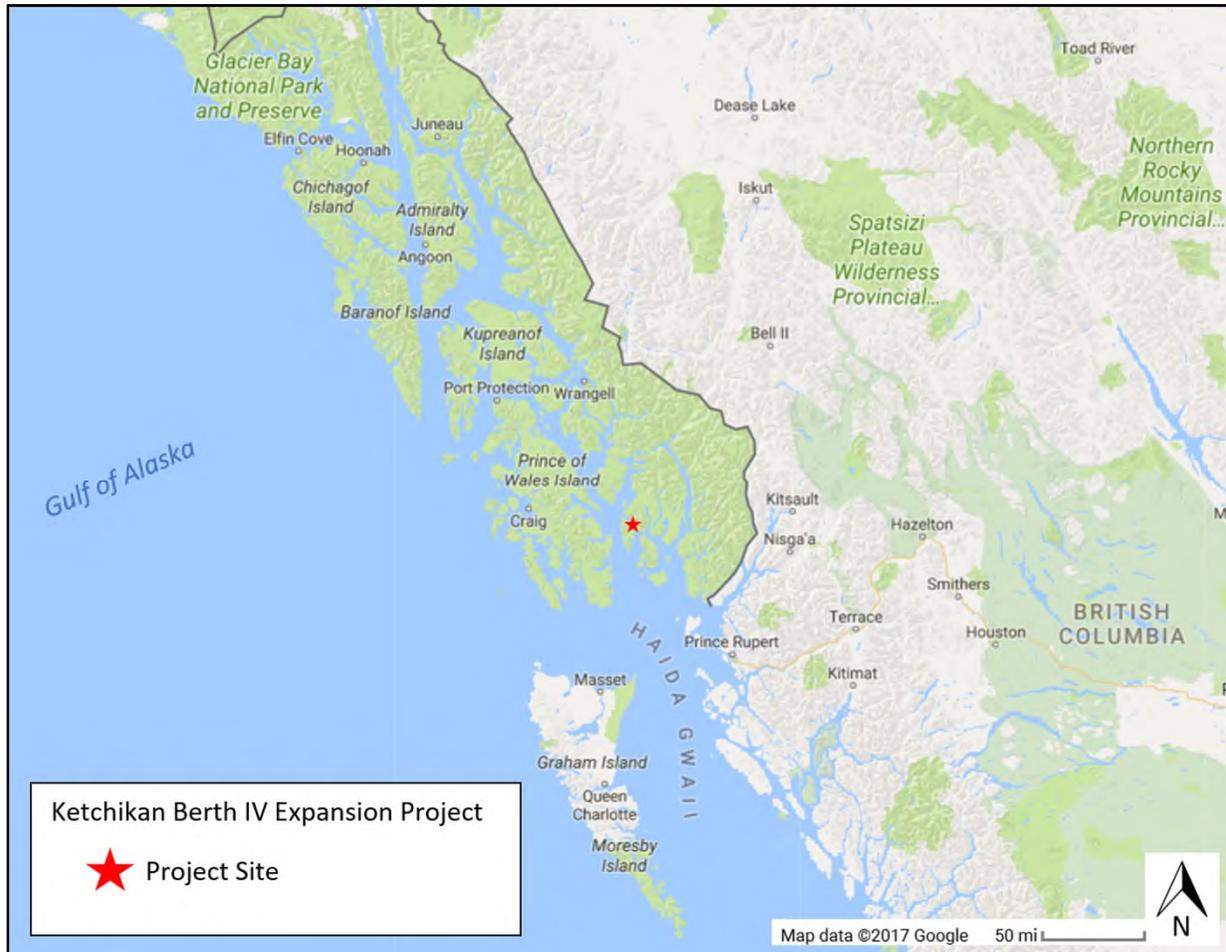


Figure 1. Project Location Map

Berth IV is adjacent to downtown Ketchikan on the shore of East Tongass Narrows (Figure 2 and Sheet 1). All Berth IV expansion would take place at the existing dock facility (Sheets 2 and 3 of 7).



Figure 2. Aerial Imagery of Berths I, II, III and IV



Figure 3. Photograph of Berth IV

Photo Credit: City of Ketchikan Planning and Design of Port Improvements Report by Moffatt & Nichol/LandDesign 2016.

1.2.2 Purpose and Need

Ketchikan is one of the main ports-of-call for cruise ships in Alaska, receiving up to six ships daily from May through September, with over 950,000 annual cruise passenger visits (Moffatt & Nichol/LandDesign 2016). The average length of cruise ships has increased over time. In the 1970s 550-foot long ships were common. Now ships with lengths over 900 feet are becoming the operational norm. These post-Panamax cruise ships which are larger than those that have been coming through Alaska's Inside Passage are expected to start docking at Port of Ketchikan in the summer of 2019. In its present configuration, Berth IV is not capable of supporting these larger cruise ships.

The purpose of this project is to reconfigure Berth IV so that it can accommodate larger cruise ships. This project is needed because the existing Berth IV cannot support the modern fleet of larger cruise ships. Once the project is constructed Berth IV will be able to accommodate these large cruise ships.

1.2.3 Anticipated Changes in Vessel Traffic

While the size of cruise ships traveling to Ketchikan is expected to increase, this project is not expected to increase vessel traffic in Alaskan waters. According to *The City of Ketchikan Planning and Design of Port Improvements* report, "Conversations with cruise lines and Cruise Line Agencies of Alaska suggest that growth over the next decade will occur primarily as a result of homeports and primary regional ports-of-call being modified to welcome larger vessels, without significantly expanding the number of vessels operating within Alaska" (Moffatt & Nichol/LandDesign 2016). It is expected, however, that more passengers may visit Alaska on these larger ships.

1.2.4 Proposed Action

The KDC proposes to expand Berth IV by replacing the existing floating barge and float with a larger pontoon dock and larger small craft float, and by expanding the existing mooring structures (Figure 4, Table 1, Sheets 2 and 3). The project would:

- Permanently remove the existing floating barge dock, float, and their associated three dolphins comprised of two 24-inch, six 30-inch, and four 36-inch diameter steel piles;
- Temporarily remove the existing transfer bridge, and then reinstall it on the new facility;
- Install sixteen temporary 30-inch diameter steel piles as templates to guide proper installation of permanent piles (these piles would be removed prior to project completion);
- Install seventeen permanent 48-inch diameter piles and one permanent 30-inch diameter pile to support a new 285 foot by 40 foot by 10 foot floating pontoon dock, its attached 220 foot by 12 foot small craft float, and mooring structures (Figure 4, Table 1);
- Install bull rail, floating fenders, mooring cleats, and three mast lights. (Note: these components would be installed out of the water.)

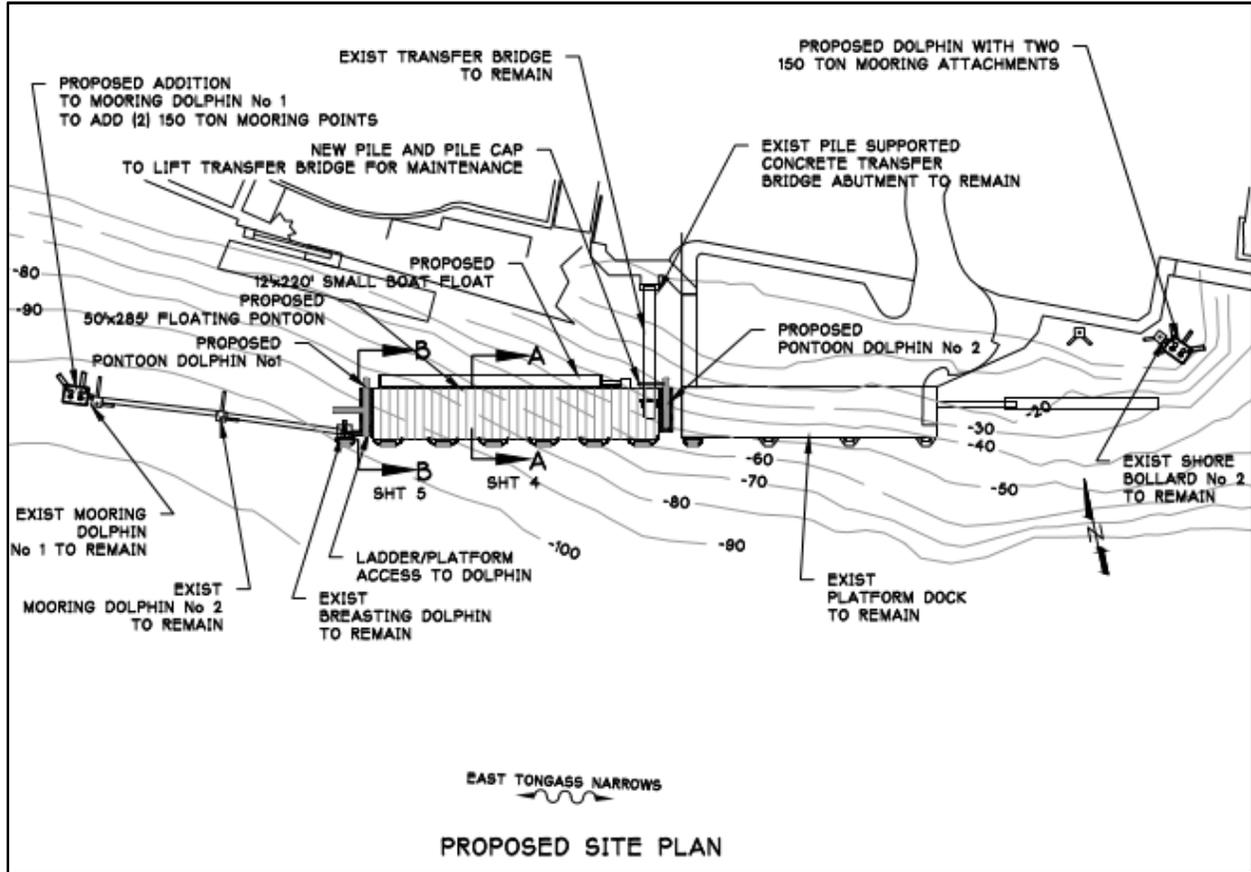


Figure 4. Proposed Site Plan (see Sheet 3 for more detail)

Table 1. Proposed Pile Schedule

Dolphin Location	Quantity and Diameter of Piles
Mooring Dolphin No. 1	(2) 48-inch batter & (2) 48-inch diameter plumb
Shore Bollard No. 2	(2) 48-inch batter, (1) 30-inch batter & (2) 48-inch plumb
Pontoon Dolphin No. 1	(2) 48-inch batter & (3) 48-inch plumb
Pontoon Dolphin No. 2	(1) 48-inch batter & (3) 48-inch plumb

1.2.5 Construction Methods

1.1.1.1 Equipment

The following equipment would be used:

- Vibratory Hammer: ICE 44B/12,450 pounds static weight
- Diesel Impact Hammer: Delmag D46/Max Energy 107,280 ft-pounds
- Drilled shaft drill: Holte 100,000 ft-lb. top drive with down-the-hole (DTH) hammer and bit
- Socket drill: Holte 100,000 ft-lb. top drive with DTH hammer and under-reamer bit

1.1.1.2 Transport of Materials and Equipment

Materials and equipment, including the dock, would be transported to the project site by barge. While work is conducted in the water, anchored barges would be used to stage construction materials and equipment. Twenty-five-foot skiffs with 250 horse power motors would be used to support dock construction.

1.1.1.3 Construction Sequence

In-water construction would begin with the removal of existing piles followed by installation of the two dolphins that would support the floating dock (pontoon dolphin No. 1 and No. 2) and the expansion of two mooring dolphins (mooring dolphin No. 1 and shore bollard No. 2). The dolphins would be constructed one at a time. Construction would be sequenced as follows:

First, the contractor would remove the existing steel piles that make up the three dolphins that support the existing dock and remove the existing floating dock and existing float.

Next, the contractor would construct the dolphins. The general dolphin pile installation sequence would be:

- 1) Vibrating four temporary 30-inch piles into place to create a template to guide later installation of permanent piles;
- 2) Welding a frame around the temporary piles;
- 3) For the Shore Bollard No. 2, vibrating and socketing one permanent 30-inch pile into place; or, for all other dolphins, vibrating, impacting, and anchoring permanent 48-inch piles into place;
- 4) Welding the dolphin structure; then,
- 5) Removing the frame and temporary piles.

Please see Table 2 at the end of this section for the specific amount of time required to install and remove piles, and see Section 2.1 for construction duration information.

1.1.1.4 Pile Removal and Installation Methods

Removal of Existing Piles

The contractor would attempt to direct pull existing piles; if those efforts prove to be ineffective existing piles would be removed with a vibratory hammer.

Installation and Removal of Temporary Piles

Temporary 30-inch diameter piles would be installed and removed with a vibratory hammer.

Installation of Permanent Piles

The single permanent 30-inch diameter pile would be installed through approximately 15 feet of sand and gravel with a vibratory hammer. Then the pile will be secured into underlying bedrock with conventional socketing means using a down-the-hole hammer and under-reamer bit to drill a hole into the bedrock and then socket the pile into the bedrock. Socket depths are expected to be approximately 20 feet (as determined by the geotechnical engineer) and take approximately 3 hours. (Note, this socketing method can also be referred to as down the hole drilling. We refer to it as socketing throughout this document to clarify this method from anchoring, which also uses a drill.)

Permanent 48-inch diameter piles would be driven through approximately 15 feet of sand and gravel with a vibratory hammer operated at a reduced energy setting when possible and impacted into bedrock. After being driven via impact hammer, the piles will be secured with rock anchors. To install the rock anchors, a hole will be drilled through the 48-inch diameter pile and down into the bedrock. During this anchor drilling, the 48-inch pile will not be touched by the drill, therefore, anchoring will not generate steel-on-steel hammering noise (noise that is generated during socketing).¹ Each anchor will take approximately 2.5 hours to complete.

Table 2 provides a conservative estimate of the amount of time required for vibratory pile removal and installation, impact pile installation, and socketing pile installation.

¹ In rock anchoring, the DTH drill only hits the bedrock and, for this effort, the 48-inch pile will act as a casing to isolate the drill noise. The process of anchoring has been used on many projects in Alaska with 8-inch diameter anchors (including the recently permitted Haines Ferry Terminal). Due to the significant loads generated from cruise ship berthing, the Ketchikan Berth IV project will use 30-inch diameter rock anchors.

Based on consultation with NMFS PR1, noise associated with anchoring is not expected to impact marine mammals because the anchoring process does not generate steel-on-steel drilling noise and because the anchoring noise occurs in isolation from the water column. Anchoring noise is not considered further in this application.

Table 2. Pile Driving Construction Summary

Description	Project Component					
	Existing Pile Removal	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation	Permanent Pile Installation	Max Installation/ Removal per Day
Pile Diameter and Type	24, 30, and 36-inch steel	30-inch steel	30-inch steel	30-inch steel	48-inch steel	--
# of Piles	2, 6, and 4 respectively; 12 total	16	16	1	17	--
Vibratory Pile Driving						
Max # of Piles Vibrated Per Day	4	4	4	1	2	4 temporary or 2 permanent
Vibratory Time Per Pile	15 minutes	30 minutes	10 minutes	1 hour	1 hour	--
Vibratory Time per day	1 hour	2 hours	40 minutes	1 hour	2 hours	2 hours
Vibratory Time Total	3 hours	8 hours	2 hours 40 minutes	1 hour	17 hours	--
Impact Pile Driving						
Max # of Piles Impacted Per Day	0	0	0	0	3	3
# of Strikes Per Pile	0	0	0	0	200 strikes	600 strikes
Impact Time Per Pile	0	0	0	0	5 minutes	--
Impact Time per Day	0	0	0	0	15 minutes	15 minutes
Impact Time Total	0	0	0	0	1 hour 25 minutes	--
Socketing Pile Installation						
Max # of Piles Socketed per Day	0	0	0	1	0	1
Socket Time Per Pile	0	0	0	0	3 hours	--
Socket Time per Day	0	0	0	0	3 hours	3 hours
Socket Time Total	0	0	0	0	3 hours	--

1.3 ACOUSTIC THRESHOLDS AND ESONIFIED AREA

Vibratory pile driving and removal, impact pile driving, and socketing would generate in-water and in-air noise that may result in take of marine mammals.

Using the best available science, National Marine Fisheries Service (NMFS) has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur Permanent Threshold Shifts of some degree (equated to Level A harassment).

1.3.1 Level A Harassment

NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing* (2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive) (NMFS 2016). KDC's activity includes the use of both impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal and socketing) sources. The thresholds for auditory injury are provided in Table 3.

Table 3. Thresholds Identifying the Onset of Permanent Threshold Shift

Hearing Group	PTS Onset Thresholds*(received level)	
	Impulsive (Impact Pile Driving)	Non-impulsive (Vibratory Pile Driving)
Low-Frequency (LF) Cetaceans	Cell 1 $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	Cell 2 $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	Cell 3 $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	Cell 4 $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	Cell 5 $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	Cell 6 $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	Cell 7 $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	Cell 8 $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	Cell 9 $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	Cell 10 $L_{E,OW,24h}$: 219 dB

Adapted from: NMFS 2016

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μ Pa, and cumulative sound exposure level (LE) has a reference value of 1 μ Pa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

1.3.2 Level B Harassment

NMFS predicts that all marine mammals are likely to be behaviorally harassed in a manner that they consider Level B harassment when exposed to underwater anthropogenic noise above

received levels of 120 decibels (dB) re $1\mu\text{Pa}$ (rms) for continuous and above 160 dB re $1\mu\text{Pa}$ (rms) for non-explosive impulsive sources.

1.3.3 Calculated Distances to Level A and Level B Thresholds

For this project, distances to the Level A and Level B thresholds were calculated based on various source levels for a given activity and pile type (e.g., vibratory removal 30-inch diameter steel pile, impact pile driving 48-inch diameter steel pile) and, for Level A harassment, accounted for the maximum duration of that activity per day using the practical spreading model in the spreadsheet tool developed by NMFS. Calculated distances to thresholds are shown in Table 4 and range from approximately 1 m to 16 kilometers. Please see Section 11.3 for shutdown and monitoring zones associated with these thresholds.

Table 4. Distances to NMFS Level A and B Acoustic Thresholds

Activity	Source Level at 10 meters (dB)	Distance (m) to Level A and Level B Thresholds					
		Level A ¹					Level B
		Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid	
Vibratory Pile Driving/Removal							
24-inch steel removal (2 piles) (~1 hour on 1 day ²)	161.9 SPL ³	7.8	0.7	11.6	4.8	0.3	6,213
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	161.9 SPL ³	7.8	0.7	11.6	4.8	0.3	6,213
36-inch steel removal (4 piles) (~1 hour on 1 day)	168.2 SPL ³	20.6	1.8	30.5	12.5	0.9	16,343*
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	161.9 SPL ³	12.4	1.1	18.4	7.6	0.5	6,213
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	161.9 SPL ³	12.4	1.1	18.4	7.6	0.5	6,213
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	168.2 SPL ³	32.7	2.9	48.4	19.9	1.4	16,343*
Impact Pile Driving							
48-inch steel permanent installation (17 piles) (~15 minutes per day on 6 days)	186.7 SEL/ 198.6 SPL ⁴	239.2	8.5	284.9	128.0	9.3	3,744
Socketing Pile Installation							
30-inch steel permanent installation (1 pile) (~3 hours on 1 day)	167.7 SPL ⁵	40.0	2.3	35	21.4	1.6	15,136*

Distances, in meters, refer to the maximum radius of the zone.

¹ The values provided here represent the distance at which an animal may incur PTS if that animal remained at that distance for the entire duration of the activity within a 24-hour period. For example, a humpback whale (low frequency cetacean) would have to remain 7.8 meters from 30-inch piles being removed for 1 hour for PTS to occur.

² This project will only remove two 24-inch diameter steel piles total for a maximum of 30 minutes of removal in one day. However, because a maximum of 4 pile could be removed each day, we used 1 hour (the time it would take to remove four piles) of removal time instead of 30 minutes to calculate the distance threshold.

³ The 36-inch and 48-inch diameter pile source levels are proxy from median measured source levels from pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16). The 24-inch and 30-inch diameter source levels are proxy from median measured sources levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).

⁴ Sound pressure level root-mean-square (SPL rms) values were used to calculate distance to Level B harassment isopleths for impact pile driving. The source level of 186.7 SEL is the median measured from the Port of Anchorage test pile project for 48-inch piles (Austin et al. 2016, Table 9). We calculated the distances to Level A thresholds assuming 200 strikes in 1 hour and 15 minutes of work in 24 hours.

⁵ The 30-inch diameter socketing source level is proxy from mean measured sources levels from drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).

* These distances represent calculated distances based on the practical spreading model; however, landforms will block sound transmission at closer distances. The farthest distance that sound will transmit from the source is 13,755 m before transmission is stopped by Annette Island.

