Request for an Incidental Harassment Authorization

Duck Point Development II, LLC
Hoonah Berth II Project
Icy Strait, Hoonah, Alaska

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Prepared for:
Duck Point Development II, LLC
9301 Glacier Highway, Suite 200
Juneau, Alaska 99801

Prepared by:

2607 Fairbanks Street Suite B
Anchorage, Alaska 99503

Submitted to:
National Marine Fisheries Service

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ACRONYMS AND ABBREVIATIONS

dB	decibels
DPD	Duck Point Development II, LLC
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
kHz	kilohertz
min	minutes
MMPA	Marine Mammal Protection Act
µPa	microPascal
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PSO	Protected Species Observer
PTS	permanent threshold shift
rms	root mean square
SEL	sound exposure level
SPL	sound pressure level
USFWS	U.S. 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

Duck Point Development II, LLC (DPD) proposes to construct a second cruise ship berth and new lightering float at Cannery Point (Icy Strait) on Chichagof Island near Hoonah, Alaska, in order to accommodate the increase in cruise ship and visitor traffic since completion of the first permanent cruise ship berth in 2016.

The expansion would include the installation of new piles and structures. All pile driving is expected to occur on 75 days (not necessarily consecutive). The proposed project would occur in marine waters that support several marine mammal species. Pile driving 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.

DPD is requesting an IHA for Level B take of nine marine mammal species and Level A take of three marine mammal species that may occur in vicinity of the project area extending through Icy Strait and Port Frederick Inlet. The species for which Level B take is requested are: minke whale (*Balaenoptera acutorostrata*), humpback whale (*Megaptera novaeangliae*), gray whale (*Eschrichtius robustus*), killer whale (*Orcinus orca*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca viutlina*), and Steller sea lion (*Eumetopias jubatus*). The species for which Level A take is requested are: harbor porpoise, harbor seal, and Steller sea lion.

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

1.2 DETAILED DESCRIPTION OF SPECIFIC ACTIVITIES

1.2.1 Location

The proposed project is located off Cannery Point, approximately 2.4 kilometers north of Hoonah in Southeast Alaska; T43S, R61E, S20, Copper River Meridian, USGS Quadrangle Juneau A5 NE; latitude 58.1351 and longitude -135.4506 (Figure 1 and Sheet 1). The project is located at the confluence of Icy Strait and Port Frederick Inlet. The proposed cruise ship berth would be installed approximately 0.5 kilometers (0.3 miles) east of the existing permanent cruise ship berth in Icy Strait (Figures 2 and 3). A separate small craft lightering float would be installed between two existing docks in Port Frederick Inlet on the west side of Cannery Point (alternatively called Icy Strait Point; Figures 2 and 4 and Sheet 3).

Figure 1. Proposed Project Location and Vicinity Map

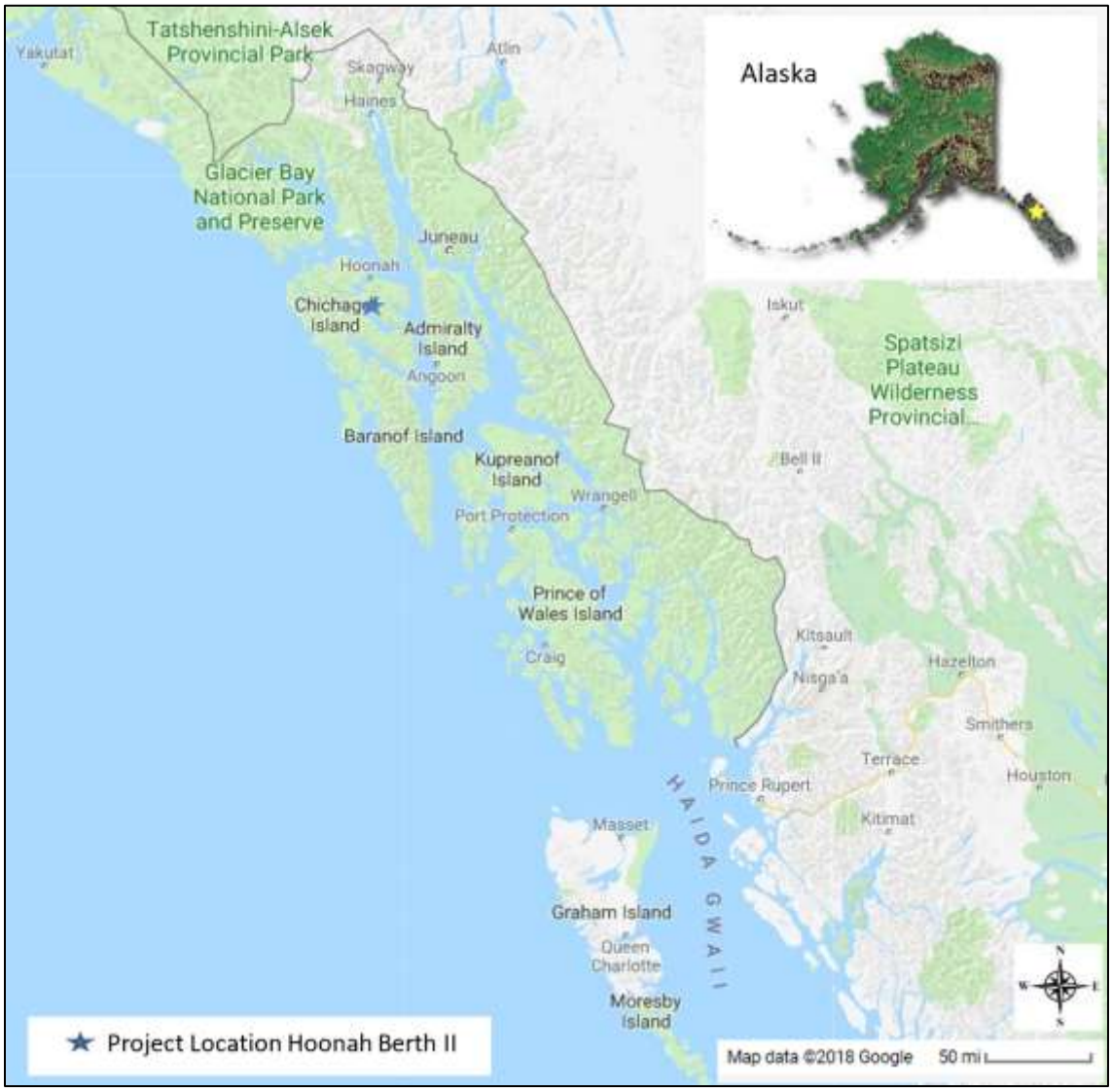


Figure 2. Location of Project Components

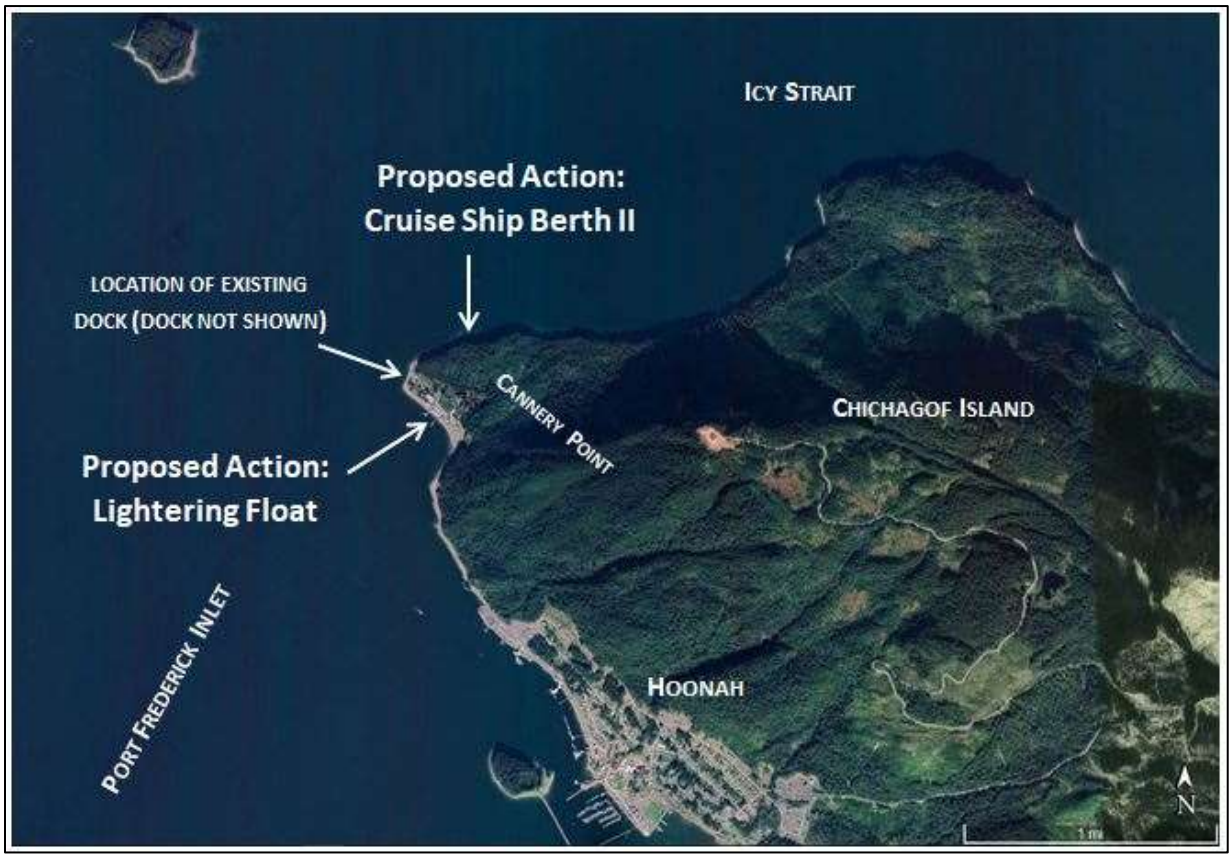


Figure 3. Proposed Berth II Location

Looking east from proposed Berth II site[1]

Looking west from proposed Berth II site

[1] The proposed Berth II site is not yet developed. These two photos shown in Figure 3 were taken during test pile driving and show a material barge that was temporarily anchored at the project site.

Figure 4. Proposed Lightering Float Site at Icy Strait Cannery Facility

1.2.2 Purpose and Need

Revenue generated from the tourism industry is a vital part of Hoonah's economy. Since the addition of a permanent cruise ship berth in 2016, Hoonah has become a top cruise ship port in Alaska, with growth from 34 ship visits in 2004 to a projected 122 visits in 2019 (Alaska Business Monthly 2018). Prior to placement of the permanent berth, cruise ship passengers were transferred to shore via smaller, "lightering" vessels. Construction of the berth allowed for direct walking access from ships to the shore, and more passengers disembarking in Hoonah. In 2016, an estimated 150,000 passengers visited Hoonah on 78 large-scale cruise ships, with many visiting Hoonah's shops and restaurants (LeMay Engineering & Consulting 2018).

The existing berth can only accommodate one large vessel at a time. Oftentimes a second visiting ship is forced to idle in Port Frederick Inlet near the cannery to wait for mooring space, or return to the traditional methods of lightering passengers to shore via small vessels. In addition to safety concerns stemming from decreased large-ship maneuverability at this location, idling ships and lightering vessels increase fuel consumption, noise, and hydrocarbon pollution within the inlet. A second shore berth is needed to allow multiple cruise ships' pedestrian visitors access directly to shore.

The increase in visitors to Hoonah has concurrently increased demand for offshore day excursions around Port Frederick and Icy Strait for wildlife viewing. An additional lightering float on the west side of the point, nearer to the Icy Strait Cannery, is needed to add mooring capacity for small vessels providing these short-day excursions.

The purpose of this project is to construct a second offshore mooring facility and small-craft lightering float to accommodate the exponential growth in cruise ship traffic Hoonah is currently experiencing. The project is needed because the existing berth configuration does not have the capacity to support multiple cruise ships at the same time. Furthermore, the increase in small vessel traffic generated by the increase in visitor numbers necessitates the addition of a small-boat lightering float for short excursions around Icy Strait Point. Once the project is constructed, Hoonah will be better able to safely accommodate the increased number of cruise ships and passengers visiting the community.

1.2.3 Anticipated Changes in Vessel Traffic

While the number of cruise ships traveling to Hoonah is expected to increase over time, this project is not expected to cause an increase vessel traffic in Alaskan waters. Hoonah's increased traffic as a top Alaskan cruise port-of-call is already occurring. The proposed project is a reactionary effort to adapt to this growth and to maintain ship and visitor safety. This project would decrease small vessel traffic to and from cruise ships unable to dock at the existing berth.

1.2.4 Proposed Action

DPD proposes to increase mooring capacity at Cannery Point by constructing a new cruise ship berth (Berth II), lightering float, associated support structures, and pedestrian walkway connections to shore (Figures 5, 6, and 7, Table 1, Sheets 4 and 13).
The project would:

- Install 62 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 8 permanent 42-inch-diameter piles, 16 permanent 36-inch-diameter piles, and 18 permanent 24-inch-diameter piles to support a new 500-foot by 50-foot floating pontoon dock, its attached 400-foot by 12-foot small craft float, mooring structures, and shore-access fixed-pier walkway (Figure 6, Table 1, Sheets 4 and 13);
- Install three permanent 30-inch-diameter piles to support a 120-foot by 20-foot lightering float, and four permanent 16-inch-diameter piles above the high tide line to construct a 12-foot by 40-foot fixed pier for lightering float shore access (Figure 7, Sheet 13);
- Install bull rail, floating fenders, mooring cleats, and mast lights. (Note: these components would be installed out of the water.)