1.3.4 Action Area

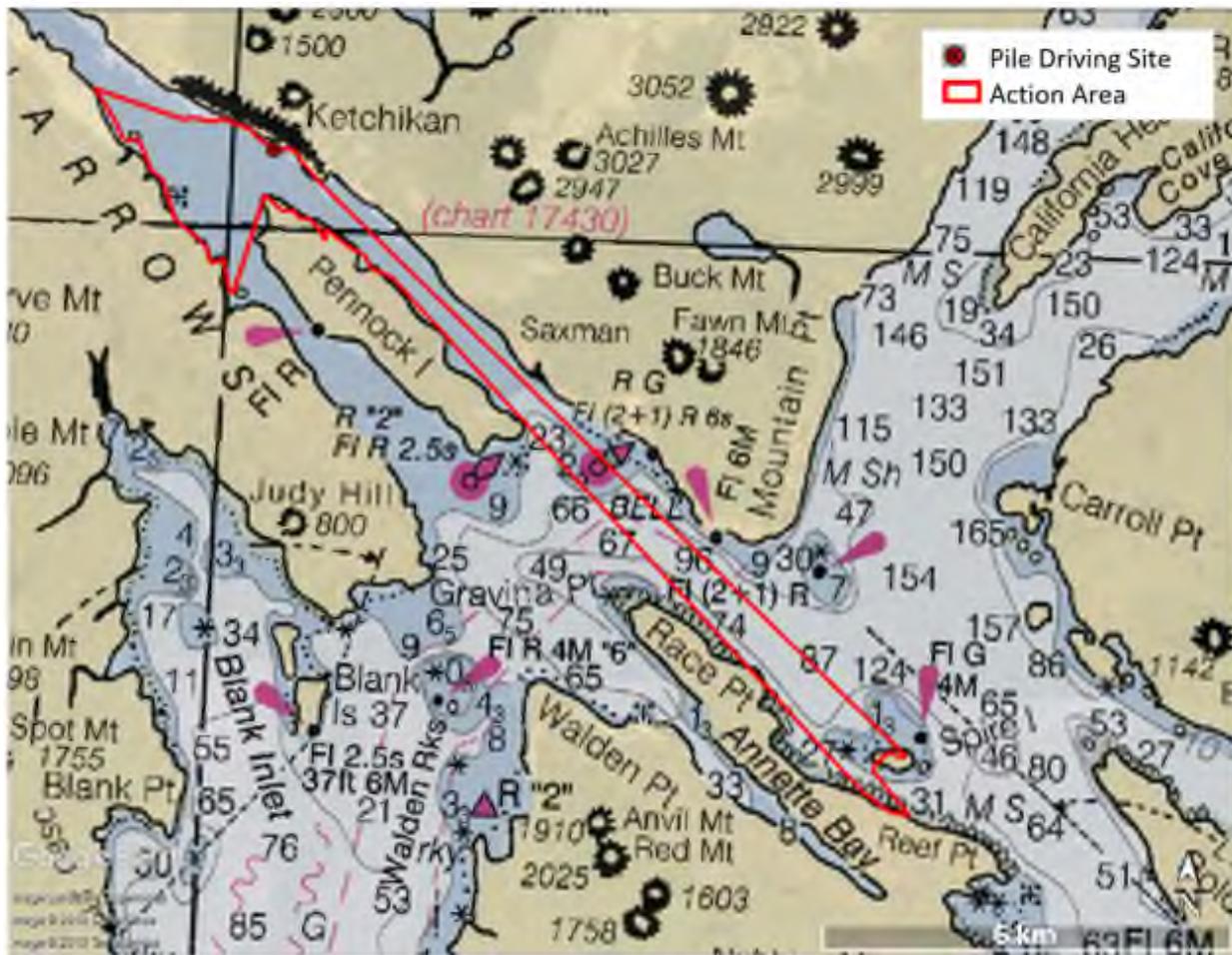
The vicinity of the project area that will be affected directly by the action, referred to as the action area in this document, has been determined by the area of water that will be ensonified above acoustic thresholds in a day. In this case, the action area is the area where received noise levels from vibratory installation of 48-inch piles (the farthest-reaching noise associated with the project) are expected to decline to 120 dB. As shown in Table 4, this area extends 16.34 kilometers from the source. However, the action area would be truncated where land masses obstruct underwater sound transmission, thus, the action area is largely confined to marine waters within Tongass Narrows, extending approximately 13.75 kilometers into Revillagigedo Channel and encompassing approximately 10.3 square kilometers (Figure 5). Note, this document also refers to the project vicinity. This term refers to an area larger than the action area, which includes the waters surrounding Gravina Island. This term is used because much of the information available about marine mammals near Ketchikan is based on sighting outside the Narrows and outside the action area in the waters surrounding Gravina Island.

In addition to in-water noise, pinnipeds can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. NMFS has established an in-air noise disturbance threshold of 90 dB rms for harbor seals and 100 dB rms for all other pinnipeds. Pile driving and removal associated with this project will generate in-air noise above ambient levels within Tongass Narrows. However, the predicted distances to the in-air noise disturbance threshold for hauled-out harbor seals (90 dB) and sea lions (100 dB rms) will not extend more than 53 meters and 17 meters from any type of pile being driven or extracted, respectively². No in-air disturbance to hauled-out individuals are anticipated as a result of this expansion project; thus, land area is not included in the action area.

To minimize impacts to protected species, shutdown and monitoring of harassment zones will be implemented to protect and document marine mammals in the action area. Please see Table 4 for calculated distances to the Level A and B thresholds, Section 11 for mitigation information and shutdown zones and figures, and the attached Marine Mammal Monitoring and Mitigation Plan (Appendix B) for more details on mitigation, shutdown, and monitoring procedures.

² Predicted distances were based on source levels in Washington and Alaska. At Puget Sound, WA, Laughlin (2010) found in-air measurements averaged 96.5 dB root mean square at 15 m during vibratory installation of 30-inch steel piles. At the Port of Anchorage, AK, Austin et al. (2016) found source levels of 101 dB @15 m during impact installation of 48-inch diameter steel piles.

Figure 5. Proposed Action Area



2 DATES, DURATION, AND REGION OF ACTIVITY

The date(s) and duration of such activity and the specific geographical region where it will occur.

2.1 DATES AND DURATION

Construction is expected to take 3-4 months beginning in Fall 2018. While construction is mostly likely to begin in October of 2018 and commence in January of 2019, depending on the start date, construction could extend into March of 2019. Regardless of start date, construction will occur within a four-month (maximum) work window.

Pile removal and installation is expected to occur for a total of approximately 36 hours over 20 days (not necessarily consecutive days). Please see Table 2 for the specific amount of time required to install and remove piles.

The total construction duration accounts for the time required to mobilize materials and resources and construct the project. The duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

2.2 SPECIFIED GEOGRAPHIC REGION

The City of Ketchikan is located in Southeast Alaska. Berth IV is located adjacent to downtown Ketchikan on the shore of East Tongass Narrows (Figures 1, 2, and 3). The berth is part of the Port of Ketchikan, an active marine commercial and industrial area. For more detailed location information see Section 1.

2.2.1 Physical Environment

Revillagigedo Channel is a large channel that is part of the Inside Passage. To the south it opens into Dixon Entrance at the Canada-United States border, and it extends north to Tongass Narrows. The channel varies between 5 and 15 kilometers wide and, in places, is over 365 meters deep (NOAA 2018).

Tongass Narrows is a U-shaped glacier-carved fjord that varies between 300 meters to 1 kilometer wide and 15 to 33 meters deep (ADEC 2017). Water temperatures in the Narrows range from 12.7 to 16.6° centigrade (C) with an average of 15° C (ADEC 2017). Tongass Narrows is known for strong tidal currents and unusually large tidal ranges (25 feet or more) (Pentec 2001). The Narrows are characterized by steep bedrock or coarse gravel-cobble-boulder shoreline. Lower intertidal and shallow subtidal areas are often sandy or mixed gravel, sand, and shell with varying amounts of silt (HDR 2003).

The project footprint is previously disturbed by the existing Berth IV. The facility currently supports cruise ship berthing and passenger loading and unloading (Moffatt and Nichol/LandDesign 2016). Island Wings Air Service is located less than 0.2 miles to the west, and the Casey Moran Harbor, owned and operated by the City of Ketchikan, is located immediately to the east (Marine Exchanges of Alaska 2017).

According to NMFS's ShoreZone Mapper, the Berth IV site has an anthropomorphic permeable habitat class and solid man-made structures with sheltered rocky beaches environmental sensitivity index (NMFS 2017).

2.3 SEASONAL ISSUES

Marine mammal species can occur year-round in the action area. However, concentrated numbers are most likely to occur during seasonal prey aggregation. Herring, salmon, eulachon, and euphausiids (krill) are among the species that congregate ephemerally, and marine mammals tend to be more common in the action area in spring and fall when these prey species tend to be more abundant (Freitag 2017, NMFS 2012). This seasonal variation has been factored into take estimates.

3 SPECIES AND NUMBERS OF MARINE MAMMALS

The species and numbers of marine mammals likely to be found within the activity area.

The marine waters surrounding Gravina Island support many species of marine mammals. Based on the Online Species Mapper and consultation with the NMFS Alaska Protected Species Division, there are eight species of marine mammals that could occur in the vicinity of the berth expansion project. Table 5 lists these species and summarizes key information regarding stock status and abundance. Please see NMFS' Stock Assessment Reports for more detailed accounts of these stocks' status and abundance (available at <http://www.nmfs.noaa.gov/pr/sars/region.htm>).

Table 5. Marine Mammal Species with Ranges Extending into the Project Area

Species ^a	Stock and Abundance Estimate	ESA Status	MMPA Status	Occurrence in Action Area ^b
Humpback Whale (<i>Megaptera novaeangliae</i>)	Central North Pacific 10,103 ^c	Endangered ^d	Strategic, depleted	Frequent
Minke Whale (<i>Balaenoptera acutorostrata</i>)	Alaska N/A ^c	Not listed	Not strategic, non-depleted	Rare
Killer Whale (<i>Orcinus orca</i>)	West Coast Transient 243 ^c	Not listed	Not strategic, non-depleted	Frequent
	Eastern North Pacific Northern Resident (BC) 261 ^c	Not listed	Not strategic, non-depleted	
	Eastern North Pacific Alaska Resident 2,347 ^c	Not listed	Not strategic, non-depleted	
Pacific White-Sided Dolphin (<i>Lagenorhynchus obliquidens</i>)	North Pacific 26,880 ^c	Not listed	Not strategic, non-depleted	Rare
Dall's Porpoise (<i>Phocoenoides dalli</i>)	Alaska 83,400 ^c	Not listed	Not strategic, non-depleted	Infrequent
Harbor Porpoise (<i>Phocoena phocoena</i>)	Southeast Alaska 11,146 ^e	Not listed	Strategic, non-depleted	Infrequent
Harbor Seal (<i>Phoca vitulina</i>)	Clarence Strait 31,634 ^c	Not listed	Not strategic, non-depleted	Common
Steller Sea Lion (<i>Eumatopia jubatus</i>)	Eastern U.S. 41,638 ^c	Not listed	Strategic, depleted	Common

^a Species listed with ranges extending into the project area derived from personal communication with Julie Scheurer, NMFS Alaska Protected Resources Division, and the NOAA Online Species Mapper

<<https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html>> (NOAA 2017).

^b Occurrence estimates based on personal communication with Gary Freitag, Associate Professor Marine Advisory Program, University Alaska Fairbanks College of Fisheries and Ocean Sciences and member of NOAA Marine Mammal Stranding Network. Common= multiple sightings every month, could occur each day; Frequent= multiple sightings every year, could occur each month; Infrequent= few sightings each year, could occur each month; Rare= no sightings in recent years. Occurrence information for killer whales is not refined to stock level.

^c Muto, M. M. et al. 2016. Appendix 2. Stock Summary Table (last revised 12.30.16). NOAA-TM-AFSC-355 Muto, M. M., et al. <http://www.nmfs.noaa.gov/pr/sars/pdf/ak2016_sars_appendix_2.pdf>.

^d In 2016, NOAA Fisheries revised the Endangered Species Act listing for the humpback whale to identify 14 DPSs; MMPA designation is currently being reviewed for each DPS (81 FR 62260). Until the MMPA stock delineations are reviewed in light of the DPS designations, NMFS considers this stock to be endangered and depleted for MMPA management purposes.

^e Muto, M. M et al. 2016a. NOAA Technical Memorandum NMFS-AFSC-355 Alaska Marine Mammal Stock Assessments, 2016 <http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf>.

Specific density data on marine mammals in Tongass Narrows and Revillagigedo Channel is limited. To determine the species and numbers of marine mammals likely to be found within the action area we:

- Reviewed NMFS' Stock Assessment Reports for stock status and abundance and groups size information;
- Discussed the project with Gary Freitag, University of Alaska Fairbanks College of Fisheries and Ocean Sciences Associate Professor Marine Advisory Program, member of National Oceanic and Atmospheric Administration (NOAA) Marine Mammal Stranding Network, and longtime Ketchikan resident to learn about species in the action area. Professor Freitag provided information that we used to estimate species occurrence and groups sizes as outlined in Table 6 (Freitag 2017);
- Discussed the project with dock builder and longtime Ketchikan resident Jerry Heisler. He corroborated that the most common species in the project area are harbor seal and Steller sea lions (Heisler 2017);
- Reviewed the Gravina Access Project Biological Assessment for species information. The assessment states that small numbers of humpback whales may be found in Tongass Narrows year-round with sightings once or twice per month and that small numbers of Steller sea lions may be found in Tongass Narrows year-round with a peak in sightings in the spring where large groups of 20-80 animals are possible (HDR 2003);
- Reviewed the OBIS-SEAMAP which documents Dall's porpoise in the action area. The map reports three sightings, with group sizes of 6, 3, and 2 animals in July 1991 (Haplin et. al. 2009);
- Reviewed marine mammal observation logs from construction at the Ketchikan Ferry Terminal in Tongass Narrows in 2016. The logs did not document any species occurring within a 1,000-meter radius of the ferry terminal during approximately 37 hours of monitoring over 18 days in July and August of 2016 (Turnagain 2016); and,
- Reviewed the marine mammal observation report from construction of the Ketchikan Transfer Facility in Tongass Narrows in 2001. The report documented no species occurring up to 2,000 meters from the facility during approximately 26.5 hours of monitoring over 12 days in July and August of 2001 (OSSA 2001).

Based on the above information we believe that humpback whales, minke whales, killer whales, Pacific white-sided dolphin, Dall's porpoise, harbor porpoises, harbor seals, and Steller sea lions could occur in the action area during construction. This IHA application is limited to and assesses the potential impacts of the project on these eight species, which are discussed more fully in Section 4.

4 AFFECTED SPECIES STATUS AND DISTRIBUTION

A description of the status and distribution of each species or stocks or marine mammals likely to be affected by the activity.

4.1 HUMPBACK WHALE

4.1.1 Hearing Ability

Humpback whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz) (NMFS 2016). However, because of the lack of captive subjects and logistical challenges of bringing experimental subjects into the laboratory, no direct measurements of mysticete hearing are available. Consequently, hearing in mysticetes is estimated based on other means such as vocalizations (Wartzok and Ketten, 1999), anatomy (Houser et al. 2001; Ketten 1997), behavioral responses to sound (Edds-Walton 1997), and nominal natural background noise conditions in their likely frequency ranges of hearing (Clark and Ellison 2004). The combined information from these and other sources strongly suggests that mysticetes are likely most sensitive to sound from perhaps tens of hertz to ~10 kHz. However, evidence suggests that humpbacks can hear sounds as low as 7 Hz (Southall et al. 2007) up to 24 kHz, and possibly as high as 30 kHz (Au et al. 2006; Ketten 1997).

4.1.2 Status

Humpback whales worldwide were designated as "endangered" under the Endangered Species Conservation Act in 1970 and were listed under the Endangered Species Act (ESA) at its inception in 1973. However, NMFS recently completed a global status review of humpback whales and on September 8, 2016 (81 FR 62260) published a final rule that changed the status of humpback whales under the ESA (81 FR 62259). The decision recognizes 14 Distinct Population Segments (DPSs) and designates 4 of these as endangered and 1 as threatened under ESA, with the remaining 9 as not warranting ESA listing status. The total population of humpback whales is at least 80,000.

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade et al. (2016) concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (now recovered), with small contributions of Mexico DPS (threatened) and Western North Pacific DPS (endangered) individuals. The KDC Berth IV expansion project is located within what Wade et al. classifies as the summer feeding area of Southeast Alaska/Northern British Columbia. The total estimated abundance of humpback whales in this summer feeding area is 6,137. Based on probabilities reported in Wade et al., in the Southeast Alaska/Northern British Columbia area, Hawaii DPS individuals comprise 93.9 percent and Mexico DPS individuals comprise 6.1 percent of the humpback whales present.

The DPSs of humpback whales that were identified through the ESA listing process do not necessarily equate to the existing MMPA stocks. The stock delineations of humpback whales under the MMPA are currently under review. Until this review is complete, NMFS considers humpback whales in southeast Alaska to be part of the Central North Pacific stock, with a status of endangered under the ESA and designations of strategic and depleted under the MMPA. The

current estimate of population size for the Central North Pacific stock is 10,103 humpback whales (Muto et al. 2016).

4.1.3 Distribution

The humpback whale is distributed worldwide in all ocean basins and a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere.

The humpback whales that forage throughout British Columbia and Southeast Alaska undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer. They may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Hawaii. In the spring, the animals migrate back to Alaska where food is abundant.

Within Southeast Alaska, humpback whales are found throughout all major waterways and in a variety of habitats, including open-ocean entrances, open-strait environments, near-shore waters, area with strong tidal currents, and secluded bays and inlets. They tend to concentrate in several areas, including northern Southeast Alaska. Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (NMFS 2012).

4.1.4 Presence in Project Area

Humpback whales may be found in and around Gravina Island in the Tongass Narrows and Revillagigedo Channel at any given time. Humpback whales are most likely to occur in the action area during periods of seasonal prey aggregations which typically occur in spring and can occur in summer and fall (Freitag 2017). Herring salmon, eulachon, and euphausiids (krill) are among the species that congregate ephemerally (HDR 2003). When humpback whales come into the Narrows to feed, they often stay in the channel for a few days at a time (Freitag 2017). While many humpback whales migrate to tropical calving and breeding grounds in winter, they have been observed in Southeast Alaska in all months of the year (Straley 2017).

Given their widespread range and their opportunistic foraging strategies, humpback whales may be in the action area year-round during the proposed project activities.

4.2 MINKE WHALE

4.2.1 Hearing Ability

Minke whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 Hz to 35 kHz (NMFS 2016).

4.2.2 Status

No estimates have been made for the number of minke whales or population trends in the entire North Pacific.

4.2.3 Distribution

Northern minke whales have a widespread distribution in the Northern Hemisphere and are found throughout the northern Atlantic and Pacific Oceans. Their range extends from the ice edge in the Arctic during the summer to close to the equator during winter (NMFS 2018).

4.2.4 Presence in Project Area

Minke whales are rare in the action area, but they could be encountered during any given day of dock construction. Minke whales do come into Herring Cove in George Inlet, approximately 5 kilometers north of the action area, to feed (Freitag 2017). Minke whales are usually sighted individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals (NMFS 2018).

4.3 KILLER WHALE

4.3.1 Hearing Ability

Killer whales are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2016). The hearing of killer whales is well developed. Szymanski et al. (1999) found that they responded to tones between 1 and 120 kHz, with the most sensitive range between 18 and 42 kHz. Their greatest sensitivity is at 20 kHz, which is lower than many other odontocetes, but it matches peak spectral energy reported for killer whale echolocation clicks.

4.3.2 Status

Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the Pacific U.S. Exclusive Economic Zone, seven of which occur in Alaska. Three stocks can occur in Southeast Alaska: The Eastern North Pacific Alaska resident stock, the Eastern North Pacific northern resident stock (British Columbia), and the West Coast transient stock (Muto et al. 2016).

At present, NMFS has preliminary genetic information on killer whales in Alaska which indicated that the current stock structure needs to be reassessed (Muto et al. 2016a); however, the populations that are known to occur in Southeast Alaska are not strategic or depleted under the MMPA.

4.3.3 Distribution

Killer whales have been observed in all oceans and seas of the world, but the highest densities occur in colder and more productive waters found at high latitudes. Killer whales are found throughout the North Pacific and occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS 2016a).

The Alaska resident stock occurs from southeastern Alaska to the Aleutian Islands and Bering Sea. The Northern resident stock occurs from Washington State through part of southeastern Alaska; and the West Coast transient stock occurs from California through southeastern Alaska (Muto et al. 2016a).

4.3.4 Presence in Project Area

Killer whales can occur in the action area at any time (Freitag 2017). Transient killer whales, primarily from the West Coast transient stock, occur frequently in Southeast Alaska (Straley 2017). Transient killer whales can pass through the waters surrounding Gravina Island, in Tongass Narrows and Revillagigedo Channel, feeding on marine mammals. Because of their transient nature, it is difficult to predict when they will be present in the area. Whales from the Alaska resident stock and the Northern resident stock are thought to primarily feed on fish. Like the transient killer whales, they can pass through the waters surrounding Graving Island, in Tongass Narrows and Revillagigedo Channel, at any given time (Freitag 2017).

4.4 PACIFIC WHITE-SIDED DOLPHIN

4.4.1 Hearing Ability

Pacific white-sided dolphins are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2016).

4.4.2 Status

Pacific white-sided dolphins are not designated as “depleted” under the MMPA or listed as “threatened” or “endangered” under the ESA. The North Pacific stock of Pacific white-sided dolphins is not classified as a strategic stock. Population trends and status of this stock are currently unknown (Muto et al. 2016).