Figure 5. Proposed Action Site Plan

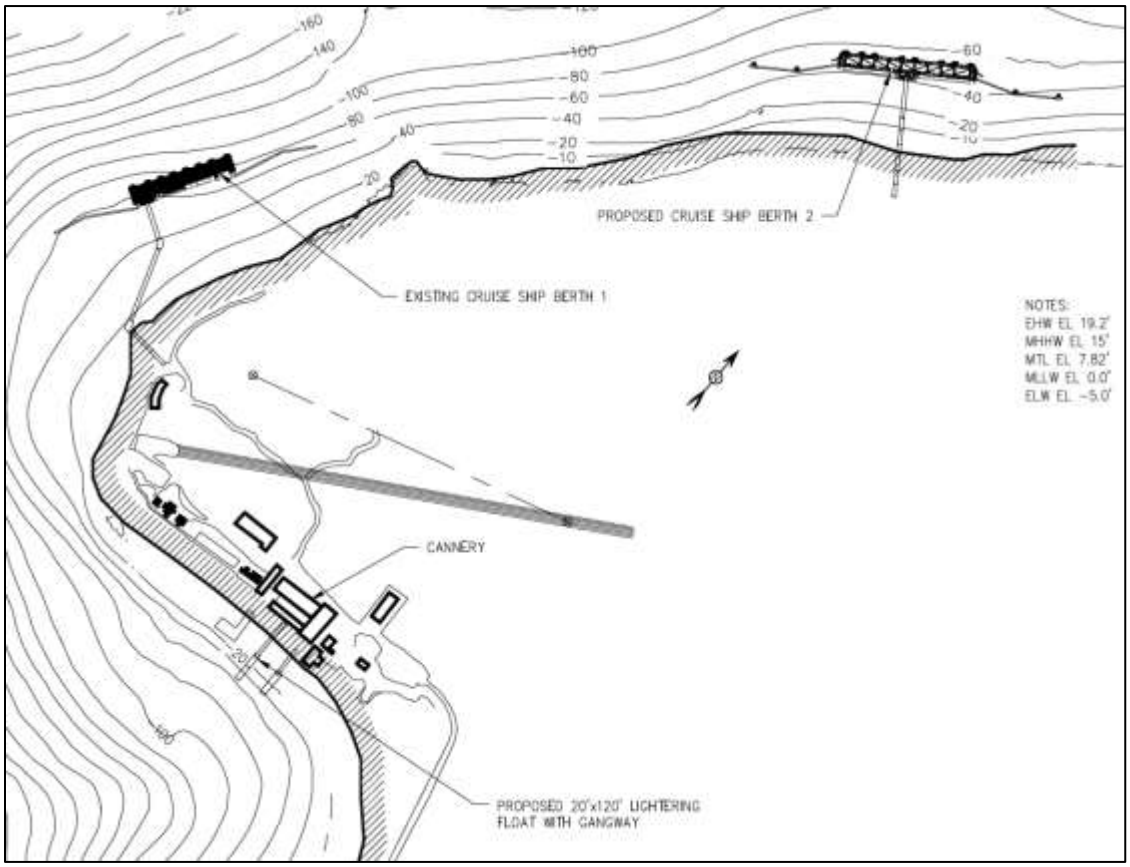


Figure 6. Berth II Details

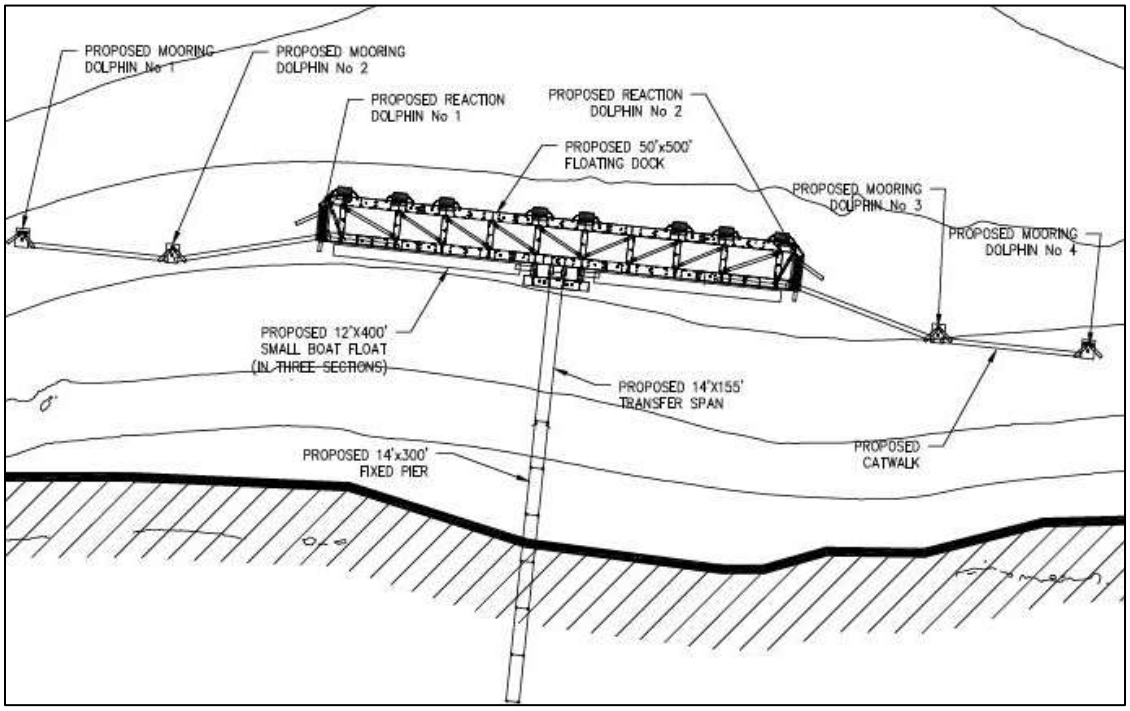


Figure 7. Lightering Float Site Plan

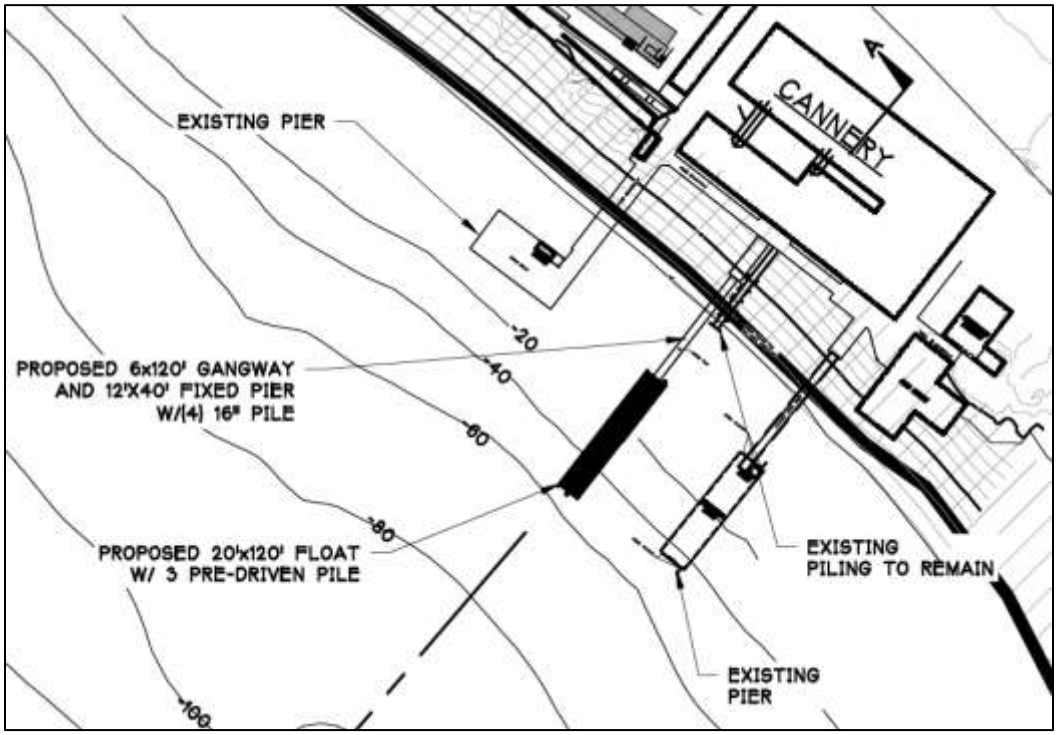


Table 1. Proposed Project Permanent Components

Feature	Notes
Cruise Ship Berth II	
Floating dock	500 ft x 50 ft
Small boat float	400 ft x 12 ft; adjacent and attached to floating dock
Catwalks	12 ft wide; total of approximately 500 ft of overwater structures in 4 sections
Transfer span	155 ft x 14 ft; between floating dock and fixed pier
Fixed pier	300 ft x 14 ft; between transfer span and land; supported by piles: (2) 24-inch batter and (16) 24-inch plumb
Mooring Dolphin No 1	Supported by piles: (2) 36-inch batter & (1) 42-inch diameter plumb
Mooring Dolphin No. 2	Supported by piles: (2) 36-inch batter & (1) 42-inch diameter plumb
Mooring Dolphin No. 3	Supported by piles: (2) 36-inch batter & (1) 42-inch diameter plumb
Mooring Dolphin No. 4	Supported by piles: (2) 36-inch batter & (1) 42-inch diameter plumb
Reaction Dolphin No. 1	Supported by piles: (2) 42-inch batter & (4) 36-inch plumb
Reaction Dolphin No. 2	Supported by piles: (2) 42-inch batter & (4) 36-inch plumb
Lightering Dock	
Lightering float	120 ft x 20 ft; timber decking; supported by piles: (3) 30-inch plumb
Gangway	120 ft x 6 ft; between lightering float and fixed pier
Fixed pier	40 ft x 12 ft; supported by piles: (4) 16-inch plumb installed above high tide line

1.2.5 Construction Methods

1.2.5.1 Equipment

The following equipment is expected to be used (a final determination will be made through the permitting process):

- Vibratory Hammer: ICE 44B/Static weight 12,250 pounds
- Diesel Impact Hammer: Delmag D46/Max Energy 107,280 feet-pounds
- Drilled shaft drill: Holte 100,000 feet-pounds top drive with down-the-hole (DTH) hammer and bit
- Socket drill: Holte 100,000 feet-pounds top drive with DTH hammer and under-reamer bit

1.2.5.2 Transport of Materials and Equipment

Materials and equipment, including the berth, would be transported from Washington to the project site by barge. While work is conducted in the water, the barge would be secured in place by four mooring anchors. The anchors would be below the surface and would not be a hazard to navigation. Local barge moves to the next pile installation area (approximately 100 feet away) would occur at a speed of less than 2 miles per hour. A material staging barge would be tied to the construction barge, and materials would be moved from the staging barge to the construction barge and site by crane on the barge.

1.2.5.3 Transport of Workers to and from Work Platform

Workers will be transported from shore to the barge work platform by a 25-foot skiff with a 125–250 horsepower motor in the morning and at the end of the work day. The travel distance will be less than 300 feet. There could be multiple (up to eight) shore-to-barge trips during the day; however, the area of travel will be relatively small and close to shore.

1.2.5.4 Other In-water Construction and Heavy Machinery Activities

In addition to the activities described above, the proposed action will involve other in-water construction and heavy machinery activities. Examples of other types of activities include using standard barges, tug boats, barge-mounted excavators, or clamshell equipment to place or remove material; and positioning piles on the substrate via a crane (i.e., “stabbing the pile”).

1.2.5.4 Construction Sequence

In-water construction of Berth II would begin with installation of an approximately 300-foot-long fixed pier. Fixed pier piles would be installed using the following sequence:

1) Vibrate and/or socket four temporary 30-inch piles a minimum of ten feet into bedrock to create a template to guide installation of the permanent piles. (Overburden depths won’t support a vibratory effort until construction progresses farther from the shoreline start point.)
2) Weld a frame around the temporary piles.
3) Within the frame, vibrate and socket two 24-inch piles into place. If needed, the contractor would anchor the two 24-inch batter piles for stability.

4) Remove the frame and temporary piles.
5) Perform this sequence at a total of eight locations, working farther from the shoreline each sequence.