4.4.3 Distribution

Pacific white-sided dolphins are a pelagic species. They are found throughout the temperate North Pacific Ocean, north of the coasts of Japan and Baja California, Mexico. (Muto et al. 2016). They are most common between the latitudes of 38°N and 47°N (from California to Washington). The distribution and abundance of Pacific white-sided dolphins may be affected by large-scale oceanographic occurrences, such as El Niño and by underwater acoustic deterrent devices (NMFS 2018a).

4.4.4 Presence in Project Area

Pacific white-sided dolphins are rare action area, because they are pelagic and prefer more open water habitats than are found in Tongass Narrows and Revillagigedo Channel, but they could be encountered during any given day of dock construction (Freitag 2017). Pacific-white sided dolphins have been observed in Alaska waters in groups ranging from 20 to 164 animals, with the sighting of 164 animals occurring in Southeast Alaska near Dixon Entrance (Muto et al 2016a).

4.5 DALL’S PORPOISE

4.5.1 Hearing Ability

Dall’s porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 275 Hz to 160 KHz (NMFS 2016).

4.5.2 Status

At present, there is no reliable information on trends in abundance for the Alaska stock of Dall's porpoises (Muto et al. 2016a). According to the NMFS species page, Dall's porpoises are considered reasonably abundant (NMFS 2018b).

4.5.3 Distribution

Dall's porpoises are widely distributed across the entire North Pacific Ocean (Muto et al 2016a). They show some migration patterns, inshore and offshore and north and south, based on morphology and type, geography, and seasonality (NMFS 2018b).

4.5.4 Presence in Project Area

Dall's porpoises are seen infrequently in the action area, but they could be encountered during any given day of dock construction. In the Ketchikan vicinity, Dall's porpoises typically occur in groups of 10-15 animals, with an estimated maximum group size of 20 animals. Dall's porpoises have been observed passing through the action area 0-1 times a month (Freitag 2017).

4.6 HARBOR PORPOISE

4.6.1 Hearing Ability

Harbor porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 275 Hz to 160 KHz (NMFS 2016). Harbor porpoises have the highest upper-frequency limit of all odontocetes investigated. Kastelein et al. (2005) found that the range of best hearing was from 16 to 140 kHz, with a reduced sensitivity around 64 kHz. Maximum sensitivity (about 33 dB 1 μ Pa) occurred between 100 and 140 kHz. This maximum sensitivity range corresponds with the peak frequency of echolocation pulses produced by harbor porpoises (120–130 kHz).

4.6.2 Status

In Alaska, harbor porpoises are currently divided into three stocks, based primarily on geography: the Bering Sea stock, the Southeast Alaska stock, and the Gulf of Alaska stock. In areas outside of Alaska, studies have shown that stock structure is more finely scaled than is reflected in the Alaska Stock Assessment Reports; however, no data are yet available to define stock structure for harbor porpoises on a finer scale in Alaska (Muto et al. 2016a). Only the Southeast Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration.

The Southeast Alaska stock is currently estimated at 11,146 individuals (Muto et al. 2016). However, according to the most recent stock report, the 1998 survey resulting in an abundance estimate for the Gulf of Alaska harbor porpoise stock of 10,489 is probably more representative of the size of the Gulf of Alaska harbor porpoise stock (Muto et al. 2016a). No reliable information is available to determine trends in abundance.

4.6.3 Distribution

In the eastern North Pacific Ocean, harbor porpoises range from Point Barrow, along the Alaska coast, and the west coast of North America to Point Conception, California. The Southeast

Alaska stock ranges from Cape Suckling, Alaska to the northern border of British Columbia. Within the inland waters of Southeast Alaska, harbor porpoises' distribution is clustered with greatest densities observed in the Glacier Bay/Icy Strait region and near Zarembo and Wrangell Islands and the adjacent waters of Sumner Strait (Dahlheim et al. 2009).

4.6.4 Presence in Project Area

Harbor porpoises are more common in open waters on the outside of Gravina Island; however, they are known to pass through Tongass Narrows and Revillagigedo Channel year-round (Freitag 2017).

4.7 HARBOR SEAL

4.7.1 Hearing Ability

Harbor seals are classified by NMFS as phocid pinnipeds with a generalized in-water hearing range of 50 Hz to 86 kHz (NMFS 2016). Harbor seals respond to underwater sounds from approximately 1 to 180 kHz, with the functional high-frequency limit around 60 kHz and peak sensitivity at about 32 kHz. Hearing ability in the air is greatly reduced (by 25 to 30 dB); they respond to sounds from 1 to 22.5 kHz, with a peak sensitivity of 12 kHz (Kastak and Schusterman 1995).

4.7.2 Status

Harbor seals are not listed as depleted under the MMPA or as threatened or endangered under the ESA. The status of all 12 stocks of harbor seals identified in Alaska relative to their Optimum Sustainable Population size is unknown. The Clarence Strait stock of harbor seals, the stock that would be expected in the project vicinity, is not classified as strategic.

The current statewide abundance estimate for Alaskan harbor seals is 205,090 based on aerial survey data collected between 1998 and 2011. The abundance estimate for the Clarence Strait stock is 31,634, with a minimum estimate of 29,093 (Muto et al. 2016a).

The current population trend for this stock is greater than 921 seals per year, with a probability that the stock is decreasing of 0.21 (Muto et al. 2016a).

4.7.3 Distribution

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals are generally non-migratory and, with local movements associated with such factors as tide, weather, season, food availability and reproduction.

Distribution of the Clarence Strait stock ranges from the east coast of Prince of Wales Island from Cape Chacon north through Clarence Strait to Point Baker and along the east coast of Mitkof and Kupreanof Islands north to Bay Point, including Ernest Sound, Behm Canal, and

Pearse Canal (Muto et al. 2016a). In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). Only the Clarence Strait stock is considered in this application because other stocks occur outside the action area under consideration.

4.7.4 Presence in Project Area

Harbor seals are common in the inside waters of southeastern Alaska. They are residents of the action area and can occur on any given day in the action area, although they tend to be more abundant in the summer. There are no known haul outs located close to the site where pile installation and removal will occur (Freitag 2017).

4.8 STELLER SEA LION

4.8.1 Hearing Ability

Steller sea lion are classified by NMFS as otariid pinnipeds with a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2016). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein et al. 2005) and in air between 250 Hz and 30 kHz (Muslow and Reichmuth 2010).

4.8.2 Status

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345; May 7, 1997). At that time, the eastern DPS (EDPS) (which includes animals born east of Cape Suckling, Alaska, at 144°W) was listed as threatened, and the western DPS (WDPS) (which includes animals breeding west of Cape Suckling, both in Alaska and Russia) was listed as endangered. On November 4, 2013, the EDPS was removed from the endangered species list (78 FR 66140).

4.8.3 Distribution

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Loughlin et al. 1984).

Of the two Steller sea lion populations in Alaska, the EDPS includes sea lions born on rookeries from California north through Southeast Alaska and the WDPS includes those animals born on rookeries from Prince William Sound westward, with an eastern boundary set at 144°W (NMFS 2017b). Only EDPS Steller sea lions are considered in this application because the WDPS occur outside the geographic area under consideration (they are not found south of Summer Strait) (Scheurer 2017, NMFS 2013).

Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July) (Jemison et al. 2013; Allen and Angliss 2015).

4.8.4 Presence in Project Area

Steller sea lions are common in the inside waters of southeastern Alaska. They are residents of the project vicinity and are common year-round in the action area (Freitag 2017).

4.8.5 Steller Sea Lion Critical Habitat

Critical habitat has been defined in Southeast Alaska at major haulouts and major rookeries (50 CFR 226.202). The nearest rookery is Forrester Island, and the nearest major haulouts are at Timbered Island and Cape Addington (NMFS No date). All three sites are about 130 kilometers west across Klawock Island from Ketchikan. Steller sea lions are known to haul out on land, docks, buoys, and navigational markers, however, there are no established haulout sites in Tongass Narrows (HDR 2003) and other haulout sites are far beyond in-air noise disturbance threshold for hauled-out pinnipeds as described in Section 1.3 Grindall Island, 12 miles west of the northern tip of Gravina Island, is a year-round sea lion haulout but not a rookery, and appears to be the haulout area nearest the project area.

5 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only; takes by harassment, injury, and/or death) and the method of incidental taking.

The KDC requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B harassment of eight species (humpback whale, minke whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion) that may occur in the KDC Berth IV Expansion Project harassment zones during pile removal and installation.

The activities outlined in Section 1 have the potential to take marine mammals by exposure to in-water sound. Level B take of the eight-species listed above will potentially result from noise associated with vibratory pile removal and installation, impact pile installation, and socketing pile installation. Pile driving will be shut down if species enter or appear likely to enter the zones where Level A take could occur, thus preventing Level A take of marine mammals. Please see Section 11 for a description of mitigation measures including shutdown zones and procedures that will prevent Level A take of all species.

The KDC requests an IHA for incidental take of marine mammals described within this application for 1 year, beginning on October 1, 2018 (or the issuance date, whichever is later). The KDC is not requesting a Letter of Authorization (LOA) at this time because the activities described herein are expected to be completed within 1 year from the date of authorization and are not expected to rise to the level of serious injury or mortality, which would require an LOA.

6 TAKE ESTIMATES FOR MARINE MAMMAL

The number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

6.1 ESTIMATED TAKE

Incidental take is estimated for each species considering: 1) Acoustic thresholds above which NMFS believes marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; 2) the size of the action area (the area of water that will be ensonified above acoustic thresholds in a day); 3) the density or occurrence of marine mammals in the action area; and, 4) the number of days of pile driving and removal activity.

Because density data are not available for the action area, we used group sighting as an indicator of how often marine mammals may be present in the action area and typical groups size estimates as an indicator of how many animals may be present in each group.

For species that are considered common in the action area and could occur there every day (harbor seals and Steller sea lions), we based the take calculation on the typical group size multiplied by the number of days of pile driving.

For species that are not likely to occur every day (humpback whales, minke whales, killer whales, Pacific white-sided dolphins, Dall's porpoises, and harbor porpoises), we based the take calculation on the typical group size multiplied by the number of sighting that could occur each month multiplied by the four-month long construction duration.

Table 5 summarizes frequency of occurrence and defines terms such as common or rare. The estimated species occurrence in the action area and the take calculation is show in Table 6.

Estimated take=Number of animals x number of days animals are expected in action area during pile driving activity by type (Table 6).

Table 6. Estimated Species Occurrence in Action Area and Take Calculation

Species ^a	Estimated Number of Sightings per Month ¹	Estimated Typical Group Size	Estimated Max Group Size	Level B Take Calculation
Humpback Whale	0-3	1-2	4	2 animals per group x 3 sightings each month x 4 months=24
Minke Whale	0-1	1, 2-3	400	3 animals per group x 1 sighting in 4 months=3
Killer Whale	1	1-2, 7-10	10	10 animals per group x 1 sighting each month x 4 months=40
Pacific White-Sided Dolphin	0-1	20-150	1,000	92 animals per group x 1 sighting in 4 months=92
Dall's Porpoise	0-1	10-15	20	15 animals per group x 1 sighting each month x 4 months=60
Harbor Porpoise	0-1	1-5	8	5 animals per group x 1 sighting each month x 4 months=20
Harbor Seal	Daily	1, 2-3	3	3 animals per group x 2 groups per day x 20 days=120
Steller Sea Lion	Daily	1, 2-3, 10	80	10 animals per group x 20 days=200

¹ Estimated number of sightings per month and group size based on NMFS Stock Assessment Reports, NMFS Species Pages, and personal communications with Gary Freitag.

6.1.1 Humpback Whale

Humpback whales frequent the action area and could be encountered during any given day of dock construction. In the project vicinity, humpback whales typically occur in groups of 1-2 animals, with an estimated maximum group size of 4 animals. Humpback whales can pass through the action area 0-3 times a month (Freitag 2017). We conservatively estimate that a group of 2 humpback whales may occur within the Level B harassment zone three times each month over the four-month construction window during active pile driving (2 animals in a group x 3 groups each month x 4 months = 24 animals). Therefore, the KDC requests authorization for 24 Level B takes of humpback whales.

6.1.2 Minke Whales

Minke whales are rare in the action area, but they could be encountered during any given day of dock construction. These whales are usually sighted individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals (NMFS 2018). Based on local sighting information (Freitag 2017), we conservatively estimate that a group of 3 whales may occur within the Level B harassment zone once over the four-month construction window during active pile driving (3 animals in a group x 1 group in 4 months = 3 animals). Therefore, the KDC requests authorization for 3 Level B takes of minke whale.

6.1.3 Killer Whales

Killer whales pass through the action area and could be encountered during any given day of dock construction. In the project vicinity, typical killer whale pod size varies from between 1-2 and 7-10 individuals, with an estimated maximum group size of 10 animals. Killer whales are estimated to pass through the action area one time a month (Freitag 2017). We conservatively estimate that a group of 10 killer whales may occur within the Level B harassment zone one time each month over the four-month construction window during active pile driving (10 animals in a group \times 1 group each month \times 4 months = 40 animals). Therefore, the KDC requests authorization for 40 Level B takes of killer whales. (To clarify, this request is for 40 takes from all stocks combined, not 40 takes from each stock)

6.1.4 Pacific White-Sided Dolphin

Pacific white-sided dolphins are rare in the action area, but they could be encountered during any given day of dock construction (Freitag 2017). Pacific-white sided dolphins have been observed in Alaska waters in groups ranging from 20 to 164 animals (Muto et al 2016a). We conservatively estimate that a group of 92 (median between 20 and 164) Pacific-white sided dolphins may occur within the Level B harassment zone once over the four-month construction window during active pile driving (92 animals in a group \times 1 group in 4 months = 92 animals). Therefore, the KDC requests authorization for 92 Level B takes of Pacific white-sided dolphins.

6.1.5 Dall's Porpoise

Dall's porpoises are seen infrequently in the action area (Freitag 2017), but they could be encountered during any given day of dock construction. In the project vicinity, Dall's porpoises typically occur in groups of 10-15 animals, with an estimated maximum group size of 20 animals. Dall's porpoises have been observed passing through the action area 0-1 times a month (Freitag 2017). We conservatively estimate that a group of 15 Dall's porpoises may occur within the Level B harassment zone once time each month over the four-month construction window during active pile driving (15 animals in a group \times 1 group each month \times 4 months = 60 animals). Therefore, the KDC requests authorization for 60 Level B takes of Dall's porpoise.

6.1.6 Harbor Porpoise

Harbor porpoises are seen infrequently in the action area, but they could be encountered during any given day of dock construction. In the project vicinity, harbor porpoises typically occur in groups of 1-5 animals, with an estimated maximum group size of 8 animals. Harbor porpoises have been observed passing through the action area 0-1 times a month (Freitag 2017). We conservatively estimate that a group of 5 harbor porpoise may occur within the Level B harassment zone once time each month over the four-month construction window during active pile driving (5 animals in a group \times 1 group each month \times 4 months = 20 animals). Therefore, the KDC requests authorization for 20 Level B takes of harbor porpoises.

6.1.7 Harbor Seals

Harbor seals are common in the action area and are expected to be encountered in low numbers during dock construction. In the action area harbor seals typically occur in groups of

1-3 animals, with an estimated maximum group size of 3 animals. Harbor seals can occur every day of the month in the project area (Freitag 2017). We conservatively estimate that 2 groups of 3 harbor seals may occur within the Level B harassment zone every day that pile driving may occur, and pile driving is estimated to occur on 20 days during the 4-month long construction duration (3 animals in a group x 2 groups per day x 20 days = 120 animals). Therefore, the KDC requests authorization for 120 Level B takes of harbor seals.

6.1.8 Steller Sea Lions

Steller sea lions are common in the action area and are expected to be encountered in low numbers during dock construction. In the project vicinity Steller sea lions typically occur in groups of 1-10 animals (Freitag 2017), with an estimated maximum group size of 80 animals (HDR 2003). Steller sea lions can occur every day of the month in the project area (Freitag 2017). We conservatively estimate that a group of 10 Steller sea lions may occur within the Level B harassment zone every day that pile driving may occur, and pile driving is estimated to occur on 20 days during the 4-month long construction duration (10 animals in a group x 20 days = 200 animals). Therefore, the KDC requests authorization for 200 Level B takes of Steller sea lions.

6.2 All Marine Mammal Takes Requested

This analysis for the KDC Berth IV expansion project predicts 24 potential takes of humpback whales, 3 potential takes of minke whales, 40 potential takes of killer whales, 92 potential takes of Pacific white-sided dolphins, 60 potential takes of Dall's porpoises, 20 potential takes of harbor porpoises, 120 potential takes of harbor seals, and 200 potential takes of Steller sea lions classified as Level B harassment under the MMPA (Figure 6).

Table 7. Take Requests for Marine Mammals and Percent of Stock

Species	Stock (NEST) ^a	Level A	Level B	Percent of Stock
Humpback Whale	Hawaii DPS (11,398) ^b	0	23 ^c	0.20
	Mexico DPS (3,264) ^b		1	0.03
Minke Whale	N/A	0	3	N/A
Killer Whale	Alaska Resident (2,347)	0	40	1.70
	Northern Resident (261)			15.33
	West Coast Transient (243)			16.46 ^d
Pacific White-Sided Dolphin	North Pacific (26,880)	0	92	0.34
Dall's Porpoise	Alaska (83,400)	0	60	0.07
Harbor Porpoise	Southeast Alaska (11,146) ^c	0	20	0.18
Harbor Seal	Clarence Strait (31,634)	0	120	0.37
Steller Sea Lion	Eastern U.S (49,497)	0	200	0.40

^a Stock estimate from Muto, M. M. et al. 2016. Appendix 2. Stock Summary Table (last revised 12.30.16). NOAA-TM-AFSC-355 Muto, M. M., et al. http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_sars_appendix_2.pdf unless otherwise noted.

^b Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, we have divided them here to account for DPSs listed under the ESA. . Based on calculations in Wade et al. 2016, 93.9% of the humpback whales in Southeast Alaska are expected to be from the Hawaii DPS and 6.1% are expected to be from the Mexico DPS.

^c Stock estimate from Muto, M. M et al. 2016a. NOAA Technical Memorandum NMFS-AFSC-355 Alaska Marine Mammal Stock Assessments, 2016: http://www.nmfs.noaa.gov/pr/sars/pdf/ak_2016_final_sars_june.pdf.

^d These percentages assume all 40 takes come from each individual stock, thus the percentage should be inflated if multiple stocks are actually impacted.

7 ANTICIPATED IMPACT OF THE ACTIVITY

The anticipated impact of the activity to the species or stock of marine mammal.

KDC is requesting authorization for Level B take of marine mammals as listed in Table 6 which shows take requests in relation to the overall stock size of each species. Incidental takes of Steller sea lions and harbor seals will likely be multiple takes of individuals, rather than single takes of unique individuals. The stock take calculations in Table 6 and 7 assume takes of individual animals, instead of repeated takes of a smaller number of individuals; therefore, the stock take percentage calculations are conservative.

Level A take will be prevented by shutdowns as described in Section 11 and is not requested.

Incidental Level B take is expected to result primarily in short-term changes in behavior, such as avoidance of the project area, changes in swimming speed or direction, and changes in foraging behavior. Level B exposure could occur on 20 days when pile driving and removal occurs. Because of the limited time that marine mammals could be exposed to Level B harassment, Berth IV expansion would be unlikely to have any impact on stock recruitment or survival, and therefore, would have a negligible impact on the stocks of these species.

8 ANTICIPATED IMPACTS ON SUBSISTENCE USES

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years. Since surveys of harbor seal and sea lion subsistence harvest in Alaska began in 1992, there have been declines in the number of households hunting and harvesting seals in Southeast Alaska while the number of household hunting and harvesting sea lions has remained relatively constant at low levels (Wolf et al. 2013). Subsistence harvest data for the Clarence Strait stock indicates an average annual harvest in the years 2004-2008 of 164 harbor seals and an average annual harvest in the years 2011-2012 of 40 harbor seals (summarized in Muto, M. M et al. 2016a from Wolf et al. 2013). In 2012, the community of Ketchikan had an estimated subsistence take of 22 harbor seals and 0 Steller sea lion (Wolf et al. 2013).

In January 2018, we attempted to contact the Alaska Harbor Seal Commission, the Alaska Sea Otter and Steller Sea Lion Commission, and the Ketchikan Indian Community (KIC, federal-recognized Tribe) to discuss this project. The Alaska Harbor Seal Commission is currently not operational. Comments were not received from Lianna Jack, the executive director for the Alaska Sea Otter and Steller Sea Lion Commission. Tony Gallegos, the cultural and natural resources director for the Ketchikan Indian Community was available for comment and wrote:

“Thank you for contacting Ketchikan Indian Community to gather information regarding tribal concerns regarding berth 4 expansion impacts on marine mammal harvesting. As we discussed over the phone although my department does deal with natural resource and cultural issues for KIC, I cannot speak on behalf of the tribe. However, in my best professional judgement there would be no significant impacts on marine mammal harvest opportunities during the construction or operation phase of the project described, which will take place in perhaps the most headily commercial and industrial area of the Tongass Narrows. I will bring this up during the Feb 26th OWL Committee and get back to you if there are further questions or concerns.”

As of March 28, 2018, there have been no further comments on this project.

The proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that are commonly used for subsistence purposes or to impact subsistence harvest of marine mammals in the region because:

- no Level A take is requested or authorized;
- construction activities are localized and temporary in the previously developed Berth IV dock site;
- mitigation measures will be implement to minimize disturbance of marine mammals in the action area; and,
- the project will not result in significant changes to availability of subsistence resources.

9 ANTICIPATED IMPACTS ON HABITAT

The anticipated impact of the activity upon the habitat of the marine mammal populations and the likelihood of restoration of the affected habitat.

9.1 Impacts to Physical Habitat

9.1.1 Project Footprint

Although the expansion of Berth IV's facilities would have some permanent removal of habitat available to marine mammals, the area lost would be very small and the quality of the habitat lost would be low. Most of the project footprint would be within previously disturbed with the existing Berth IV structures and within an active marine commercial and industrial area.

9.1.2 Turbidity/Sedimentation

During the estimated 36 hours of pile driving, a temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are removed and placed. As described in Section 1, lower intertidal and shallow subtidal areas are characterized by sandy or mixed gravel, sand, and shell with varying amounts of silt (HDR 2003). These sediments will be disturbed during pile driving; however, suspension will be brief and very localized and is unlikely to measurably affect marine mammals or their prey in the area.

9.2 Effects of Project Activities on Marine Mammal Habitat

9.2.1 Animal Avoidance or Abandonment

All of these species discussed in this application could experience a temporary loss of suitable habitat, depending on the degree that they use the area, within the action area if elevated noise levels associated with in-water construction result in their displacement from the area. However, displacement of species by noise is expected to be temporary and will not result in long-term effects to the local populations.

9.3 Effects of Project Activities on Marine Mammal Prey Habitat

The action area supports marine habitat for prey species including:

- Large populations of anadromous fish including Pacific salmon (five species), cutthroat and steelhead trout, and Dolly Varden (ADFG 2017);
- other species of marine fish such as halibut, lingcod, Pacific cod, greenling, herring, eulachon, and rockfish (ADFG 2017, NMFS 2012); and,
- euphausiids (krill) (NMFS 2012).

Many anadromous streams flow into Tongass Narrows including Ketchikan Creek, Hoadley Creek, Carlann Creek, Lewis Creek, Airport Creek, Government Creek, and Gravina Creek; however, there are no anadromous fish streams at the project site (ADFG 2017).

Essential Fish Habitat (EFH) exists within Tongass Narrows for all five species of Pacific salmon (NOAA 2017).

Because piles would be placed in a previously disturbed industrial area, the project is not likely to adversely affect prey habitat including EFH.

Fish populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. High underwater sound pressure levels have been documented to alter behavior, cause hearing loss, and injure or kill individual fish by causing serious internal injury (Hastings and Popper 2005).

In general, impacts to marine mammal prey species are expected to be minor and temporary. The area impacted by the project is very small compared to the available habitat around Ketchikan. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During pile driving it is expected that fish and marine mammals would temporarily move to nearby locations and return to the area following cessation of in-water construction activities. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial.

10 ANTICIPATED EFFECTS OF HABITAT IMPACTS ON MARINE MAMMALS

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The proposed project will occur primarily within the previously disturbed footprint of an active marine commercial and industrial area and would not result in a significant area of permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project will be temporary, short duration in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts, and other construction activity is expected to be short-term and minimal.

10.1 Loss of Marine Mammal Habitat Due to Noise

One potential impact on marine mammals associated with the project could be a temporary loss of habitat because of elevated noise levels. Displacement of marine mammals by noise would not be permanent and would not have long-term effects. The proposed project is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or their populations, because pile driving and other noise sources will be temporary and intermittent.

10.2 Loss of Marine Mammal Habitat Due to Turbidity

Another potential impact on marine mammals associated with the project could be temporary sediment suspension and increased turbidity associated with pile driving and removal in Tongass Narrows. The temporary and localized turbidity associated with the expansion project is unlikely to measurably affect marine mammals or their prey in the area.

10.3 Disturbance or Loss of Prey Species

As stated in Section 9, fish populations in the project area that serve as marine mammal prey could be affected by noise from in-water pile-driving. It is expected that most fish will be able to move away from the proposed activity to avoid harm and will still be available to marine mammals as a food source. The quantity, quality, and availability of adequate food resources are therefore not likely to be reduced (due to the small area affected, mobility of fish, anticipated recolonization, and the temporary nature of the project).

These temporary impacts on habitat were discussed in more detail in Section 9.

11 MITIGATION MEASURES

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, their habitat, and their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Mitigation measures and construction techniques will be employed to minimize effects to marine mammal species and habitat. These measures are described below and presented in detail in the KDC Berth IV Expansion Project Marine Mammal Monitoring and Mitigation Plan (Appendix B).

11.1 Mitigation Measures Designed to Reduce Project Impacts

The project uses the most compact design possible, while meeting the demands of the vessels that would use the facility.

- The project uses a design that does not require dredging, blasting, or fill.
- The project uses a design that incorporates the smallest-diameter piles practicable while still minimizing the overall number of piles.
- Noise associated with in-water pile driving would be localized and short-term. In-water pile driving would occur over a 20-day period (not necessarily consecutive days). During that time, vibratory driving would occur for approximately 32 hours, impact pile driving would occur for approximately 1.5 hours, and socketing would occur for approximately 3 hours. A maximum of 2 hours of vibratory pile driving, 15 minutes of impact pile driving, and 3 hours of socketing would occur each day.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented.
- Spill response equipment will be kept on-site during construction and operation.
- Floats or barges will not be grounded at any tidal stage.

11.2 Mitigation Measures Designed to Reduce Impacts to Marine Mammals

- Protected Species Observers (PSOs) will be present in the action area during all vibratory pile removal and vibratory, impact, and socketing installation.
- To ensure that the action area has been surveyed for marine mammal presence, pile driving/removal would not begin until a PSO has given a notice to proceed.
- To minimize construction noise levels the contractor would first attempt to direct pull existing piles; if those efforts prove to be ineffective, they would proceed with a vibratory hammer.
- To reduce noise production, the vibratory hammer will be operated at a reduced energy setting (30 to 50 percent of its rated energy) as much as practicable.
- Piles will be driven with a vibratory hammer to the maximum extent possible (i.e. until the desired depth is achieved or to refusal) prior to using an impact hammer.
- To reduce noise production, the impact hammer will be operated the minimum energy needed to safely install the piles.

- To minimize noise during vibratory and impact pile driving, pile caps (pile softening material) will be used. Much of the noise generated during pile installation comes from contact between the pile being driven and the steel template used to hold the pile in place. The contractor will use high-density polyethylene (HDPE) or ultra-high-molecular-weight polyethylene (UHMW) softening material on all templates to eliminate steel on steel noise generation.
- To minimize impact to marine mammals, a “soft start” technique would be used when impact pile driving with an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent 3-strike sets.
- The soft-start would be applied prior to the beginning of pile driving/removal activities each day or when pile driving/removal hammers have been idle for more than 30 minutes.
- Prior to pile driving, the action area would be surveyed for marine mammal presence for 30 minutes. If any marine mammal is sighted within a shutdown zone during this 30-minute survey period prior to pile driving, or during the soft-start, KDC would delay pile driving/removal until the animal(s) is confirmed to have moved outside of and on a path away from the area or if 15 minutes (for pinnipeds or small cetaceans) or 30 minutes (for large cetaceans) have elapsed since the last sighting of the marine mammal within the shutdown zone.
- Shutdowns would be implemented if an animal appears likely to enter a shutdown zone (Section 11.3)
- The NOAA Species Mapper lists sea otters, managed by the United States Fish and Wildlife Service (USFWS), as a species that can occur in the action area (NOAA 2017). Sea otters are not known to occur near Ketchikan and are not expected to occur in the action area during pile driving/removal (Freitag 2017). If a sea otter were to occur in the action area during pile driving/removal, the USFWS’s recommended draft protocols for avoiding harm to sea otters from noise during pile driving would be implemented (USFWS 2012).

11.3 Shutdown and Monitoring Zones

The KDC is requesting Level B take for humpback whale, minke whale, killer whale, Pacific white-sided dolphin, Dall’s porpoise, harbor porpoise, harbor seal, and Steller sea lion incidental to constructing the Berth IV Expansion. The KDC is not requesting take for any other marine mammal.

Shutdown and monitoring zones are described in the following sub-sections.

11.3.1 Level A Shutdown Zones

There will be a nominal 10 m shutdown zone for construction-related activity where acoustic injury is not an issue. This type of work could include (but is not limited to) the following activities:

- Movement of the barge to the pile location;

- positioning of the pile on the substrate via a crane (i.e., stabbing the pile);
- removal of the pile from the water column/substrate via a crane (i.e., deadpull); or
- the placement of sound attenuation devices around the piles.

For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.

The KDC will implement additional shutdowns to protect marine mammals from Level A harassment and prevent auditory injury to all hearing groups during vibratory pile driving and to all groups during impact pile driving as shown in Table 8 and Figure 6. These shutdowns would.

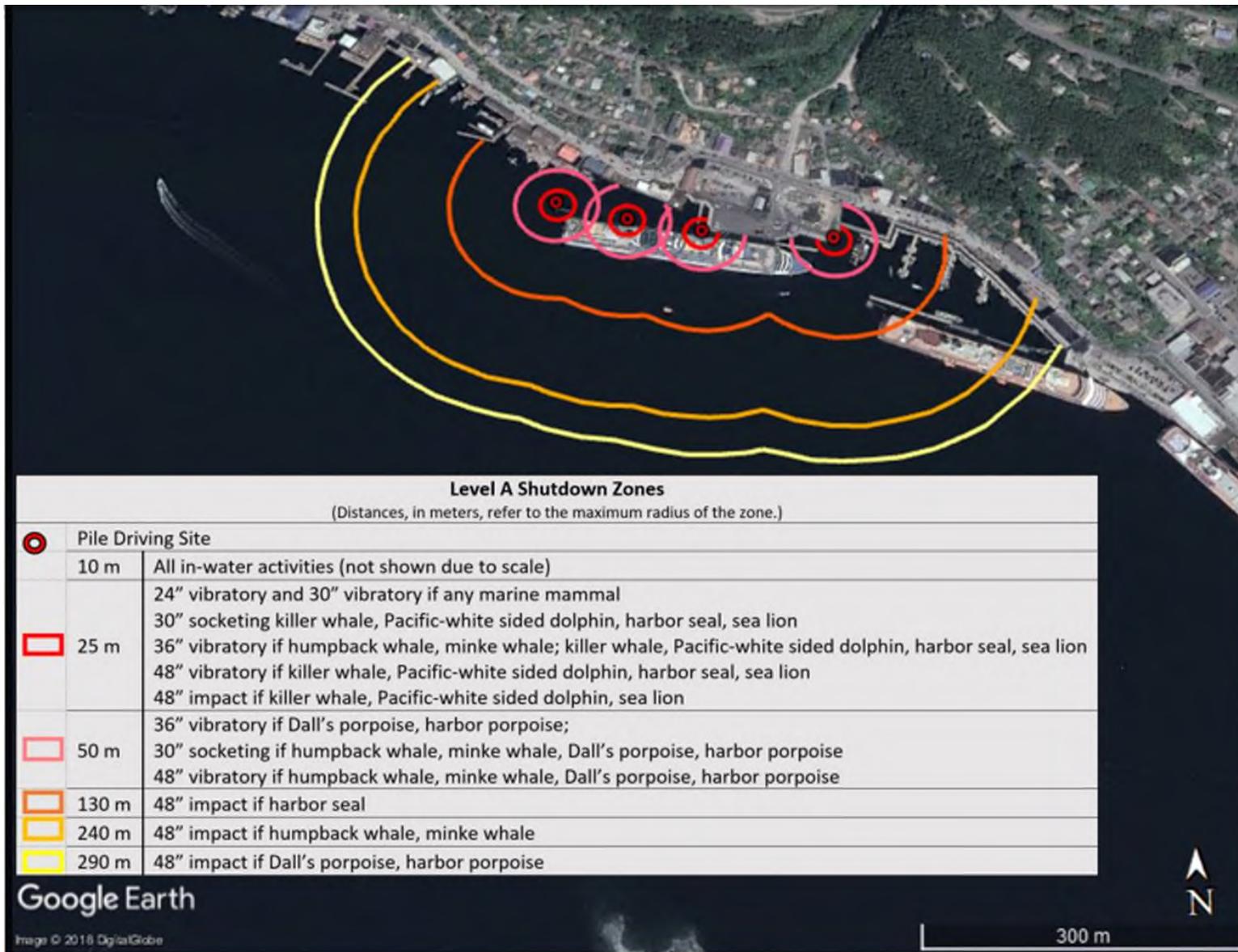
Table 8. Pile Driving Shutdown Zones Designed to Avoid Level A Take

Source	Shutdown Zones in meters				
	Low-Frequency Cetaceans (humpback whale, minke whale)	Mid-Frequency Cetaceans (killer whale, Pacific-white sided dolphin)	High-Frequency Cetaceans (Dall's porpoise, harbor porpoise)	Phocid (harbor seal)	Otariid (sea lion)
In-Water Construction Activities*					
Barge movements, pile positioning, deadpulling, sound attenuation placement	10	10	10	10	10
Vibratory Pile Driving/Removal					
24-inch steel removal (2 piles) (~1 hour on 1 day)	25	25	25	25	25
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	25	25	25	25	25
36-inch steel removal (4 piles) (~1 hour on 1 day)	25	25	50	25	25
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	25	25	25	25	25
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	25	25	25	25	25
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	50	25	50	25	25
Impact Pile Driving					
48-inch steel permanent installation (17 piles) (~15 minutes per day on 6 days)	240	25	290	130	25
Socketing Pile Installation					
30-inch steel permanent installation (1 pile) (3 hours per day on 1 day)	50	25	50	25	25

Shutdown zone distances refer to the maximum radius of the zone and are rounded (see Table 4 for calculated distances).

*Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species

Figure 6. Level A Shutdown Zones



11.3.2 Level B Shutdown and Monitoring Zones

The KDC is requesting Level B take of humpback whale, minke whale, killer whale, Pacific white-sided dolphin, harbor porpoise, harbor seal, and Steller sea lion incidental to constructing the Berth IV expansion and shutdowns associated with Level B harassment of these species are not proposed. The monitoring zones associated with Level B disturbance are outlined in Table 9 and Figure 7.

No other Level B take is authorized, and pile driving would be shut down as summarized in Table 9 and Figure 7 to avoid Level B take in the unlikely event that another marine mammal species, other than those listed to occur and discussed in this document, were to enter the action area.

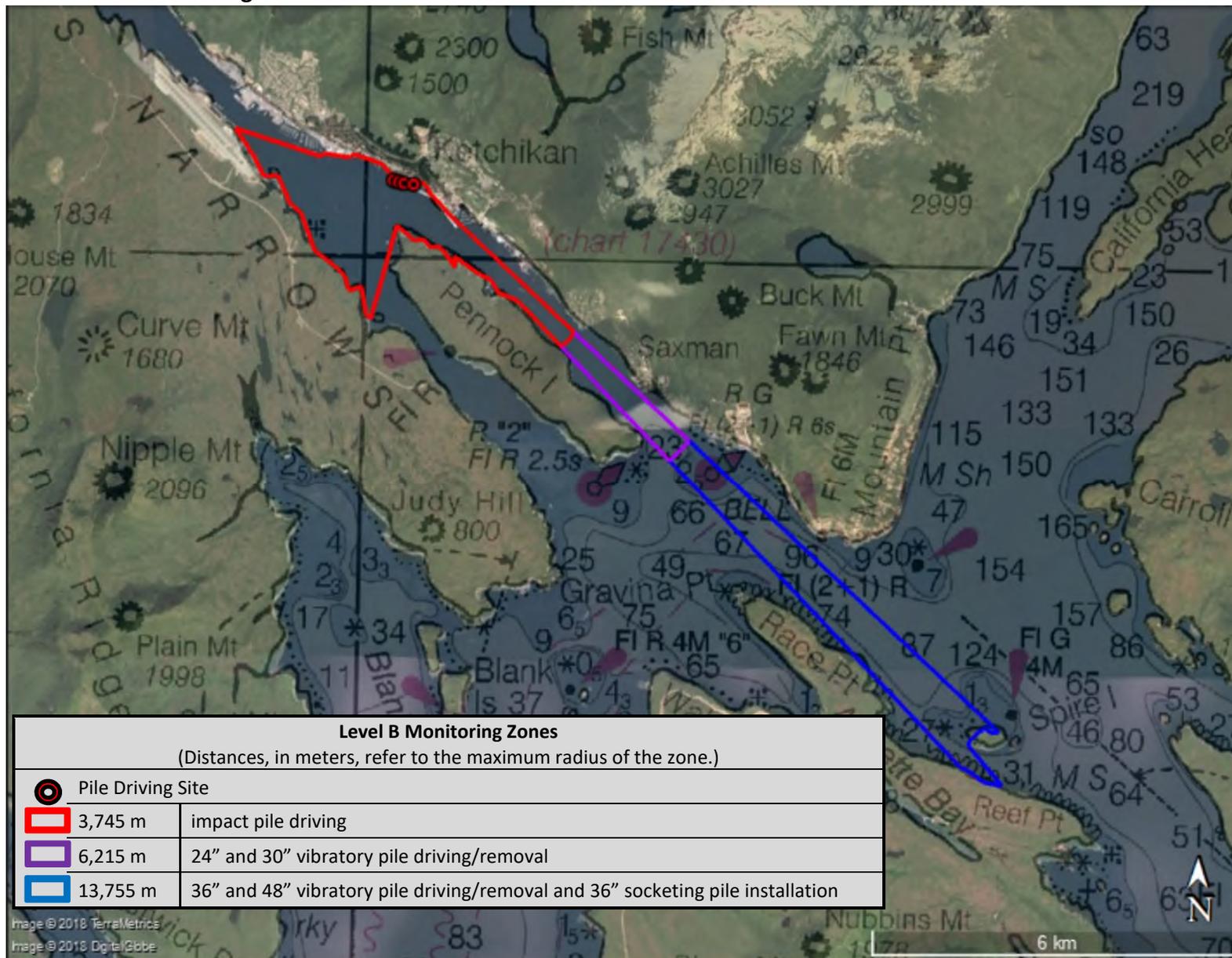
Table 9. Level B Monitoring Zones

Source	Monitoring Zones (meters)
Vibratory Driving/Removal	
24-inch steel removal (2 piles) (~1 hour on 1 day ³)	6,215
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	6,215
36-inch steel removal (4 piles) (~1 hour on 1 day)	13,755*
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	6,215
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	6,215
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	13,755*
Impact Driving	
48-inch steel (17 piles) (~15 minutes per day on 6 days)	3,745
Socketing	
30-inch steel (1 pile) (~3 hours per day on 1 day)	13,755*

Numbers rounded up to nearest 5 meters; see Table 4 for calculated distances.

* The farthest distance that sound will transmit from the source is 13,755 m before transmission is stopped by Annette Island.

Figure 7. Level B Monitoring Zones



12 ARCTIC PLAN OF COORDINATION

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. (This requirement is applicable only for activities that occur in Alaskan waters north of 60° North latitude.)

Although the action area is located south of 60° North, the latitude NMFS regulations consider Arctic waters, and no activities will take place in or near traditional Arctic subsistence hunting areas, there are subsistence uses of marine mammals in Southeast Alaska and in the community of Ketchikan. Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years.

Section 8 details subsistence information and consultations with subsistence users in the project vicinity.

13 MONITORING AND REPORTING

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

To minimize impacts of project activities on marine mammals, PSOs will be present in the action area during all vibratory pile removal and vibratory, impact, and socketing pile installation. PSOs will search for, monitor, document, and track marine mammals within the Level A and B harassment zones (Figures 6 and 7), and, shut downs will be implemented if a marine mammal is likely to enter a specified shutdown zone (Section 11.3).

If the number species exposed to Level B harassment approaches the number of takes allowed by the IHA, the KDC will notify NMFS and seek further consultation.

13.1 Monitoring Protocols

The following marine mammal monitoring protocols will be implemented during pile driving and removal activities to help prevent and document acoustic effects on MMPA-listed marine mammals.

Monitoring will be conducted before, during, and after pile driving and removal activities by PSOs. Monitoring will initiate 30 minutes prior to pile driving/removal through 30 minutes post-completion of pile activities. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is not more than one hour.

The number of PSOs will vary from 2 to 4, depending on the type of pile driving and size of pile, which determines the size of the harassment zones. Two land-based PSOs will monitor during all impact pile driving activity, three land-based PSOs will monitor during vibratory pile driving of 36-inch and 48-inch diameter piles, and four land-based PSOs will monitor during vibratory pile driving of 36-inch and 48-inch diameter piles.

One PSO will be stationed at Berth IV and will be able to view across Tongass Narrows south and west to Gravina Island. The second and third PSOs will be located in increments along the road systems at locations that provide the best vantage points for viewing Tongass Narrows west and east of Berth IV. These locations will vary depending on type of pile driving. The fourth PSO will be located on the road system near Mountain Point and will be able to view Tongass Narrows to the northwest and Revillagigedo Channel to the southeast.

PSOs will be responsible for monitoring the zones shown in Figures 6 and 7:

- The PSOs will have no other primary duties than watching for and reporting on events related to marine mammals.
- The PSOs will scan the monitoring zone for the presence of listed species for 30 minutes before any pile driving or removal activities take place.
- Each day prior to commencing in-water work, the PSOs will conduct a radio check with the construction foreman or superintendent. The PSOs will brief the foreman or supervisor as to the shutdown procedures if any of the listed species are observed likely to enter or within a shutdown zone, and will have the foreman brief the crew, requesting that the crew notify the PSO when a listed species is spotted.
- To reduce fatigue, the PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts and will not perform duties as a PSO for more than 12 hours in a 24-hour period.
- The PSOs will continue monitoring each day for 15 minutes after all in-water pile driving/removal is completed.
- No less than 30 minutes prior to any pile driving or removal, PSOs will begin monitoring the Level A and B harassment zones.
- If any marine mammals are present within a shutdown zone, pile driving and removal activities will not begin until the animal(s) has left the shutdown zone or no marine mammals have been observed in the shutdown zone for 15 minutes (for pinnipeds) or 30 minutes (for cetaceans).