6) Install pile caps, girders, and the fixed pier decking following all associated foundation work (steps 1-5 above).

After fixed pier pile installation, pile templates would be installed at the eight dolphin locations. It is anticipated that overburden depths will support installation of temporary template piles using only vibratory methods. Temporary template piles for dolphin construction will be performed using the following sequence:

1) Beginning at Reaction Dolphin 1, vibrate five temporary 30-inch piles to refusal to create a template to guide installation of the permanent piles.
2) Weld a frame around the temporary piles.
3) Repeat this sequence at Reaction Dolphin 2.
4) At Mooring Dolphin 1, vibrate five temporary 30-inch piles to refusal to create a template to guide installation of the permanent piles.
5) Weld a frame around the temporary piles.
6) Repeat sequence at the other three mooring dolphins.
7) Remove all associated frames and template piles following completion of the dolphins using vibratory methods.

Upon completion of the transfer span piles, crane barge 1 will transition to installation of the permanent dolphin piles. At this point temporary dolphin template piles will be installed by crane barge 2 while crane barge 1 installs the permanent dolphin piles as follows:

1) Vibrate, impact, and anchor drill 36-inch and 42-inch piles into place. Each dolphin will be worked to completion before proceeding to another.
2) Install rebar cages and anchor with concrete infill (all piles).
3) Repeat this sequence at the other five dolphin locations.
4) With crane barge 2, install pile cap/gangways as pile dolphins are installed.

After all piles and caps are installed, construction will proceed with installation of the floating dock, transfer bridge connection to the fixed pier, mechanical systems, and other above-water work.

Installation of the lightering float and fixed pier would begin with removal of a single existing wood pile separate from the existing wooden pier (not in use). The contractor would remove the wood pile through direct-pull methods using a crane. Three 30-inch-diameter piles would then be vibrated in to support the new lightering float structure. Above-water construction would include installation of four 16-inch-diameter piles for the lightering float's fixed pier and placement of a gangway to connect the two components.

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.

1.2.5.5 Installation Methods

Installation and Removal of Temporary (Template) Piles

Temporary 30-inch-diameter piles would be installed and removed using a vibratory hammer. If needed for stability, the contractor would socket in up to 10 of these piles if a sufficient quantity of overburden is not present.

Installation of Permanent Piles

The permanent 24-inch-diameter piles would be installed through sand and gravel with a vibratory hammer. Then, the pile will be secured into underlying bedrock with conventional socketing means using a DTH 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 5 feet (as determined by the geotechnical engineer). (Note: this socketing method can also be referred to as DTH drilling. We refer to it as socketing throughout this document to clarify this method from anchoring, which also uses a drill.) The contractor may employ 8-inch-diameter rock anchors as needed for up to 2 of the 24-inch battered piles (see next paragraph for rock anchoring description).

Permanent 36-inch and 42-inch-diameter piles would be driven through sand and gravel with a vibratory hammer and impacted into bedrock. After being impacted, the pile would be anchored using a smaller 33-inch-diameter drilled shaft within the pile. Once the shaft is drilled, a DTH hammer with a 33-inch-diameter bit (isolated from the steel casing) will be used to drill a shaft (depth as determined by geotechnical engineer) into the bedrock and filled with concrete to install the rock anchors. During this anchor drilling, the larger diameter piles would not be touched by the drill; therefore, anchoring will not generate steel-on-steel hammering noise (noise that is generated during socketing).

Construction of the lightering float would require installation of permanent 30-inch piles using a vibratory hammer only.