The following measures also apply to visual monitoring:

- a) Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface with ability to estimate target size and distance; use of binoculars or spotting scope may be necessary to correctly identify the target;
- b) Advanced education in biological science or related field (undergraduate degree or higher required);
- c) Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- d) Experience or training in the field identification of marine mammals, including the identification of behaviors;
- e) Sufficient training, orientation or experience with vessel operation and pile driving operations to provide for personal safety during observations;
- f) Writing skills sufficient to prepare a report of observations including but not limited to the number, type, and location of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental harassment of marine mammals observed within a defined shutdown zone; and marine mammal behavior;
- g) 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; and
- h) At least one PSO must have prior experience working as an observer.

- i) When Using a team of three or more PSO, one PSO will be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer.

In addition, KDC must submit curriculum vitae of all PSOs to NMFS prior to monitoring.

13.2 Monitoring Report

KDC will submit a draft report to NMFS within ninety calendar days of the completion of marine mammal monitoring. A final report will be prepared and submitted within thirty days following resolution of any comments on the draft report from NMFS. The report will contain, information on monitoring results, mitigation measure implementation, and number of animals, by species, taken. The KDC will also immediately report injured or dead marine mammals to NMFS, and, if the specified activity clearly causes the take of marine mammals in a manner prohibited by the IHA (e.g. serious injury or mortality), KDC will immediately cease pile activities and report the incident to NMFS.

14 SUGGESTED MEANS OF COORDINATION

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

In-water and in-air noise generated by vibratory and impact pile driving at the KDC's Berth IV is the primary issue of concern to local marine mammals during this project. Potential impacts on marine mammals have been studied, with the results used to establish the noise criteria for evaluating take.

The data recorded during marine mammal monitoring for the proposed project will be provided to NMFS in the monitoring report (Section 13.2). The report will provide information on marine mammals use of Tongass Narrows and Revillagigedo Channel, including numbers before, during, and after pile driving activities. The monitoring data may also inform NMFS and future permit applicants generally about the behavior of marine mammals during pile installation and removal for future projects of a similar nature.

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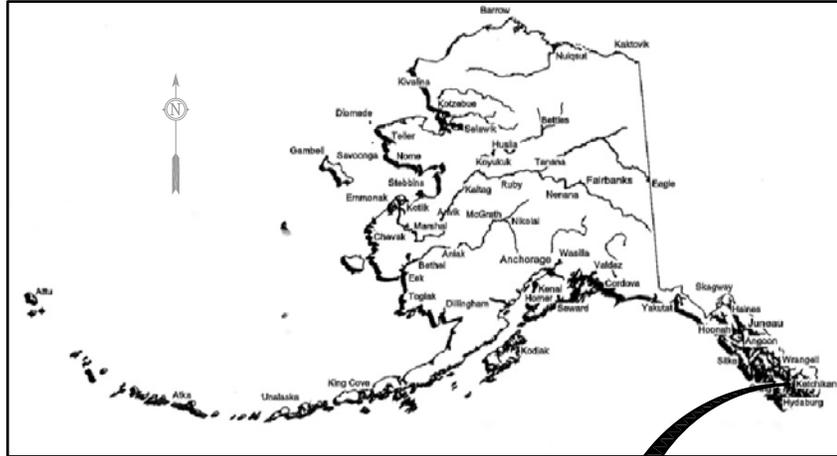
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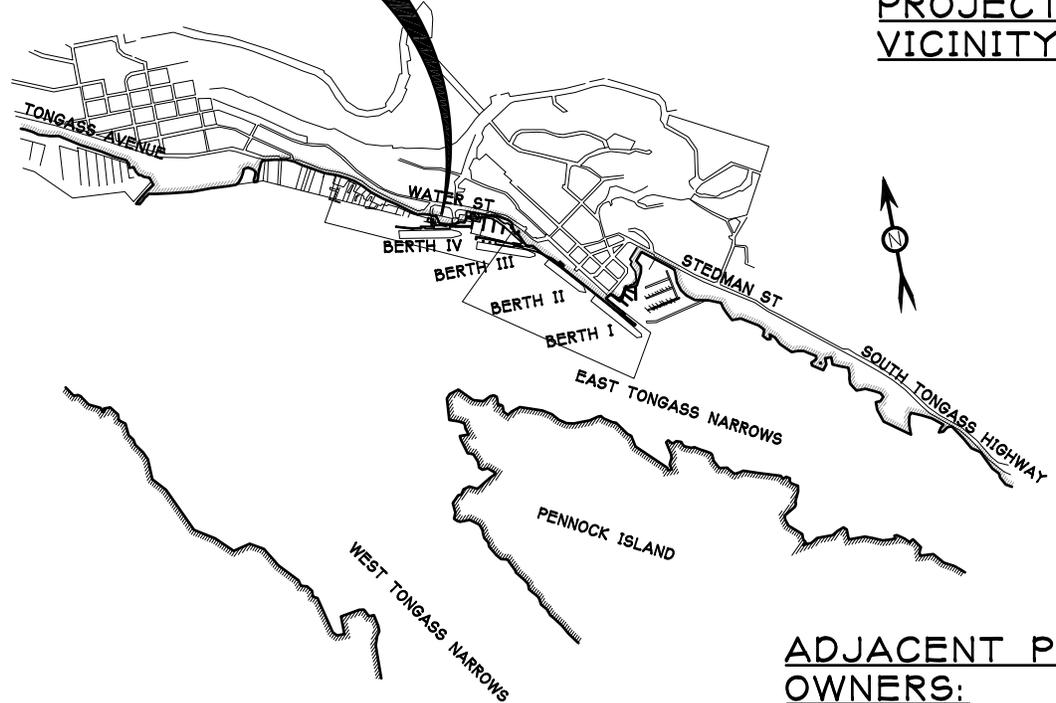
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Appendix A. Project Permit Drawings



PROJECT LOCATION

PROJECT VICINITY



ADJACENT PROPERTY OWNERS:

CITY OF KETCHIKAN
 1000 WATER STREET
 KETCHIKAN, AK

TALBOTS INC
 1101 TONGASS
 KETCHIKAN, AK

PURPOSE: INCREASE CAPACITY
 OF EXISTING BERTH IV

DATUM: 0.0' HTL = 19.7'
 MHW = 15.45'
 MLLW = 0.0'

VICINITY MAP
 & LOCATION MAP

JOB NO. 17_124_A

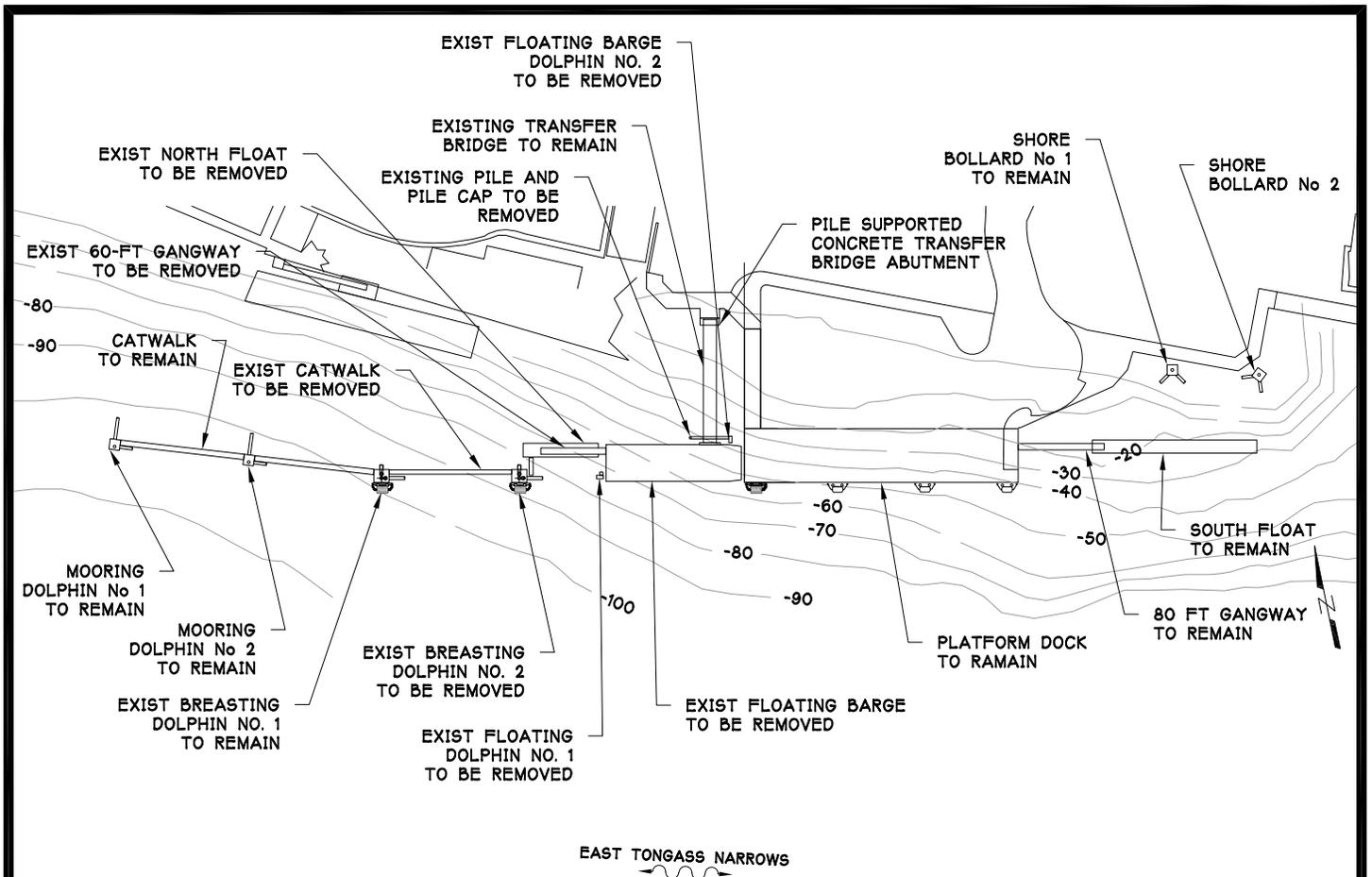
PROPOSED: KETCHIKAN BERTH IV

IN: TONGASS NARROWS

AT: KETCHIKAN, AK

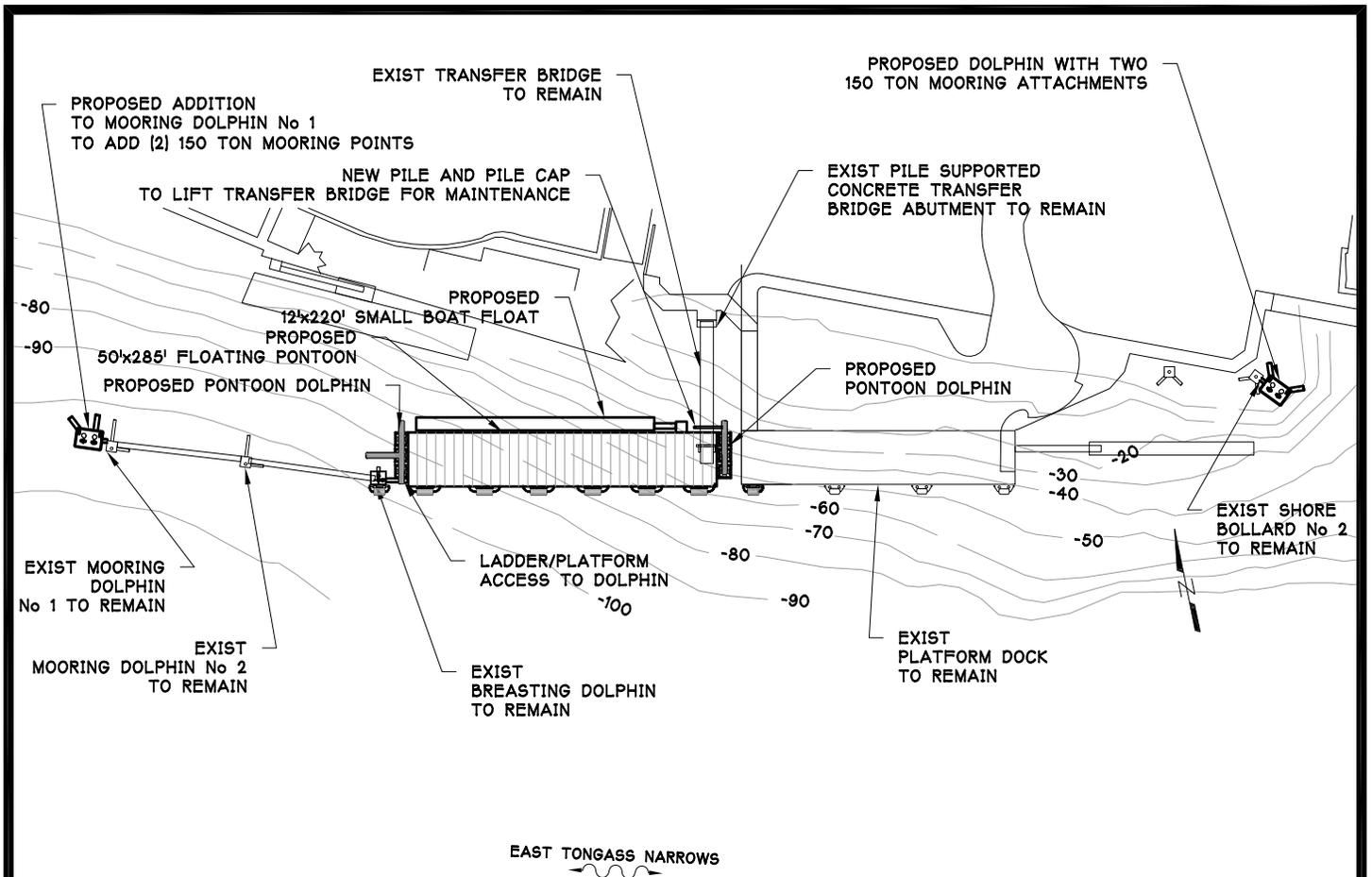
APPLICATION BY: KETCHIKAN DOCK COMPANY LLC

DATE: 30 OCT '17 SHEET: 1 OF 7



EXISTING SITE PLAN

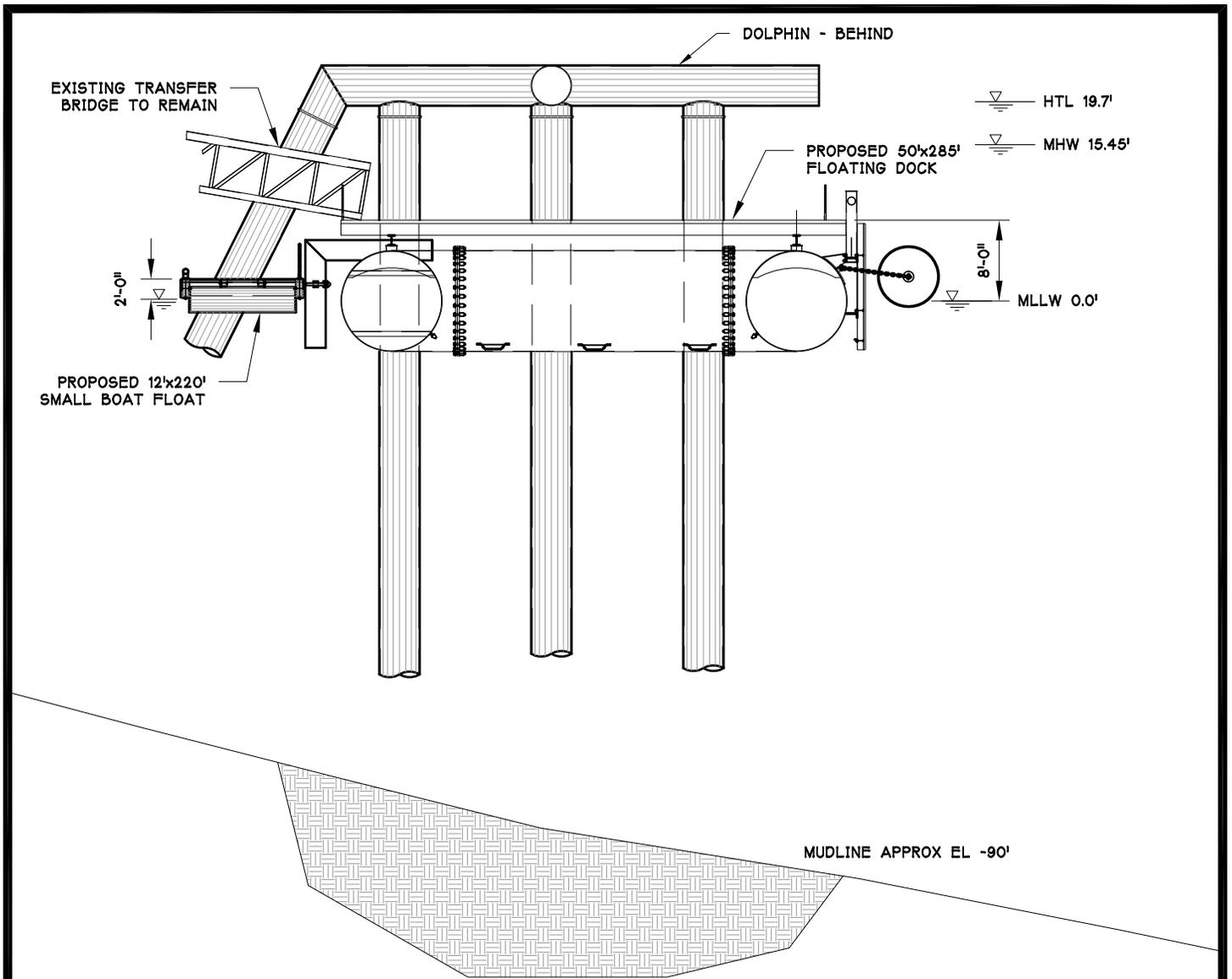
<p>PURPOSE: INCREASE CAPACITY OF EXISTING BERTH IV</p> <p>DATUM: 0.0' HTL = 19.7' MHW = 15.45' MLLW = 0.0'</p>	<p>EXISTING CONDITION SITE PLAN</p> <p>JOB NO. 17_124_A</p>	<p>PROPOSED: KETCHIKAN BERTH IV</p> <p>IN: TONGASS NARROWS</p> <p>AT: KETCHIKAN, AK</p> <p>APPLICATION BY: KETCHIKAN DOCK COMPANY LLC</p> <p>DATE: 30 OCT '17 SHEET: 2 OF 7</p>
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EAST TONGASS NARROWS

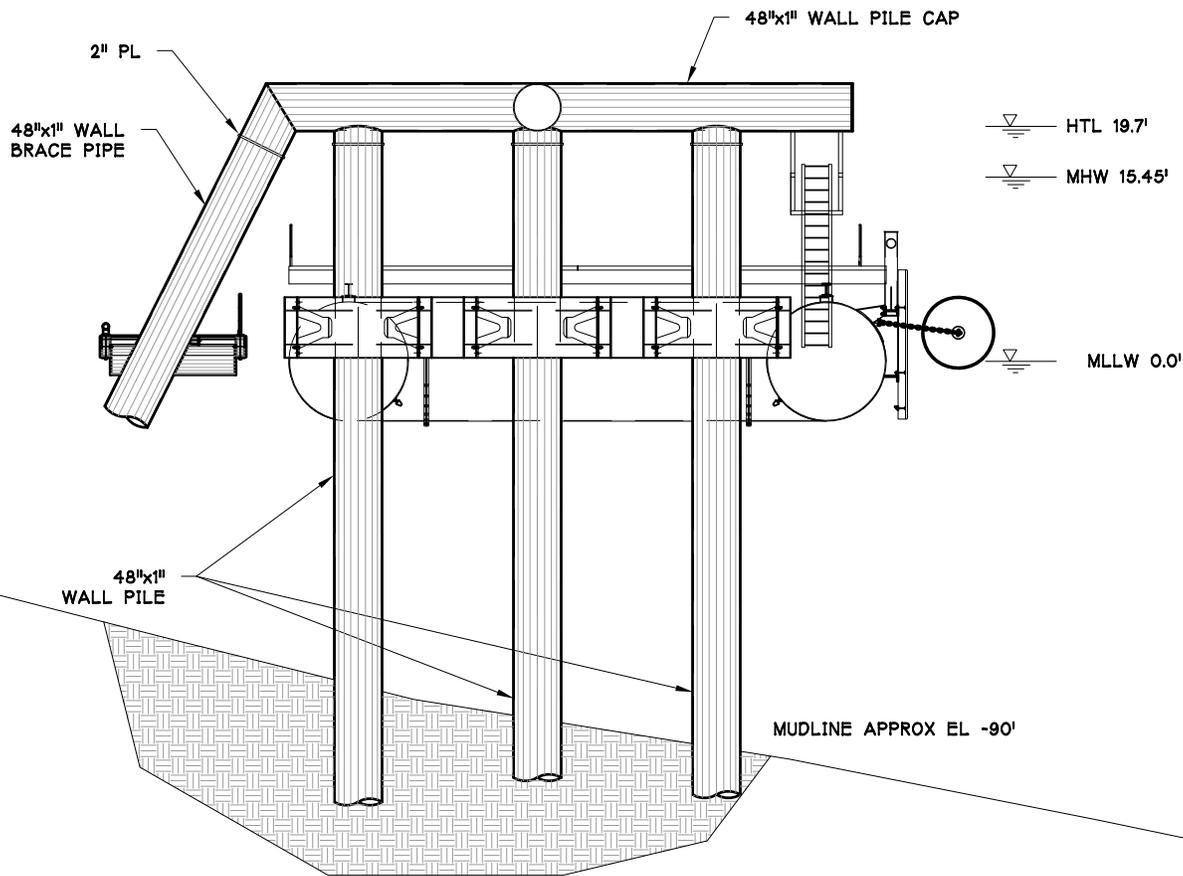
PROPOSED SITE PLAN

<p>PURPOSE: INCREASE CAPACITY OF EXISTING BERTH IV</p> <p>DATUM: 0.0' HTL = 19.7' MHW = 15.45' MLLW = 0.0'</p>	<p>PROPOSED SITE PLAN</p> <p>JOB NO. 17_124_A</p>	<p>PROPOSED: KETCHIKAN BERTH IV IN: TONGASS NARROWS AT: KETCHIKAN, AK APPLICATION BY: KETCHIKAN DOCK COMPANY LLC</p> <p>DATE: 30 OCT '17 SHEET: 3 OF 7</p>
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TYPICAL SECTION

<p>PURPOSE: INCREASE CAPACITY OF EXISTING BERTH IV</p> <p>DATUM: 0.0'</p> <p>HTL = 19.7' MHW = 15.45' MLLW = 0.0'</p>	<p>PROPOSED TYPICAL SECTION</p> <p>JOB NO. 17_124_A</p>	<p>PROPOSED: KETCHIKAN BERTH IV</p> <p>IN: TONGASS NARROWS</p> <p>AT: KETCHIKAN, AK</p> <p>APPLICATION BY: KETCHIKAN DOCK COMPANY LLC</p> <p>DATE: 30 OCT '17</p> <p>SHEET: 4 OF 7</p>
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TYPICAL ELEVATION AT PONTOON DOLPHIN

PURPOSE: INCREASE CAPACITY
OF EXISTING BERTH IV

PROPOSED TYPICAL SECTION

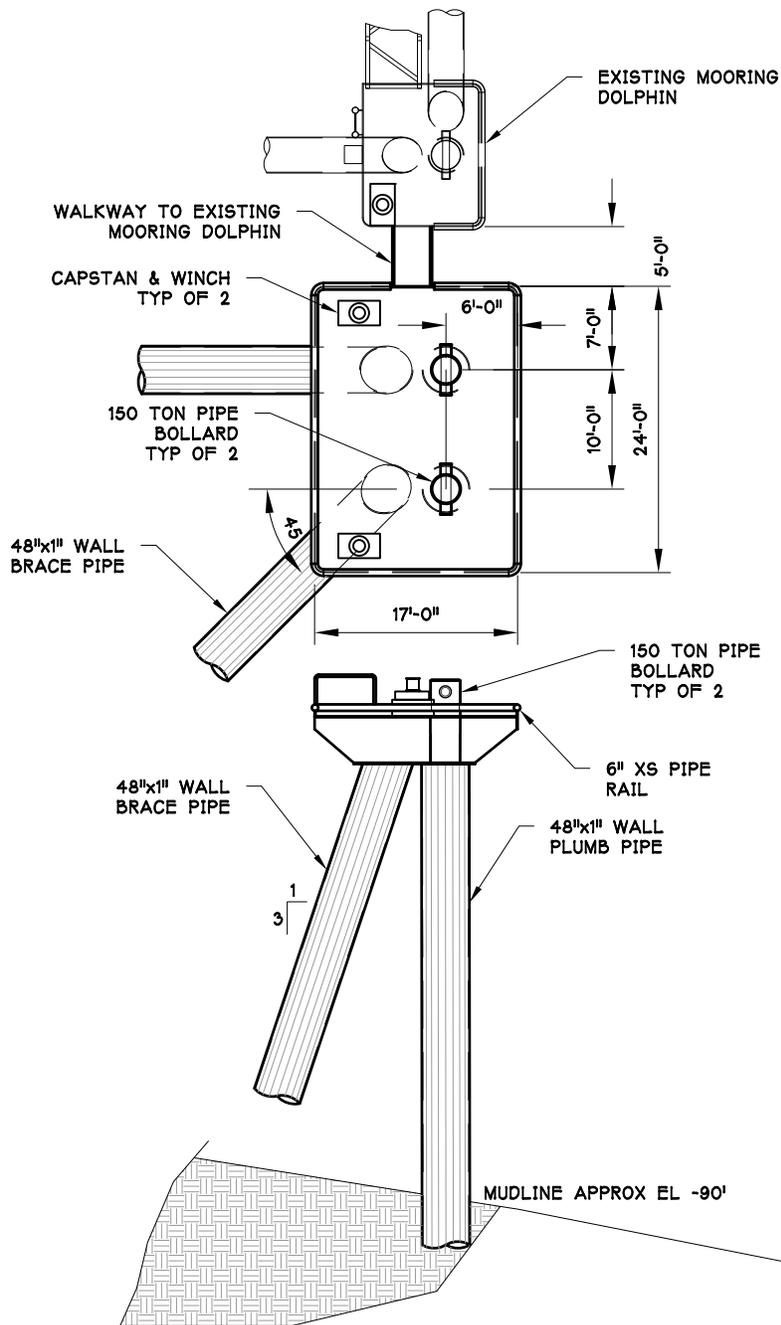
PROPOSED: KETCHIKAN BERTH IV
IN: TONGASS NARROWS
AT: KETCHIKAN, AK
APPLICATION BY: KETCHIKAN DOCK COMPANY LLC

DATUM: 0.0' HTL = 19.7'
 MHW = 15.45'
 MLLW = 0.0'

JOB NO. 17_124_A

DATE: 30 OCT '17

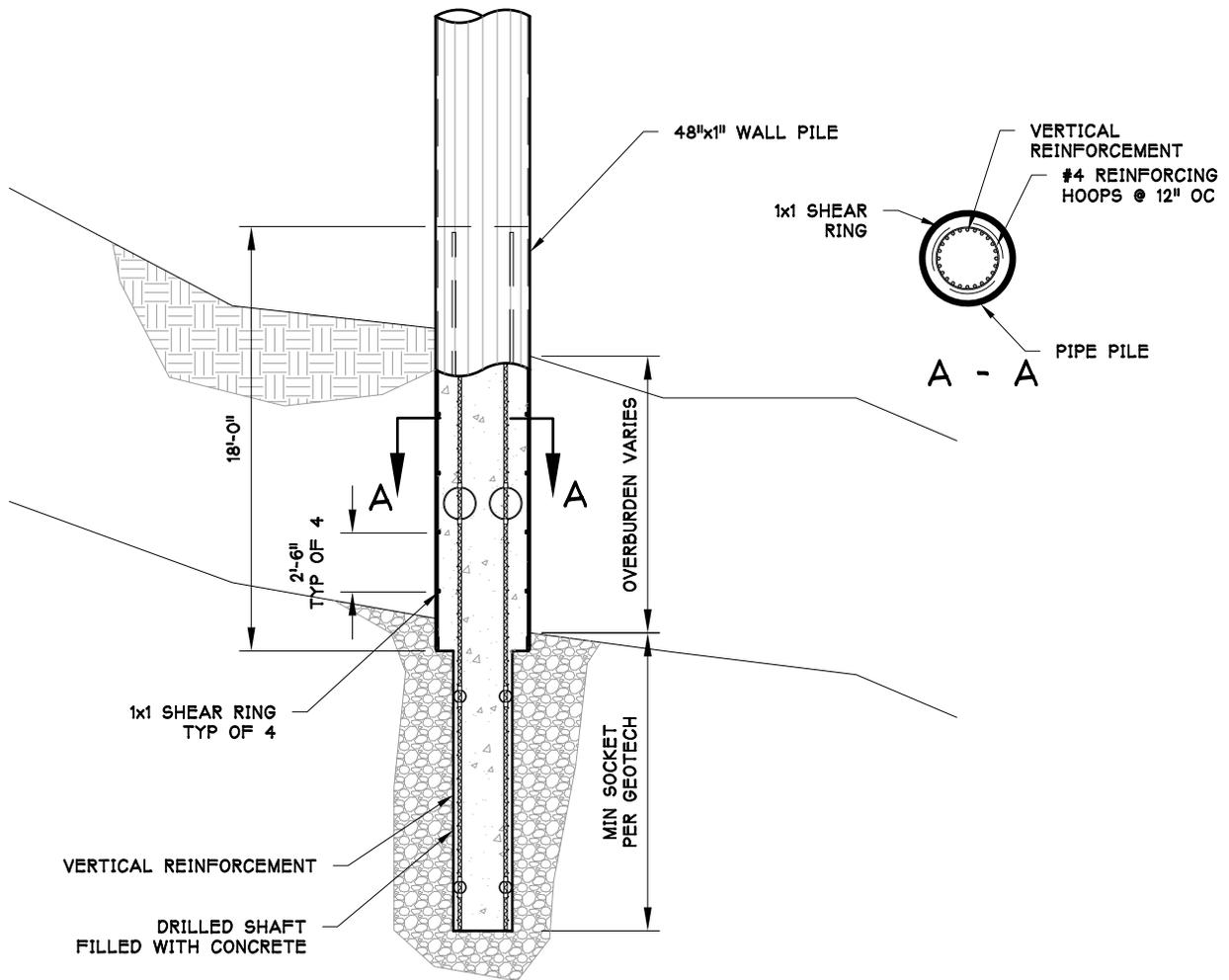
SHEET: 5 OF 7



DETAIL AT MOORING DOLPHIN No 1

SHORE BOLLARD DETAILS ARE SIMILAR

PURPOSE: INCREASE CAPACITY OF EXISTING BERTH IV DATUM: 0.0' HTL = 19.7' MHW = 15.45' MLLW = 0.0'	PROPOSED DOLPHIN PILE DETAILS JOB NO. 17_124_A	PROPOSED: KETCHIKAN BERTH IV IN: TONGASS NARROWS AT: KETCHIKAN, AK APPLICATION BY: KETCHIKAN DOCK COMPANY LLC DATE: 30 OCT '17 SHEET: 6 OF 7
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TYPICAL ELEVATION AT ROCK ANCHOR

PURPOSE: INCREASE CAPACITY
OF EXISTING BERTH IV

PROPOSED
PILE DETAILS

PROPOSED: KETCHIKAN BERTH IV
IN: TONGASS NARROWS
AT: KETCHIKAN, AK
APPLICATION BY: KETCHIKAN DOCK COMPANY LLC

DATUM: 0.0' HTL = 19.7'
MHW = 15.45'
MLLW = 0.0'

JOB NO. 17_124_A

DATE: 30 OCT '17

SHEET: 7 OF 7

Appendix B. Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

Ketchikan Dock Company, LLC

Ketchikan Berth IV Expansion Project

Tongass Narrows, Ketchikan, Alaska

March 2018

Prepared for:
Ketchikan Dock Company, LLC
55 Schoenbar Court
Ketchikan, Alaska 99901

Prepared by:
Solstice Alaska Consulting, Inc.
2607 Fairbanks Street Suite B
Anchorage, Alaska 99503

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APPENDICES

- Appendix A. USFWS Observer Protocols
- Appendix B. Marine Mammal Sighting Forms

ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
BO	Biological Opinion
DA	Department of the Army
ESA	Endangered Species Act
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
KDC	Ketchikan Dock Company LLC
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NMFS AKR	National Marine Fisheries Service Alaska Region
OPR	National Marine Fisheries Service Office of Protected Resources
PSO	Protected Species Observer
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

The Ketchikan Dock Company, LLC (KDC) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile removal and installation to expand Berth IV in Tongass adjacent to downtown Ketchikan, Alaska. The project is in Waters of the U.S, within the range of Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) listed marine mammals and has the potential to generate noise that could exceed Level A and B harassment thresholds established by the National Marine Fisheries Service (NMFS).

Monitoring and shutdown zones will be implemented to avoid Level A and reduce Level B impacts to marine mammals.

The overall goal of this 4MP is to ensure compliance with the ESA and the MMPA when the 4MP is implemented by the Protected Species Observers (PSO) at the project site. The project shall comply with the terms and conditions outlined in the following requested permits and authorizations:

- U.S Army of Engineers (USACE) Permit (DA Permit) POA-2016-576, Sawmill Cove for activities in Waters of the U.S. (requested);
- NMFS Office of Protected Resources (OPR) Incidental Harassment Authorization (IHA) (requested);
- NMFS Alaska Region Protect Resources Division (NMFS AKR) Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion (BO) and Incidental Take Statement (ITS) (requested); and
- U.S. Fish and Wildlife Service (USFWS) Observer Protocols dated August 7, 2012 (Appendix A).

The species that are most common in the project area; as well as species for which take is authorized, and the number and type of authorized take are shown in Table 1.

Table 1. Species Most Likely to Occur in Project Area and Requested Take Numbers, by Species and Manner of Take.

Species Most Likely to Occur	Level A Take	Level B Take
Humpback Whale (<i>Megaptera novaeangliae</i>)	0	24
Minke Whale (<i>Balaenoptera acutorostrata</i>)	0	3
Killer Whale (<i>Orcinus orca</i>)	0	40
Pacific White-Sided Dolphin (<i>Lagenorhynchus obliquidens</i>)	0	92
Dall's Porpoise (<i>Phocoenoides dalli</i>)	0	60
Harbor Porpoise (<i>Phocoena phocoena</i>)	0	20
Harbor Seal (<i>Phoca vitulina</i>)	0	120
Steller Sea Lion (<i>Eumatopia jubatus</i>)	0	200
Northern Sea Otter (<i>Enhydra lutris</i>)	0	0

2 MONITORING AND SHUTDOWN ZONES

Because species are impacted by noise in different ways, species-specific monitoring and shutdown zone have been calculated for this project. These monitoring and shutdown zones are shown in Figures 1, 2, and 3 and are summarized in Tables 2, 3, and 4. The zones shown in Figures 1 and 2 apply to all species other than sea otters. The zones shown in Figure 3 apply to sea otters.

Further, there will be a nominal 10-meter shutdown zone for construction-related activity where acoustic injury is not the primary concern. This type of work could include (but is not limited to) the following activities: (1) vibratory pile driving; (2) movement of the barge to the pile location; (3) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (4) removal of the pile from the water column/substrate via a crane (i.e., deadpull); or (5) the placement of sound attenuation devices around the piles. For these activities, monitoring would take place from 15 minutes prior to initiation until the action is complete.

Table 2. Level B Monitoring Zones

Source	Monitoring Zones (meters)
Vibratory Pile Driving	
24-inch steel removal (2 piles) (~1 hour on 1 day ³)	6,215
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	6,215
36-inch steel removal (4 piles) (~1 hour on 1 day)	13,755*
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	6,215
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	6,215
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	13,755*
Impact Pile Driving	
48-inch steel (17 piles) (~15 minutes per day on 6 days)	3,745
Socketing Pile Installation	
30-inch steel (1 pile) (~3 hours on 1 day)	13,755*

These monitoring zones apply to all species other than northern sea otters (see Table 4 and Figure 3 for sea otter shutdown zones).

Numbers are rounded up to nearest 5 meters; see Table 4 for calculated distances.

* The farthest distance that sound will transmit from the source is 13,755 m before transmission is stopped by Annette Island.

Figure 1. Level B Monitoring Zones

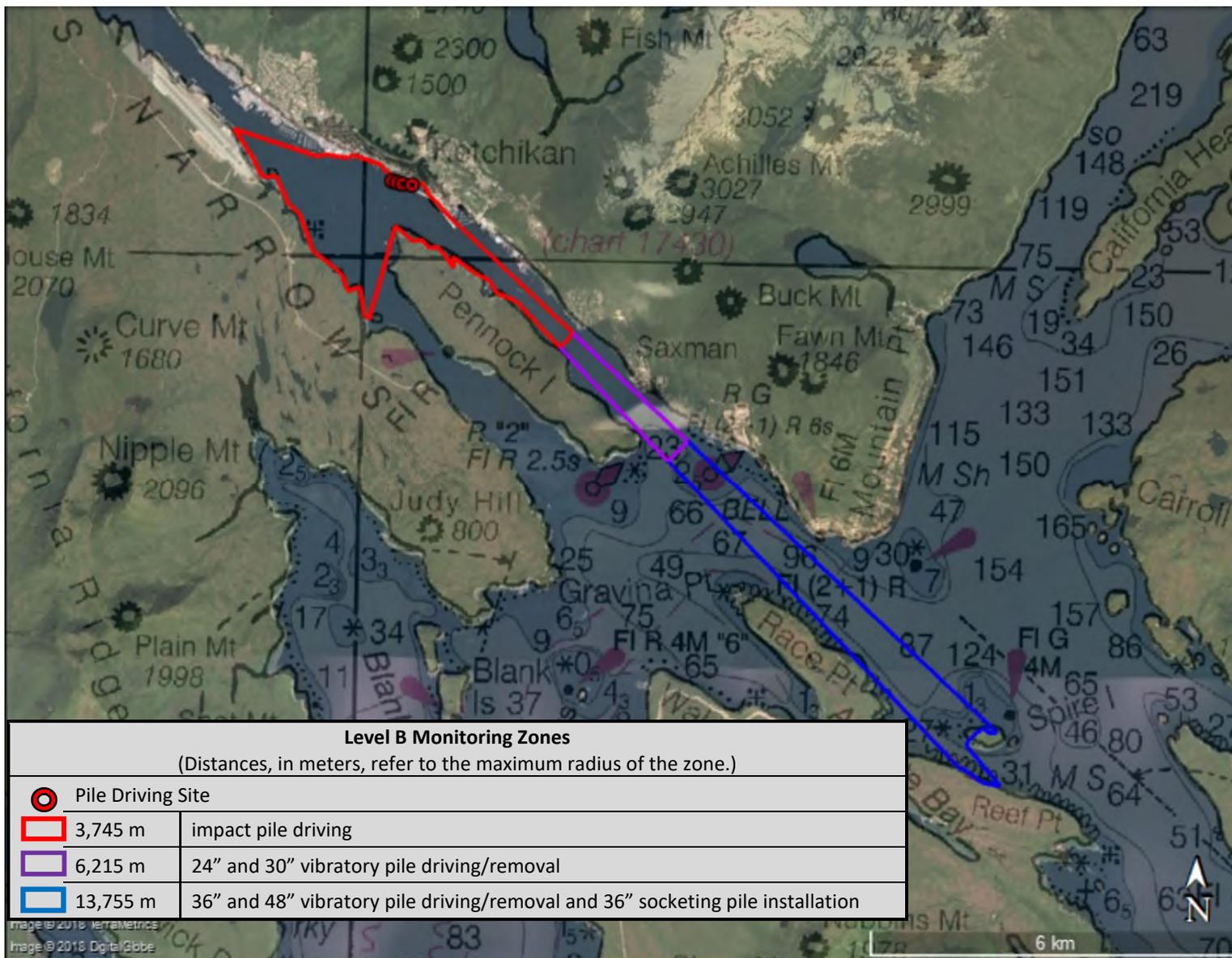


Table 3. Pile Driving Shutdown Zones Designed to Avoid Level A Take

Source	Shutdown Zones (meters)				
	Low-Frequency Cetaceans (humpback whale, minke whale)	Mid-Frequency Cetaceans (killer whale, Pacific-white sided dolphin)	High-Frequency Cetaceans (Dall's porpoise, harbor porpoise)	Phocid (harbor seal)	Otariid (sea lion)
In-Water Construction Activities*					
Barge movements, pile positioning, deadpulling, sound attenuation	10	10	10	10	10
Vibratory Pile Driving					
24-inch steel removal (2 piles) (~1 hour on 1 day)	25	25	25	25	25
30-inch steel removal (6 piles) (~1 hour per day on 2 days)	25	25	25	25	25
36-inch steel removal (4 piles) (~1 hour on 1 day)	25	25	50	25	25
30-inch steel temporary installation (16 piles) (~2 hours per day on 4 days)	25	25	25	25	25
30-inch steel permanent installation (1 pile) (~2 hours on 1 day)	25	25	25	25	25
48-inch steel permanent installation (17 piles) (~2 hours per day on 9 days)	50	25	50	25	25
Impact Pile Driving					
48-inch steel permanent installation (17 piles) (~15 minutes per day on 6 days)	240	25	290	130	25
Socketing Pile Installation					
30-inch steel permanent installation (1 pile) (3 hours per day on 1 day)	50	25	50	25	25

Shutdown zone distances rounded, in meters, refer to the maximum radius of the zone.

*Although acoustic injury is not the primary concern from these activities, shutdowns will be implemented to avoid impacts to species.