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

Table 2. Hoonah Berth II and Lightering Float Pile Summary: Number, Size, and Estimated Number of Hours Required by Installation Method

Description	Project Component						
	Temporary Pile Installation	Temporary Pile Removal	Permanent Pile Installation	Permanent Pile Installation	Permanent Pile Installation	Permanent Pile Installation	Max Installation/ Removal per Day
Diameter of Steel Pile (inches)	30	30	24	30	36	42	--
# of Piles	62	62	18	3	16	8	--
Vibratory Pile Driving							
Total Quantity	62	62	18	3	16	8	--
Max # Piles Vibrated per Day	6	6	4	2	2	2	6
Vibratory Time per Pile	20 min	10 min	10 min	30 min	30 min	60 min	--
Vibratory Time per Day	120 min	60 min	40 min	60 min	60 min	120 min	120 min
Vibratory Time Total (39days)	1,240 min	620 min	180 min	90 min	480 min	480 min	--
Impact Pile Driving							
Total Quantity	0	0	0	0	16	8	--
Max # Piles Impacted per Day	0	0	0	0	4	2	4
# of Strikes per Pile	0	0	0	0	100	135	--
Impact Time per Pile	0	0	0	0	2.5 min	3 min	--
Impact Time per Day	0	0	0	0	10 min	6 min	10 min
Impact Time Total (8 days)	0	0	0	0	40 min	24 min	--
Socketed Pile Installation (Down-Hole Drilling)							
Total Quantity	10	0	18	0	0	0	--
Max # Piles Socketed per Day	2	0	2	0	0	0	2
Socket Time per Pile	60 min	0	60 min	0	0	0	--
Socket Time per Day	120 min	0	120 min	0	0	0	240 min
Socket Time Total (14 days)	600 min	0	1,080 min	0	0	0	--
Rock Anchor Installation (Drilled Shaft)							
Total Quantity	0	0	2	0	16	8	--
Anchor Diameter	--	--	8”	0	33”	33”	--
Max # Piles Anchored per Day	0	0	1	0	2	2	2
Anchor Time per Pile	0	0	60 min	0	240 min	240 min	--
Anchor Time per Day	0	0	60 min	0	480 min	480 min	480 min
Anchor Time Total (14 days)	0	0	120 min	0	3,840 min	1,920 min	--

1.3 ACOUSTIC THRESHOLDS AND ESONIFIED AREA

Vibratory pile driving and removal, impact pile driving, socketing, and rock anchor installation 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 (PTS) 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* (NMFS 2018) 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 2018). DPD's activity includes the use of both impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal, socketing, and rock anchor installation) sources. The thresholds for auditory injury are provided in Table 3.

Table 3. Thresholds Identifying the Onset of PTS

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

Adapted from: NMFS 2018

* 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 microPascal (µPa), and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. 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 (low frequency, medium frequency, and high frequency cetaceans, and Phocid pinnipeds and Otariid 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 1µPa (rms) for continuous and above 160 dB re 1µPa (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, expressed in sound pressure level (SPL)[2] or sound exposure level (SEL)[3] for a given activity and pile type (e.g., vibratory removal of 30-inch-diameter steel pile, impact pile driving 42-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 meter to 16 kilometers. See Appendix B for the threshold calculation spreadsheets.

[2] Sound pressure is the sound force per unit micropascals (µPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 µPa, and the units for underwater sound pressure levels are decibels (dB) re 1 µPa (NMFS 2018a).

[3] A measure of sound level that takes into account the duration of the signal (NMFS 2018).

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

Activity	Received Level at 10 meters	Distance (in meters) to Level A and Level B Thresholds[1]					
		Level A[2]					Level B
		Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid	
Vibratory Pile Driving/Removal							
24-inch steel installation (18 piles; ~40 min per day on 4.5 days)	161.9 SPL[3]	6.0	0.5	8.8	3.6	0.3	6,213
30-inch steel temporary installation (62 piles; ~2 hours per day on 10.5 days)	161.9 SPL[3]	12.4	1.1	18.4	7.6	0.5	6,213
30-inch steel removal (62 piles; ~1 hour per day on 10.5 days)	161.9 SPL[3]	7.8	0.7	11.6	4.8	0.3	6,213
30-inch steel permanent installation (3 piles; ~1 hour per day on 1.5 days)	161.9 SPL[3]	7.8	0.7	11.6	4.8	0.3	6,213
36-inch steel permanent installation (16 piles; ~1 hour per day on 8 days)	168.2 SPL[4]	20.6	1.8	30.5	12.5	0.9	16,343
42-inch steel permanent installation (8 piles; ~2 hours per day on 4 days)	168.2 SPL[4]	32.7	2.9	48.4	19.9	1.4	16,343
Impact Pile Driving[5,6]							
36-inch steel permanent installation (16 piles; ~10 min per day on 4 days)	186.7 SEL/ 198.6 SPL[4]	956.7	34.0	1,139.6	512.0	37.3	3,744
42-inch steel permanent installation (8 piles; ~6 min per day on 4 days)	186.7 SEL/ 198.6 SPL[4]	736.2	26.2	876.9	394.0	28.7	3,744
Socketed Pile Installation							
24-inch steel permanent installation (18 piles; ~2 hours per day on 9 days)	166.2 SPL[7]	24.1	2.1	35.6	14.6	1.0	12,023
30-inch steel temporary installation (up to 10 piles; ~2 hours per day on 5 days)	166.2 SPL[7]	24.1	2.1	35.6	14.6	1.0	12,023
Rock Anchor Installation							
8-inch anchor permanent installation (for 24-inch piles, 2 anchors; ~1 hour per day on 2 days)	166.2 SPL[7]	15.2	1.3	22.4	9.2	0.6	12,023
33-inch anchor permanent installation (for 36-inch piles, 16 anchors; ~8 hours per day on 8 days)	166.2 SPL[7]	60.7	5.4	89.7	36.9	2.6	12,023
33-inch anchor permanent installation (for 42-inch piles, 8 anchors; ~8 hours per day on 4 days)	166.2 SPL[7]	60.7	5.4	89.7	36.9	2.6	12,023

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

[2] 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 (LF cetacean) would have to remain 7.8 meters from 30-inch piles being installed via vibratory methods for 1 hour for PTS to occur.

[3] The 24-inch and 30-inch-diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch-diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).

[4] The 36-inch and 42-inch-diameter pile source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16). We calculated the distances to impact pile driving Level A thresholds for 36-inch piles

assuming 100 strikes per pile and a maximum of 4 piles installed in 24 hours; for 42-inch piles we assumed 135 strikes per pile and a maximum of 2 piles installed in 24 hours.

[5] Assuming strike duration of 100 milliseconds per NMFS Manual for Optional User Spreadsheet Tool (Version 2.0) for: 2018 Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0).

[6] SPL rms values were used to calculate distance to Level B harassment isopleths for impact pile driving.

[7] The socketing and rock anchor source level is proxy from median measured sources levels from down-hole drilling of 24-inch-diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).