Figure 2. Level A Shutdown Zones

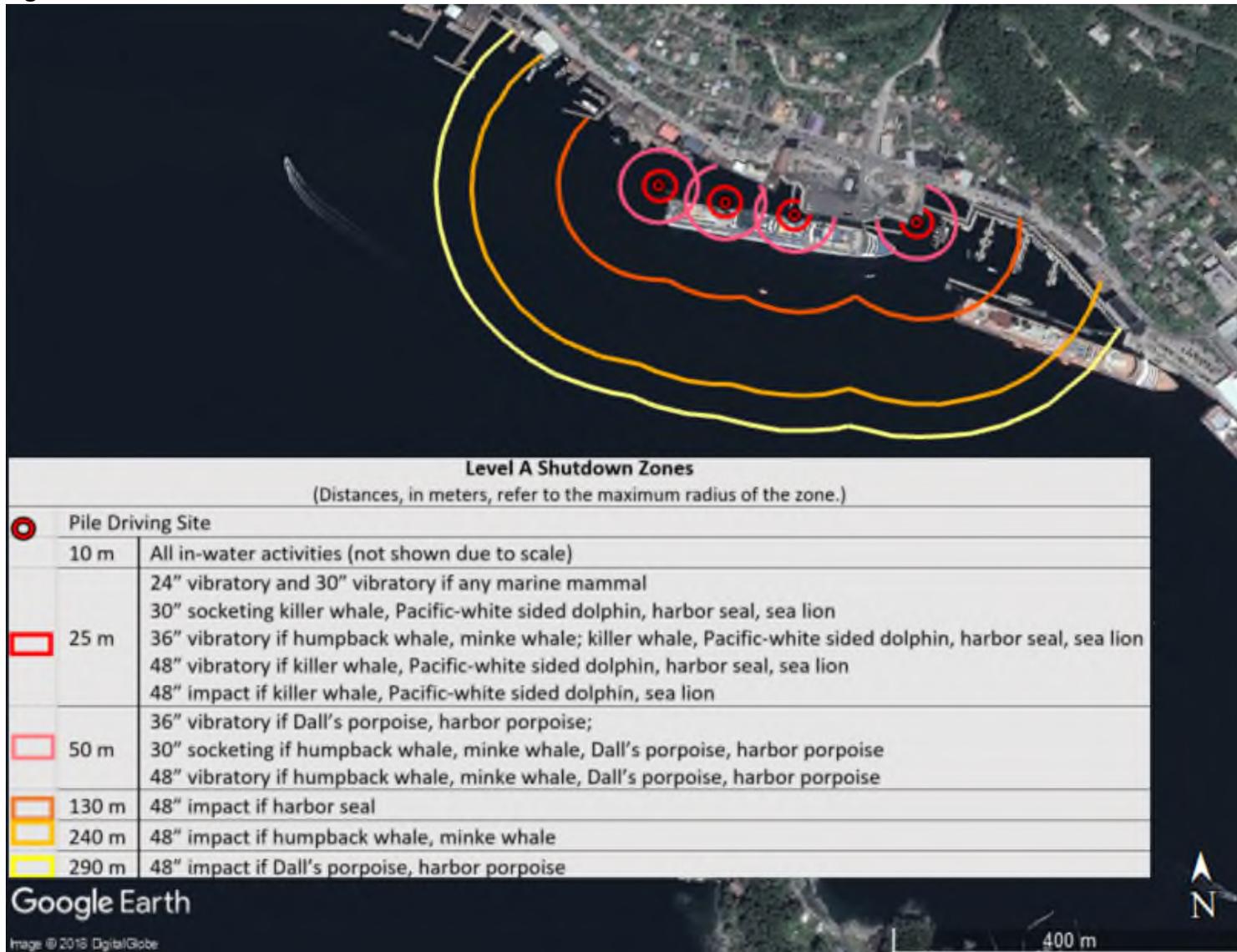
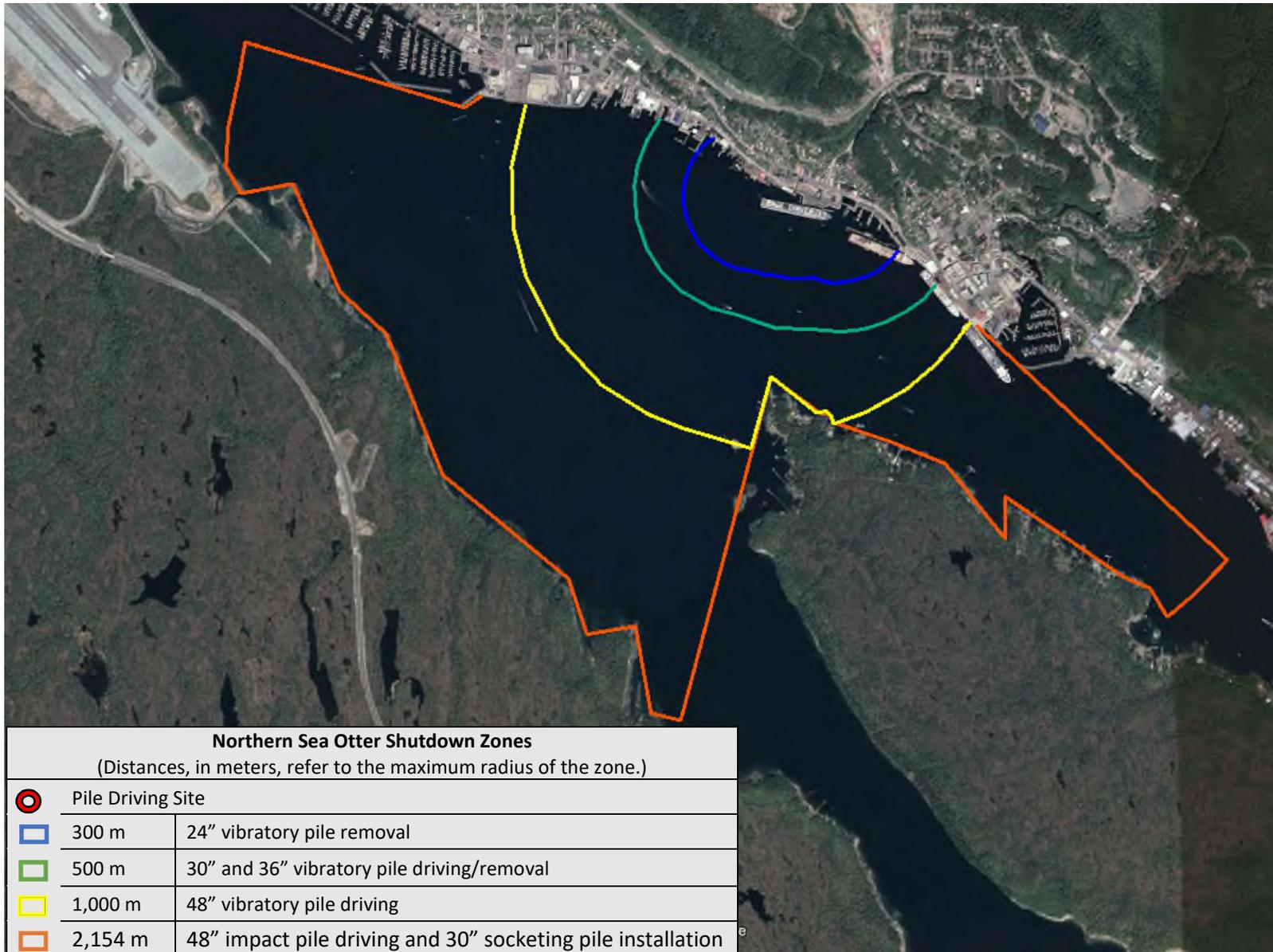


Table 4. Northern Sea Otters Shutdown Zones

Source	Shutdown Zones (meters)
Vibratory Pile Driving	
24-inch steel removal	300
30-inch steel removal and installation	500
36-inch steel removal	500
48-inch steel installation	1,000
Impact Pile Driving	
48-inch steel installation	2,154
Socketing Pile Installation	
30-inch steel installation	2,154

Table based on USFWS 2012 and Klein 2017

Figure 3. Northern Sea Otter Shutdown Zones



3 COMPLIANCE OVERVIEW

- An IHA has been requested. A copy of the issued IHA must be in the possession of the KDC, its designees, and work crew personnel operating under its authority.
- A copy of the USACE permit shall remain on site at all times during construction.
- Construction mitigation measures including attempting to direct pull existing piles, operating the vibratory hammer at reduced energy settings, driving all piles with a vibratory hammer to the maximum extent possible prior to using an impact hammer, operating the impact hammer at reduced energy settings, operating a down hole drill, and using soft-starts and pile caps for pile driving should be applied to this project.
- The KDC must monitor for the presence and behavior of marine mammals prior to, during, and after all pile driving and removal.
- Two to four land-based PSO are required during pile driving and removal, determined pile size and hammer type.
- At least one observer must have prior experience working as an observer.
- When using a team of three or more observers, one observer will be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer. PSOs are expected to monitor the entire project area (Figure 1), monitor the species-specific monitoring and shutdown zones (Table 2, 3, and 4), implement shutdowns when necessary, and record observations.
- The KDC is required to conduct briefings between construction supervisors and crews, marine mammal monitoring team, and KDC staff prior to the start of all pile driving activities and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
- If a marine mammal appears likely to enter its respective shutdown zone during pile-driving activities, all driving activity must cease immediately.
- If an injured or dead marine mammal is observed KDC shall report the incident to NMFS.
- If it is clear that project activity has caused the take of a marine mammal in a manner prohibited by the (requested) IHA, such as serious injury or mortality, KDC shall immediately cease the specified activities and report the incident to NMFS.
- If take of humpback whales approaches the number of takes authorized, the KDC will notify NMFS by email, Julie Scheurer (julie.scheurer@noaa.gov) and request that the USACE and NMFS OPR reinitiate consultation.
- Comprehensive reports are due to USFWS regarding sea otters and to NMFS AK and NMFS OPR regarding all marine mammals. Sample marine mammal sighting forms are attached in Appendix B. This project has detailed reporting requirements-PSOs should document all required information on their data sheets.
- A compliance certification form is due to the USACE after project completion.

The above list provides an overview of requirements for this project. Use the requested DA Permit, the requested IHA and BO, and the USFWS Observer Protocols (Appendix A) for detailed terms and conditions.

4 GENERAL CONDITIONS

As outlined in the requested IHA (Section 3. General Conditions):

- A copy of the issued IHA must be in the possession of the KDC, its designees, and work crew personnel operating under the authority of the IHA.
- The species authorized for taking are the humpback whale (*Megaptera novaeangliae*), minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and Steller sea lion (*Eumetopias jubatus*).
- The taking, by Level B harassment, is limited to the species listed in condition 3(b). See Table 1 (attached) for numbers of take authorized.
- The taking by 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 IHA. Any taking exceeding the authorized amounts and manner listed in Table 1 is prohibited and may result in the modification, suspension, or revocation of this IHA.
- The KDC shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, and KDC staff prior to the start of all pile driving activities and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

5 MITIGATION MEASURES

As outlined in the requested IHA the KDC is required to implement the following mitigation measures:

- KDC shall begin marine mammal monitoring at least 30 minutes prior to pile activity onset at the beginning of the day or if one hour has elapsed in activity. Pile driving or removal shall not begin until this 30-minute monitoring period is complete and a PSO has given a notice to proceed.
- For timber pile removal, KDC shall first attempt to direct pull piles; if those efforts prove to be ineffective, they may proceed with a vibratory hammer.
- KDC shall operate the vibratory hammer at a reduced energy setting (30 to 50 percent of its rated energy).

- KDC shall use a pile cushion during impact hammering.
- KDC shall use a “soft start” technique when impact pile driving. KDC shall provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a one-minute waiting period, then two subsequent 3–strike sets.
- If any marine mammal is sighted within a shut-down zone during the 30-minute survey prior to pile driving, or during the soft start, KDC shall delay pile-driving until the animal is confirmed to have moved outside and on a path away from the area or if 15 minutes (for pinnipeds or small cetaceans) or 30 minutes (for large cetaceans) have elapsed since the last sighting of the marine mammal within the shut-down zone. This soft-start shall be applied prior to beginning pile driving activities each day or after cessation of impact driving for more than 30 minutes.
- KDC shall drive all piles with a vibratory hammer to the maximum extent possible prior to using an impact hammer. KDC shall also use the minimum impact hammer energy needed to safely install the piles.
- KDC shall use delay and shut-down procedures, if a species for which authorization has not been granted or if a species for which authorization has been granted but the authorized takes are met, approaches or is observed within the Level A and/or B harassment zone (as appropriate).
- KDC shall implement the shut-down zones identified in Table 3 and Table 4 of this document.

6 MONITORING

6.1 Monitoring Protocols

- The number of PSOs will vary from 2 to 4, depending on the type of pile driving and size of pile, which determines the size of the harassment zones.
- Two land-based monitors will be present during all pile driving/removal activity. One PSO will be stationed at Berth IV and will be able to view across Tongass Narrows south and west to Gravina Island. A second PSO will be located along the road systems at locations that provide the best vantage points for viewing Tongass Narrows west and east of Berth IV.
- Three land-based PSO will monitor during vibratory pile driving of 36-inch and 48-inch diameter piles to ensure that the entire harassment zone is observed. The third PSO would be located along the road system on Revillagigedo Island east of Ketchikan.
- The fourth PSO will be located on the road system near Mountain Point and will be able to view Tongass Narrows to the northwest and Revillagigedo Channel to the southeast.
- The PSOs shall have no other primary duties than watching for and reporting on events related to marine mammals.

- PSOs shall scan for the presence of marine mammals for 30 minutes before any pile driving or removal activities take place for the day or if more than one hour has elapsed in absence of pile activity.
- Each PSO shall work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and shall not perform duties as an PSO for more than 12 hours in a 24-hr period.
- The PSOs shall continue monitoring each day for 15 minutes after all in-water pile driving/removal is completed.
- Each day prior to commencing in-water work, the PSO shall conduct a radio check with the construction foreman or superintendent.
- Prior to the start of the project, the lead-PSO shall brief the foreman or supervisor as to the shutdown procedures if any marine mammals are observed likely to enter or within a shutdown zone, and shall have the foreman brief the crew, requesting that the crew notify the PSO when a marine mammal is spotted
- Monitoring shall be conducted by independent (i.e., not construction personnel) qualified observers, who shall be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. At least one observer must have prior experience working as an observer. Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience.

6.2 PSO Qualifications

KDC must submit to NMFS OPR (jonathan.molineaux@noaa.gov) the curriculum vitae (CV) of all observers prior to monitoring.

All PSOs must have:

- 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 binoculars may be necessary to correctly identify the target;
- Advanced education in biological science or related field (undergraduate degree or higher required);
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- Experience or training in the field identification of marine mammals, including the identification of behaviors;

- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and
- 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.

7 REPORTING

7.1 Submittal of Monitoring Reports

7.1.1 USACE

Within 60 days of completion of the work authorized by this permit, the KDC shall complete the "Self-Certification Statement of Compliance" form (attached to the DA Permit) and submit it to the USACE.

7.1.2 USFWS

As outlined in the USFWS Observer Protocols:

All observation records will be made available to the USFWS at the end of each calendar month and a summary report will be provided to the USFWS by December 1 each year. The contact for these reports is Kimberly Klein at Kimberly_Klein@fws.gov.

7.1.3 NMFS AK

Submit a project specific report within 90 days of the conclusion of the project that analyzes and summarizes marine mammal interactions during this project. The report should be submitted by email to the Protected Resources Division, NMFS Alaska Region Attn: julie.scheurer@noaa.gov.

This report must contain the following information:

- Dates, times, species, number, location, and behavior of any observed ESA-listed marine mammals, including all humpback whales. Note that only 6% of humpback whales are expected to be from the ESA-listed Mexico DPS and will count towards humpback whales listed as threatened.
- Number of shut-downs throughout all monitoring activities.
- An estimate of the instances of exposure (by species) of ESA-listed marine mammals that: (A) are known to have been exposed to noise from pile driving with a discussion of

any specific behaviors those individuals exhibited, and (B) may have been exposed to noise from pile driving, with a discussion of the nature of the probable consequences of that exposure on the individuals that were or may have been exposed.

- A description of the implementation and effectiveness of each Term and Condition, as well as any conservation recommendations, for minimizing the adverse effects of the action on ESA-listed marine mammals.

7.1.4 NMFS OPR

Submit a draft report to NMFS (jonathan.molineaux@noaa.gov) on all monitoring conducted under the requested IHA within ninety calendar days of the completion of marine mammal monitoring. A final report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the informational elements below:

- Detailed information about any implementation of shutdowns, including the distance of animals to pile driving and removal and description of specific actions that ensued and resulting behavior of the animal, if any.
- Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take (i.e., multiple exposures of the same animal).

7.2 Reporting of Injured or Dead Marine Mammals

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as serious injury or mortality, KDC shall immediately cease the specified activities and report the incident to:

- The Office of Protected Resources 301-427-8401 (NMFS OPR) or jonathan.molineaux@noaa.gov, and
- The NMFS Alaska Protected Resources Division 907-5867638 and/or Jon.Kurland@noaa.gov, jonathan.molineaux@noaa.gov, the NMFS Alaska Region Stranding Coordinator (907-271-1332), or Mandy.Migura@noaa.gov.

The report must include the following information:

- Time and date of the incident;
- Description of the incident;
- Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and

- 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 KDC to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. KDC may not resume their activities until notified by NMFS.

In the event that KDC 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), KDC shall immediately report the incident to the Office of Protected Resources, NMFS, and the Alaska Region Stranding Coordinator, NMFS.

The report must include the same information identified above and in 6(b)(i) of the requested IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with KDC to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that KDC 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 requested IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), KDC shall report the incident to the Office of Protected Resources, NMFS, and the Alaska Region Stranding Coordinator, NMFS, within 24 hours of the discovery. KDC shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

7.3 Reporting of Take of ESA-Listed Species

If take of humpback whales approaches the number of takes authorized in the BO's Incidental Take Statement (ITS), the KDC will notify NMFS by email, attn: julie.scheurer@noaa.gov.

Appendix B. Marine Mammal Sighting Forms

Marine Mammal Sighting Form

Project: _____ **Location:** _____ **Sighting #:** _____
(1st sighting of the day is Sighting#: 1)

Date: _____ **Observer(s):** _____

Time <small>(military)</small>		Species <small>(circle)</small>	Distance <small>(animal to activity)</small>		Number of Animals		Number of Animals in Each Class			
Initial Sighting Time		Steller Sea Lion	Initial Distance		Min Count		Adults		Calves/ Pups	
Final Sighting Time			Harbor Seal	Closest Distance		Max Count		Juveniles		Unkn. Age
Time Entered H-Zone B		Harbor Porpoise		Final Distance		Best Count				
Time Exited H-Zone B		Killer Whale					Male		Female	
Time Entered H-Zone A			Sea Otter					Unknown Sex		
Time Exited H-Zone A		other: _____								

Behavior of Marine Mammal check all observed behaviors; place a **1** next to primary, **2** next to secondary activity):
Indicate any changes in behavior in the Additional Information section

- | | | | |
|-------------------------------------------|-----------------------------------------------|--------------------------------------------------|--------------|
| <input type="checkbox"/> Travel | <input type="checkbox"/> Fight | <input type="checkbox"/> Mill | Other: _____ |
| <input type="checkbox"/> Disoriented | <input type="checkbox"/> Play | <input type="checkbox"/> Dive | |
| <input type="checkbox"/> Slap | <input type="checkbox"/> Spyhop | <input type="checkbox"/> Unknown | |
| <input type="checkbox"/> Feeding Observed | <input type="checkbox"/> Swimming Toward Site | <input type="checkbox"/> Swimming Away from Site | |

Group Cohesion (Orientation of animals within the group and the approx. distance between animals) :

Project Activities and Harassment Zone

Entered Harassment Zone A? **Y or N** Entered Harassment Zone B? **Y or N**
 In-Water Work was occurring at initial sighting? **Y or N** List In-water Activities: _____

SHUT DOWN or DELAYED from _____ to _____ (time)

NO SHUT DOWN, EXPLANATION REQUIRED:

Describe Commerical Activities (# and type of vessels offloading at sea food processing dock, traveling by, refueling at dock):

Additional Information (include more detailed information on behavior):

Draw locations on hardcopy map

Marine Mammal Sighting Form Version 2

Marine Mammal Sightings During Pile Driving

Date: _____ Observer: _____

General Weather AM _____ Daily Start Time: _____
 PM _____ Daily End Time: _____

Was the Entire Exclusion Zone Visible During Pile Driving Operations (Y/N)? _____

If No, Please Explain _____

Time of initial observation	Species Code	No. of Individ.		Age Class	Sex	Within Exclusion Zone (Y/N)	Resight (Y/N/UNK)	Beh. 1°	Beh. 2°	Pile Number	Activity Type	Notes/Abnormal Behaviors/Other
		HO	Water									
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
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19												
20												

Sheet _____ of _____

Data Codes

(This section contains a list of data codes and their corresponding definitions, which are currently illegible due to blurring in the original image.)