1.3.4 Action Area

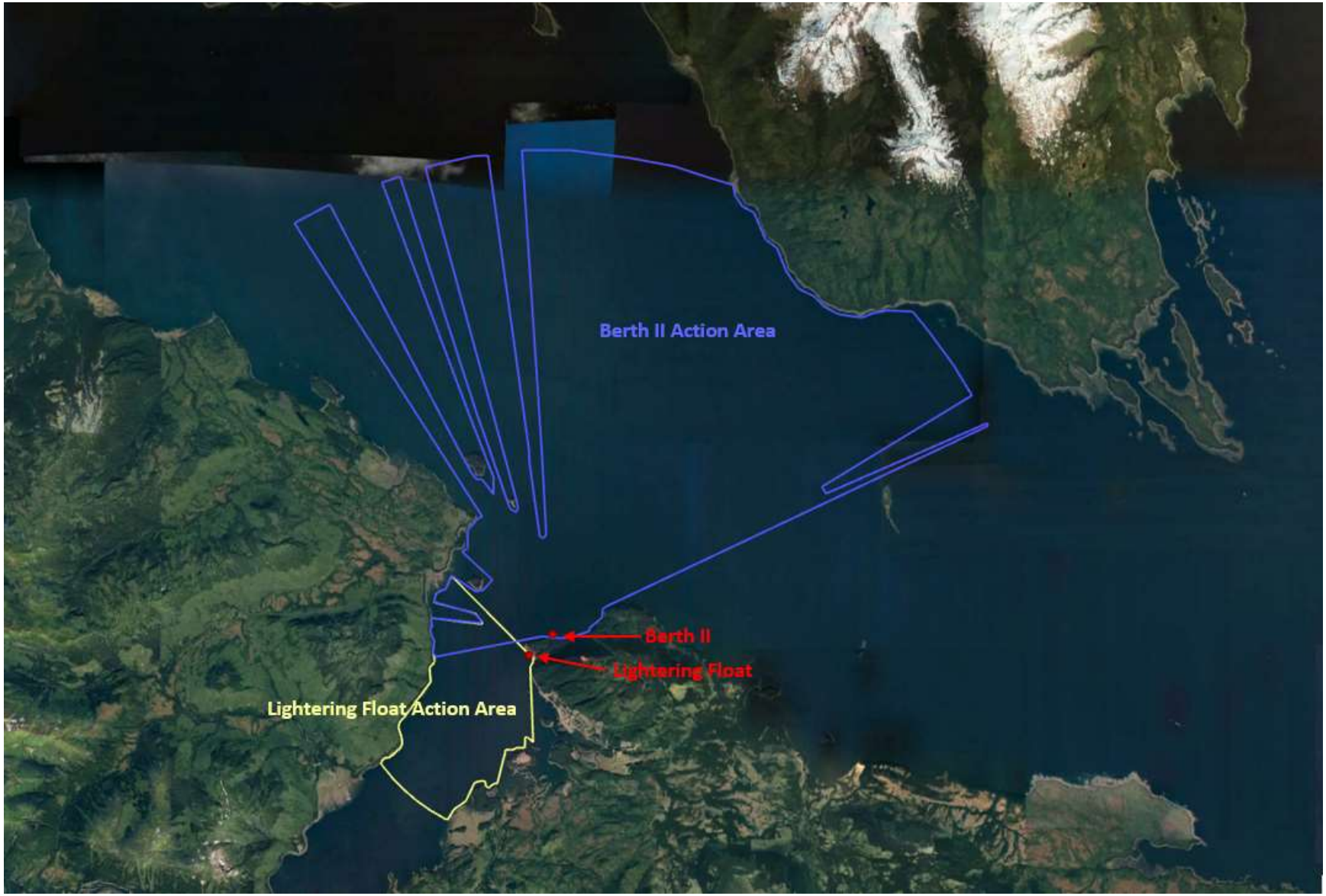
The vicinity of the project area that will be affected directly by the action, referred to as the action area in this document, has been determined by the area of water that will be ensonified above acoustic thresholds in a day. In this case, the action area is the area where received noise levels from vibratory pile driving of 36- and 42-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 16.3 kilometers from the source. However, the action area would be truncated in areas where land masses obstruct underwater sound transmission; the action area extends into Port Frederick Inlet and into Icy Strait, encompassing approximately 193 square kilometers (Figure 8).

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 (NMFS 2018b). Pile driving and removal associated with this project will generate in-air noise above ambient levels within Port Frederick Inlet and Icy Strait. However, the predicted distances to the in-air noise disturbance threshold for hauled-out harbor seals (90 dB rms) and sea lions (100 dB rms) will not extend more than 53 meters and 69 meters from any type of pile being impacted or vibrated, respectively.[4] The nearest documented harbor seal haul out to the project area is approximately 1,850 meters west, and the nearest sea lion haul out is more than 50 kilometers away (Alaska Fisheries Science Center [AFSC] 2018; NMFS No date). No in-air disturbance to hauled-out individuals are anticipated as a result of the proposed 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 for more details on mitigation, shutdown, and monitoring procedures (Appendix C).

[4] Predicted distances for in-air threshold distances. The Washington State Department of Transportation has documented un-weighted rms levels for a vibratory hammer (30-inch pile) to an average 96.5 dB and a maximum of 103.2 dB at 15 meters (Laughlin 2010). Maximum levels were used to extrapolate distances for the project's largest (42-inch-diameter) piles. In-air sound levels for impact hammering of 42-inch-diameter piles were not available; the Port of Anchorage, AK, Austin et al. (2016) found source levels of 101 dB at 15 meters during impact installation of 48-inch-diameter steel piles.

Figure 8. 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 begin in June and end in November 2019.

Pile installation activities are expected to occur for a total of approximately 179 hours over 75 days (not necessarily consecutive days). Please see Table 2 for the specific amount of time required to install (and remove temporary) 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.

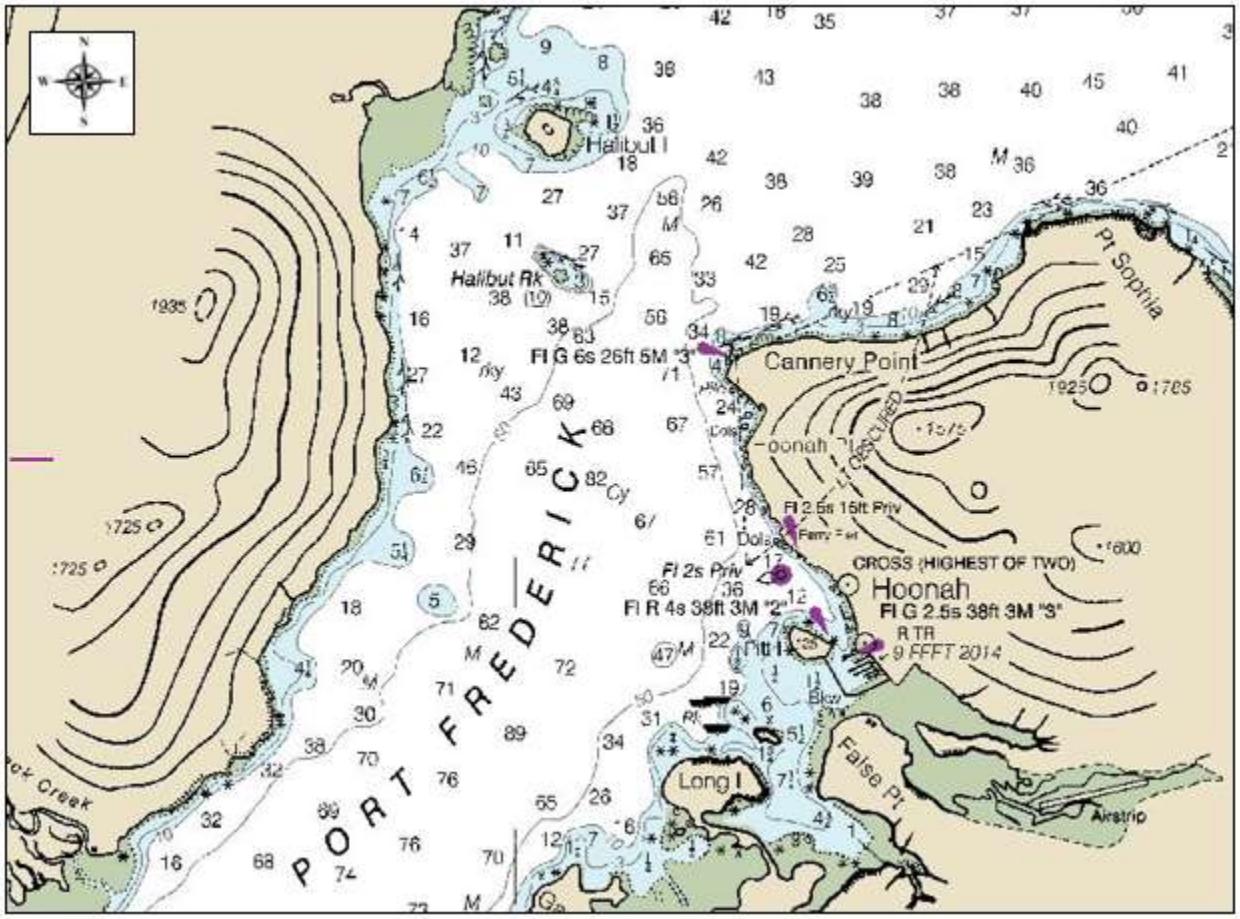
2.2 SPECIFIED GEOGRAPHIC REGION

Hoonah is located in Southeast Alaska on Chichagof Island, 64 kilometers southwest of Juneau. Cannery Point is located approximately 2.4 kilometers north of the city on the shore where Port Frederick Inlet and Icy Strait converge (Figures 1 and 2). For more detailed location information, see Section 1.

2.2.1 Physical Environment

Icy Strait is part of Alaska's Inside Passage, a route for ships through Southeast Alaska's network of islands, located between Chichagof Island and the North American mainland. Port Frederick is a 24-kilometer inlet that dips into northeast Chichagof Island from Icy Strait, leading to Neka Bay and Salt Lake Bay. The inlet varies between 4 and almost 6 kilometers wide with a depth of up to 150 meters. According to charts published by the National Oceanic and Atmospheric Administration (NOAA), near the proposed project the inlet is 14 to 35 meters deep (Figure 9, NOAA 2016). NMFS's ShoreZone Mapper details the proposed project site as a semi-protected/partially mobile/sediment or rock and sediment habitat class with gravel beaches environmental sensitivity index (NMFS 2018c).

Figure 9. NOAA Nautical Chart #17302 Hoonah Area Bathymetry



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, walleye pollock, salmon, and eulachon are among the species that congregate ephemerally, and marine mammals tend to be more common in the action area in late spring/early summer when these prey species tend to be more abundant (Straley et al. 2017). As project construction would be initiated in the spring, this seasonal variation (increase) 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 Chichagof Island support many species of marine mammals. Based on their Online Species Mapper, NMFS Alaska identifies nine species of marine mammals that could occur in the vicinity of the proposed project. Table 5 lists these species and summarizes key information regarding stock status and abundance.

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

Species [a]	Stock and Abundance Estimate [c]	Endangered Species Act (ESA) Status	MMPA Status	Occurrence in Action Area [b]
Minke Whale (*Balaenoptera acutorostrata*)	Alaska N/A	Not listed	Not strategic, non-depleted	Rare
Humpback Whale (*Megaptera novaeangliae*)	Hawaii DPS 9,487 [c]	Not listed	Strategic, depleted	Common
	Mexico DPS 606 [c]	Threatened	Strategic, depleted	Common
Gray Whale (*Eschrichtius robustus*)	Eastern North Pacific 20,990 [d]	Not listed	Not strategic, non-depleted	Rare
Killer Whale (*Orcinus orca*)	West Coast Transient 243	Not listed	Not strategic, non-depleted	Frequent
	Northern Resident (BC) 261	Not listed	Not strategic, non-depleted	
	Alaska Resident 2,347	Not listed	Not strategic, non-depleted	
Pacific White-Sided Dolphin (*Lagenorhynchus obliquidens*)	North Pacific 26,880	Not listed	Not strategic, non-depleted	Rare
Dall's Porpoise (*Phocoenoides dalli*)	Alaska (occurs in Southeast Alaska in summer) 2,680 [e]	Not listed	Not strategic, non-depleted	Infrequent
Harbor Porpoise (*Phocoena phocoena*)	Southeast Alaska 6,980 [f]	Not listed	Strategic, non-depleted	Common
Harbor Seal (*Phoca vitulina*)	Glacier Bay/Icy Strait 7,210	Not listed	Not strategic, non-depleted	Common
Steller Sea Lion (*Eumatopia jubatus)*	Western U.S. 53,303	Endangered	Strategic, depleted	Common
	Eastern U.S. 41,638	Not listed	Not strategic, non-depleted	

[a] Species listed with ranges extending into the project area derived from the NOAA Online Species Mapper (NMFS 2018k) and monitoring conducted for other projects in the area.

[b] Occurrence estimates based on Marine Mammal Monitoring Summary Report: Icy Strait Cruise Ship Terminal (BergerABAM 2016). 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] Under the MMPA humpback whales are considered a single stock (Central North Pacific); however, we have divided them here to account for distinct population segments (DPSs) listed under the ESA. Using the stock assessment from Muto et al. 2018 for the Central North Pacific stock (10,103) and 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.

[d] Carretta et al. 2018.

[e] Jefferson et al. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4%), lower numbers in summer (N=2,680, CV=19.6%), and lowest in fall (N=1,637, CV=23.3%). NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2018). However, this estimate does not include coastal or inland waters of Southeast Alaska. For this application we use the most current estimate for Southeast Alaska in the summer.
[f] Hobbs and Waite 2010.

Based on the above information we believe that minke whales, humpback whales, gray 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 requests the take of, and assesses the potential impacts of the project to these nine 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 MINKE WHALE

4.1.1 Hearing Ability

Minke whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz; NMFS 2018).

4.1.2 Status

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

4.1.3 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 2018d).

4.1.4 Presence in Project Area

Minke whales are rare in the action area, but they could be encountered during any given day of construction. Minke whales are observed in Alaska's nearshore waters during the summer months (National Park Service [NPS] 2018). 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 2018d). The protected species observers (PSOs) for construction of the first Icy Strait cruise ship berth reported one sighting of a minke whale throughout the duration of monitoring (June 2015 –January 2016, BergerABAM 2016).

4.2 HUMPBACK WHALE

4.2.1 Hearing Ability

Humpback whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 Hz to 35 kHz (NMFS 2018). However, because of the lack of captive subjects and logistical challenges of bringing experimental subjects into the laboratory, no direct measurements of mysticete (baleen whale) 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 Hz 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).

4.2.2 Status

Humpback whales worldwide were designated as "endangered" under the Endangered Species Conservation Act in 1970 and were listed under the 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). The proposed 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 (NMFS 2016).

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. 2018).

4.2.3 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 Colombia 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 (Clapham 2000).

4.2.4 Presence in Project Area

Humpback whales may be found in and around Chichagof Island, Icy Strait, and Port Frederick Inlet at any given time. 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 (Bettridge et al. 2015). Diet for humpback whales in the Glacier Bay/Icy Strait area mainly consists of small schooling fish (capelin, juvenile walleye pollock, sand lance, and Pacific herring) rather than euphausiids (krill). They migrate to the northern reaches of Southeast Alaska (Glacier Bay) during spring and early summer following these fish and then move south towards Stephens Passage in early fall to feed on krill, passing the project area on the way (Krieger and Wing 1986). Over 32 years of humpback whale monitoring in the Glacier Bay/Icy Strait area reveals a substantial decline in population since 2014; a total of 164 individual whales were documented in 2016 during surveys conducted from June-August, making it the lowest count since 2008 (Neilson et al. 2017)

During construction of the first Icy Strait cruise ship berth from June 2015 through January 2016, humpback whales were observed in the action area on 84 of the 135 days of monitoring; most often in September and October. Up to 18 humpback sightings were reported on a single day (October 2, 2015), and a total of 226 Level B harassments were recorded during project construction (BergerABAM 2016). In the project vicinity, humpback whales typically occur in groups of 1-2 animals, with an estimated maximum group size of 4 animals.