Appendix A. USFWS Observer Protocols



**Anchorage Fish and Wildlife Field Office
Observer Protocols for
Pile Driving, Dredging and Placement of Fill
Draft August 7, 2012**

Contact: Kimberly Klein,
907-271-2066, Kimberly_Klein@fws.gov



Northern sea otters (*Enhydra lutris kenyoni*) may be harmed by noise from pile driving and other activities. Steller's eiders (*Polysticta stelleri*) are unlikely to be in the project area between April 15-November 15 (Unalaska), May 1 - October 31 (Cook Inlet and Kodiak Island); work should be scheduled to occur during this time to avoid impacts. However, if present, Steller's eiders may also be harmed by noise. Impacts from noise are likely to be avoided if it is confirmed that otters and eiders are not present within a "hazard area" near the source of the noise. The "hazard area" is defined here as the area in which noise levels from construction activities are expected to exceed threshold noise levels that cause harm. Table 1 specifies the size of the hazard area for dredge and fill activities and pile driving. The use of one or more observers to "clear" the hazard area is an effective means to assure that no Steller's eiders or sea otters will be harmed. The observer is responsible for communicating the presence of one or more Steller's eider or sea otters in the hazard area to the construction operators, and halting work until the animal voluntarily leaves the area. To "clear" the area means to verify no listed species are present; no action may be taken to disturb otters or eiders, move them away, or discourage their use of an area.

Because there has been no research conducted to establish noise thresholds for sea otters or Steller's eiders, we used noise thresholds established by the National Marine Fisheries Service National Marine Fisheries Service [NMFS] for pinnipeds to guide development of hazard areas. NMFS determined that thresholds for Level A Harassment (injury) and Level B Harassment (disturbance) would be reached for pinnipeds under the following scenarios (NOAA 2005; NOAA 2006; NOAA 2008; NMFS 2009, Southall et al. 2007; full citations are available upon request):

- Level B Harassment due to airborne noise: 100 dB re: 20 μ Pa;
- Level B Harassment due to underwater noise: 120 dB re: 1 μ Pa for vibratory pile driving;
- Level B Harassment due to underwater noise: 160 dB re: 1 for impact pile driving;
- Level A Harassment due to underwater noise: 190 dB re: 1.

The U.S. Fish and Wildlife Service (Service) recommends the size of the hazard area be established according to Table 1. The hazard area includes all marine areas below mean high tide (MHT) within a specified radius around the source of the noise. Areas blocked by points of land or shoreline contours are not included in the hazard area, but a 10° buffer outside of these areas should be included (see Figure1).

The distances identified in Table 1 represent the minimum hazard area radii needed to ensure that the typical maximal sound production levels reached during specified activities attenuate to levels below those expected to cause injury. The Service estimates these thresholds to be **110 dB re: 20 μ Pa for airborne noise, and 183 dB re 1 μ Pa²-sec cumulative SEL for underwater noise**. These distances include a buffer for protection against injury due to cumulative sound exposure.

Table 1. Hazard area radii for specified activities, based on typical maximal sound levels generated during pile driving, dredging and fill placement activities¹.

Activity	Details (pile size, etc.)	Sound Production Level			Radius of Hazard Area centered on noise source
		Peak**	RMS**	SEL**	
In-water Impact Pile Driving*	Round or H pile >36"	>215	>200	>190	Contact the Service
	Round or H >36" with sound attenuation devices	200-215	185-200	175-190	2000 meters
	Round or H >24" up to 36"	200-215	185-195	175-185	2000 meters
	Round or H >24-36" with sound attenuation devices	190-205	175-185	165-175	500 meters
	Round or H ≤24"	185-210	170-185	160-175	500 meters
	Round or H ≤24" with sound attenuation devices	<200	<185	<175	300 meters
	Sheet Pile-any size	190	170	160	500 meters
	Sheet Pile-any size, with sound attenuation devices	180	160	150	300 meters
In-water Vibratory Pile Driving*	Round or H >36"	185-200	170-190	160-180	1000 meters
	Round or H >36" with sound attenuation devices	175-190	160-180	150-170	500 meters
	Round or H >24" up to 36"	175-195	165-185	155-175	500 meters
	Round or H >24" up to 36" with sound attenuation devices	165-185	155-175	145-165	300 meters
	Round or H ≤24"	<190	<180	<170	300 meters
	Round or H ≤24" with sound attenuation devices	<180	<170	<160	100 meters
	Sheet Pile-any size	182	165	165	300 meters
	Sheet Pile-any size, with sound attenuation devices	172	155	155	100 meters
Land-based Pile Driving	Based on in-situ recordings and sound propagation modeling, the distances needed to provide protection from airborne noise impacts would be adequately covered by monitoring the hazard area established for underwater sound propagation.			Same as each category above. Hazard area is limited to areas below MHT.	
In-water Fill Placement and Dredging	All in-water use of heavy equipment for manipulating the substrate; including use of hydraulic rock breakers, drills, etc.	140-200	125-185	115-175	300 meters

* In-water <20 m ** Underwater sound pressure levels are measured in dB re: 1 µPa.

¹ Typical maximal sound levels from Illinworth Rodkin (2007); Blackwell et al. (2004, cited in Navy 2011); Hastings and Popper (2005); Jasco Research Ltd (2005, as cited in Navy 2011); Laughlin (2005, 2010a,b) ; Reyff (2005); Onuu and Tawo (2006); URS (2007); Parvin et al. (2008); Jones and Stokes (2009); NOAA (2009); Navy (2009); Scientific Fishery Systems, Inc. (2009); Thomsen et al. (2009); Mumford (2011); Navy (2011); Robinson et al. (2011); WSDOT (2011); Cardno ENTRIX (2012). Full citations are available upon request.

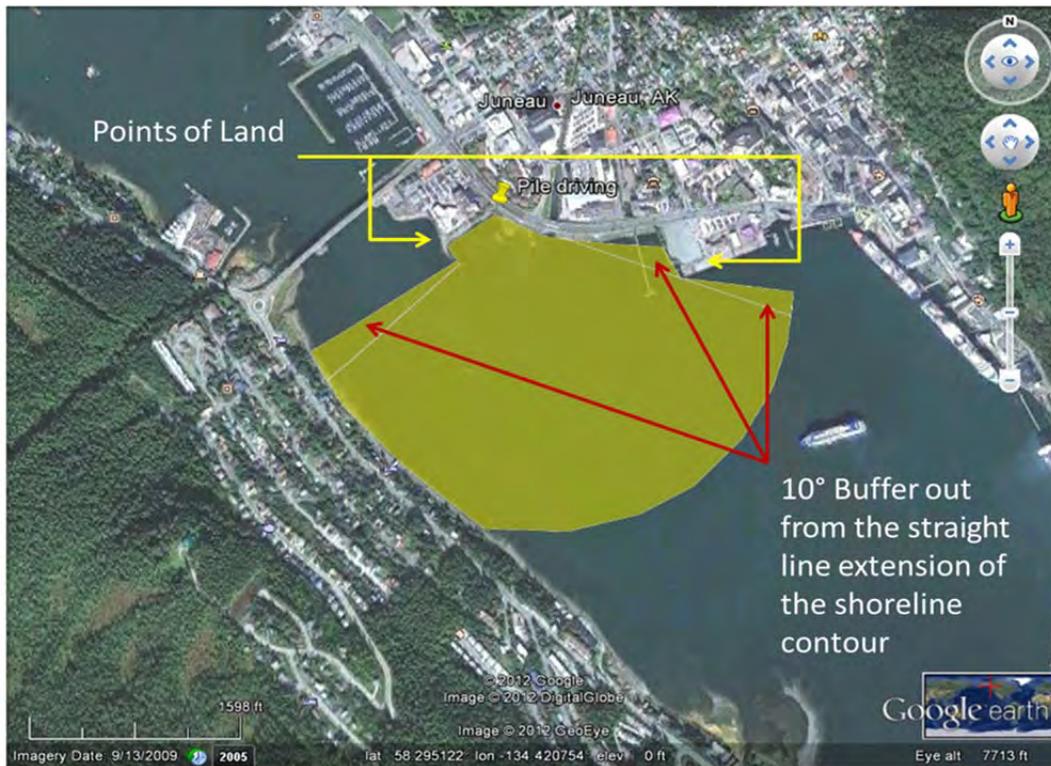


Figure 1. Depiction of a hazard area modified by the contours of the shoreline and points of land.

Ramp-up procedures

1. For impact pile driving, contractors will be required to provide an initial set of three strikes from the hammer at 40% energy, followed by a 30-second waiting period, then two subsequent three-strike sets. For vibratory pile driving, sound should be initiated for fifteen seconds at reduced energy followed by a 1-minute waiting period. This procedure would be repeated two additional times.
2. Ramp up procedures will be designed by the Applicant for in-water fill placement and in-water dredging activities specified in Table 1 to allow noise production to increase gradually from a low level, and to begin at locations farthest from marine areas. For example, a 5-minute period following startup of a single generator located well above high tide could be followed by 5 minutes of operating an excavator near the shoreline, etc. Equipment should be operated at low power, and then gradually increased to noisier, high-power levels. In-water noise production such as placement of fill should occur only after all other noise-generating activities have ramped up and otters and eiders have had the opportunity to leave the area of their own accord.

Monitoring the “hazard area”

A. Pile driving: 100 to 2000-m “hazard area”

1. Observers will watch for Steller’s eiders and sea otters within the appropriate hazard area as specified in Table 1 for 30 minutes prior to start of work. Observations will continue for the full duration of these activities.
2. If one or more Steller’s eider or sea otter occurs within the hazard area before or at any time during pile driving, the observer will report the presence of the animal and work will immediately cease or be postponed until the animal leaves the hazard area on its own.

B. Fill Placement and Dredging: 300-m “hazard area”

3. Prior to commencing in-water fill placement, in-water dredging, and any other in-water use of heavy equipment for manipulating the substrate (including use of hydraulic rock breakers,

drills, etc.) observers will clear a 300-m hazard area. Additionally, observers will clear the hazard area before recommencing work after any break greater than 30 minutes.

4. If an otter or eider is seen within the hazard area during the 30-minute observation period prior to start-up, the observation period need not start over once the animal moves out of the hazard area, but work may not commence until the observation period is complete.
5. If a sea otter or eider enters the 300-m hazard area during fill placement or dredging, after the observation period has ended, work may continue.
6. If an otter or eider is seen in the 300-m buffer during the observation period prior to start of work and does not leave the area prior to the completion of the 30-minute observation period, ramp up procedures will be applied.

C. ALL noise-generating activities specified in Table 1 (applies to both A and B)

7. All observers must be capable of spotting and identifying sea otters and Steller's eiders and recording applicable data during all types of weather in which pile driving, in-water fill placement, or in-water dredging will be conducted.
8. All observer protocols will be applied to any unidentified duck whenever the observer cannot identify whether a duck is a male or a female Steller's eiders in breeding or nonbreeding plumage.
9. Observers will be given the authority to halt project activities if a sea otter or Steller's eider is present and to provide clearance for work to resume after the animal leaves on its own.
10. Observers will have no other duties during the observation period in order to ensure that watching for protected species remains the observer's main focus.
11. A lead observer will be responsible for implementing the protocols. The lead observer may select and train additional observers, but should remain accountable for their performance throughout the work season.
12. All observers must be trained in the monitoring methods to include the following topics:
 - Types of construction activities that require monitoring
 - Observation methods and equipment
 - Observation locations
 - Distance estimation
 - Data to record (parameters) and field forms
 - Species identification
 - Procedures to Stop Work
13. Tools, such as a laser range finder or buoys placed at 300 m intervals away from the shoreline should be used to aid the observer in estimating distances out to 1,000 m.
14. The following are examples of standard equipment recommended for use by observers:
 - High power, reticle binoculars 10 x 50 Bushnell
 - Range finder equivalent to Leica LRF 1200
 - GPS and compass
 - High power spotting scope
15. Observation stations will be established to maximize visibility of the hazard areas. Elevated observation stations will provide better visibility than those at sea level.
16. Observation stations may be established aboard moored vessels and stationary skiffs.
17. Use of a particular station may depend upon weather conditions. If the observable range from any one vantage point is limited due to weather or construction activity, the observer should use an established station that has a better vantage point for monitoring.
18. If visibility is poor due to weather or low light, pile driving will not commence until viewing conditions make it possible to clear the entire hazard area. In-water fill placement and in-water dredging may commence after ramp up procedures are conducted.
19. During periods of low visibility, pile driving may commence if additional observers can be added in multiple stations to provide complete visual coverage of the "hazard area".

20. Observers will record basic metrics such as start and end times, date, GPS location of the observation station, name of observers, type of work occurring, numbers and locations of observed sea otters or eiders, environmental conditions (air temperature, wind speed and direction, sea state, swell height, tide stage, visibility, percent cloud cover, and precipitation), documentation of work shut downs or postponements due to presence of otters or eiders, and length of time work was shut down or postponed.
21. Other data that may be useful include: records of sea otter and Steller's eider movements (direction and distance of travel), the times during which the movements occur, and a categorical assessment of behaviors during the observation period. For example, indicate whether sea otters or eiders are resting, feeding, grooming, engaging in social interactions, or travelling from one place to another. Record behavioral changes during the observation period, and comment on whether these behaviors appear to be associated with the work being conducted, and if so, what indications lead to that conclusion.
22. All observation records will be made available to the Service at the end of each calendar month.
23. A summary report will be provided to the Service by December 1 each year.

Optional Considerations:

Monitoring: Whenever possible, sound level testing should be conducted to determine the size of the "hazard area". A more accurate size of the "hazard area" for pile driving and for fill placement/dredging can then be used for these two categories of work instead of the buffers in Table 1. A smaller impact area can be monitored more easily and more accurately by fewer observers. To accomplish this, we recommend the following procedures:

1. Prior to sound monitoring, observers should clear a hazard area according to Table 1.
2. In-air and in-water sound pressures should be measured with portable instrumentation placed in intervals in multiple directions from the noise source as shown in Figure 2.
3. For best results, in-water measurements should be taken at multiple water depths.
4. Sound pressure should be monitored in marine waters out to the appropriate distance specified in Table 1 for the type of pile driving being conducted. For fill placement and dredging, a 300-m radius should be monitored.
5. Monitoring should be timed to record peak sound pressures. Sound pressure should be monitored during two categories of work (when both types of work will occur):
 - a. Pile driving
 - b. Dredging and fill placement
6. If possible, sound measurements should be taken at various locations simultaneously.
7. If actual noise levels are greater than **110 dB re: 20 μ Pa; for airborne noise or 183 dB re 1 μ Pa²-sec cumulative SEL for underwater noise** at either the 500-m or 300-m radius from the source (as applicable for the type of activity), testing should be conducted at additional points at 300-m intervals further from the source site to determine the full extent of the area in which threshold levels are reached. If the hazard area is larger than 500 m, the Service should immediately be notified, and a 50% larger hazard area should be cleared by the observers prior to continuing work. All observer protocols will be applied to the expanded hazard area.
8. Sound level monitoring results should be reported to the Service. All estimates of sound pressure levels should be reported in dB re: 1 μ p for in-water and dB re: 20 μ p in air.

Modeling: Acoustic modeling may be conducted by a qualified engineer or hydrologist as an alternative to acoustic monitoring. The models selected should be capable of predicting underwater noise production and attenuation at various distances from the proposed noise-generating activities. Models should be customized to incorporate the specific techniques to be used, and the local bathymetry and substrate information. Modeling methods, assumptions, outputs, and uncertainties should be reported to the Service. The hazard area should be defined as wherever pressure levels are predicted to exceed **110 dB re: 20 μ Pa; for airborne noise or 183 dB re 1 μ Pa²-sec cumulative**

SEL for underwater noise. All observer protocols should be applied to those areas. When possible, noise levels should be tested upon startup of work for comparison with model outcomes. If actual noise levels exceed predicted values, work should follow protocols outlined here, or should stop until sound level testing can be completed.

Videography: The use of video documentation of sea otter or Steller's eiders observations in or near the hazard area during pile driving, dredging or placement of fill is recommended to assist observers in recording and characterizing responses to noise. We are interested in developing a systematic videographic study. Please notify the Service if you intend to record wildlife near the hazard area as part of your project.

If warranted by new information, observer protocols may be revised by the USFWS.

Contact the Anchorage Fish and Wildlife Field Office with any additional questions or concerns.

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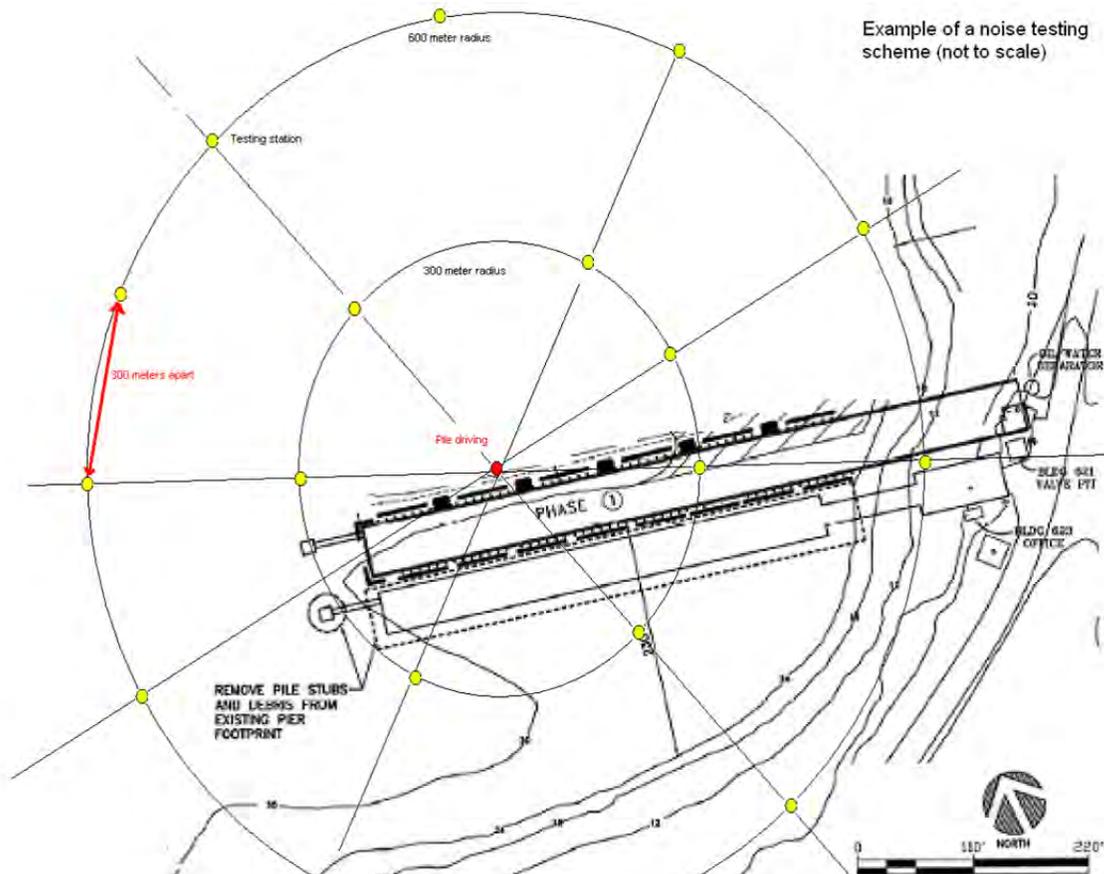


Figure 2. An example plan for noise testing. Test points are placed in intervals around the work site and each other (it is not to scale) to provide complete coverage of all areas of in-water work.

Appendix B. Marine Mammal Sighting Forms

Marine Mammal Sighting Form

Project: _____ **Location:** _____ **Sighting #:** _____
(1st sighting of the day is Sighting#: 1)

Date: _____ **Observer(s):** _____

Time <i>(military)</i>		Species <i>(circle)</i>	Distance <i>(animal to activity)</i>		Number of Animals		Number of Animals in Each Class			
Initial Sighting Time		Steller Sea Lion	Initial Distance		Min Count		Adults		Calves/ Pups	
Final Sighting Time			Harbor Seal	Closest Distance		Max Count		Juveniles		Unkn. Age
Time Entered H-Zone B		Harbor Porpoise		Final Distance		Best Count				
Time Exited H-Zone B		Killer Whale					Male		Female	
Time Entered H-Zone A			Sea Otter					Unknown Sex		
Time Exited H-Zone A		other: _____								

Behavior of Marine Mammal check all observed behaviors; place a **1** next to primary, 2 next to secondary activity):
Indicate any changes in behavior in the Additional Information section

Travel Fight Mill Other: _____
 Disoriented Play Dive
 Slap Spyhop Unknown
 Feeding Observed Swimming Toward Site Swimming Away from Site

Group Cohesion (Orientation of animals within the group and the approx. distance between animals) :

Project Activities and Harassment Zone

Entered Harassment Zone A? **Y or N** Entered Harassment Zone B? **Y or N**

In-Water Work was occurring at initial sighting? **Y or N** List In-water Activities: _____

SHUT DOWN or DELAYED from _____ to _____ (time)

NO SHUT DOWN, EXPLANATION REQUIRED:

Describe Commerical Activities (# and type of vessels offloading at sea food processing dock, traveling by, refueling at dock):

Additional Information (include more detailed information on behavior):

Draw locations on hardcopy map

Marine Mammal Sighting Form Version 2

Marine Mammal Sightings During Pile Driving

Date: _____ Observer: _____

General Weather AM _____ Daily Start Time: _____
 PM _____ Daily End Time: _____

Was the Entire Exclusion Zone Visible During Pile Driving Operations (Y/N)? _____

If No, Please Explain _____

Time of initial observation	Species Code	No. of Individ.		Age Class	Sex	Within Exclusion Zone (Y/N)	Resight (Y/N/UNK)	Beh. 1°	Beh. 2°	Pile Number	Activity Type	Notes/Abnormal Behaviors/Other
		HO	Water									
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
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20												

Sheet _____ of _____

Data Codes

(This section contains a list of data codes and their corresponding definitions, which is currently very faint and difficult to read.)