4.3 GRAY WHALE

4.3.1 Hearing Ability

Gray whales are classified by NMFS as low-frequency cetaceans, with an estimated hearing range of approximately 10 Hz to 30 kHz (NMFS 2018).

4.3.2 Status

There are two recognized gray whale stocks in the Pacific Ocean. The Western North Pacific stock largely migrates along the Russian coastline and is unlikely to be found in Southeast Alaska. This stock is classified as endangered by the ESA, with an estimated 140 individual whales in 2012 (NMFS 2014). At one time, the Eastern North Pacific stock of gray whales was also listed as endangered under the ESA but was removed from the list in 1994. Today this stock is abundant, with a population estimated to be near 20,000 whales (NMFS 2014a).

4.3.3 Distribution

Gray whales are found exclusively in the North Pacific Ocean. The Eastern North Pacific stock of gray whales inhabit the Chukchi, Beaufort, and Bering Seas in northern Alaska in the summer and fall and California and Mexico in the winter months, with a migration route along the coastal waters of Southeast Alaska. Gray whales have also been observed feeding in waters off Southeast Alaska during the summer (NMFS 2018e).

4.3.4 Presence in Project Area

The migration pattern of gray whales appears to follow a route along the western coast of Southeast Alaska, traveling northward from British Columbia through Hecate Strait and Dixon

Entrance, passing the west coast of Chichagof Island from late March to May (Jones et al. 1984, Ford et al. 2013). Since the project area is on the east coast of Chichagof Island it is less likely there will be gray whales sighted during project construction; however, the possibility exists. During the 2016 construction of the first cruise ship terminal at Icy Strait Point, no gray whales were seen over the duration of project construction (June 2015 – January 2016; BergerABAM 2016).

4.4 KILLER WHALE

4.4.1 Hearing Ability

Killer whales are classified by NMFS as mid-frequency cetaceans with a generalized hearing range of 150Hz to 160 KHz (NMFS 2018). 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.

4.4.2 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 are most likely to occur in northern Southeast Alaska (Muto et al. 2018); the Alaska Resident stock, the Northern Resident stock, and the West Coast Transient stock.

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. 2018); however, the populations that are known to occur in Southeast Alaska are not strategic or depleted under the MMPA.

4.4.3 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 2018f).

The Alaska Resident stock occurs from Southeast Alaska to the Aleutian Islands and Bering Sea. The Northern Resident stock occurs from Washington State through part of Southeast Alaska; and the West Coast Transient stock occurs from California through Southeast Alaska (Muto et al. 2018) and are thought to occur frequently in Southeast Alaska (Straley 2017).

4.4.4 Presence in Project Area

Transient killer whales can pass through the waters surrounding Chichagof Island, in Icy Strait and Glacier Bay, 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 Icy Strait at any given time (North Gulf Oceanic Society 2018).

Killer whales were observed infrequently during construction of the first Icy Strait cruise ship berth in 2015. During the 6-month marine mammal construction observation period, killer whales were observed a few times a month. Usually a singular animal was observed, but a group containing 8 individuals was seen in the action area on one occasion, for a total of 24 animals observed during in-water work (BergerABAM 2016).

4.5 PACIFIC WHITE-SIDED DOLPHIN

4.5.1 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 2018).

4.5.2 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. 2018).

4.5.3 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. 2018). They are most common between the latitudes of 38° North and 47° North (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 (NPS 2018a).

4.5.4 Presence in Project Area

No Pacific white-sided dolphins were observed during construction of the first cruise ship berth from June 2015 to January 2016 (BergerABAM 2016). They are rare in the action area, likely because they are pelagic and prefer more open water habitats than are found in Icy Strait and Port Frederick Inlet. 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. 2018).

4.6 DALL'S PORPOISE

4.6.1 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 2018).

4.6.2 Status

NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2018). However, this

estimate does not include coastal or inland waters of Southeast Alaska. Jefferson et al. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4%), lower numbers in summer (N=2,680, CV=19.6%), and lowest in fall (N=1,637, CV=23.3%). According to the NMFS, Dall's porpoises are considered reasonably abundant (NMFS 2018g).

4.6.3 Distribution

Dall's porpoises are widely distributed across the entire North Pacific Ocean. They show some migration patterns, inshore and offshore and north and south, based on morphology and type, geography, and seasonality (Muto et al 2018). They are common in most of the larger, deeper channels in Southeast Alaska and are rare in most narrow waterways, especially those that are relatively shallow and/or with no outlets (Jefferson et al. 2019). In Southeast Alaska, abundance varies with season.

4.6.4 Presence in Project Area

Jefferson et al. 2019 recently published a report with survey data spanning from 1991 to 2012 that studied Dall's porpoise density and abundance in Southeast Alaska. They found Dall's porpoise were most abundant in spring, observed with lower numbers in summer, and lowest in fall. Surveys found Dall's porpoise to be common in Icy Strait and sporadic with very low densities in Port Frederick (Jefferson et al. 2019). During a 16-year survey of cetaceans in Southeast Alaska, Dall's porpoises were commonly observed during spring, summer, and fall in the nearshore waters of Icy Strait (Dahlheim et al. 2009). Individual Dall's porpoises were observed on two occasions during construction of the first cruise ship berth (BergerABAM 2016). Dall's porpoises generally occur in groups from 2-12 individuals (NMFS 2018g).

4.7 HARBOR PORPOISE

4.7.1 Hearing Ability

Harbor porpoises are classified by NMFS as high-frequency cetaceans with a generalized hearing range of 275 Hz to 160 KHz (NMFS 2018). Harbor porpoises have the highest upper-frequency limit of all odontocetes investigated. Kastelein, Janssen, Verboom, and de Haan (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 re 1 µPa) 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).

4.7.2 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. 2018). Only the Southeast Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration.

No consensus on population estimates for this stock of harbor porpoise has been reached. The entire Southeast Alaska stock of harbor porpoise is currently estimated from aerial surveys to be 11,146 individuals (Hobbs and Waite 2010) and from line-transect vessel surveys to be 975 individuals (Dahlheim et al. 2015). A report by Dahlheim et al. (2015) calculated region-specific abundance estimates for Southeast Alaska and found the northern region's (Cross Sound/Icy Strait/Glacier Bay) population to be close to 400 harbor porpoises. According to Muto et al. (2018), the estimates by Dahlheim et al. are likely underestimates. No reliable information is available to determine trends in abundance. For the purposes of this application, we used the lower 95% confidence limit of 6,980 animals from Hobbs and Waite's aerial surveys (2010, Table 2).

4.7.3 Distribution

In the eastern North Pacific Ocean, the Bering Sea and Gulf of Alaska harbor porpoise stocks 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. 2015).

4.7.4 Presence in Project Area

Harbor porpoises are common in the area surrounding the project area, preferring shallow, nearshore waters. The PSOs for construction of the first cruise ship berth in 2015 and the test pile program for the current dock in 2018 recorded harbor porpoises a few times a month from May to September, and rarely outside of those months (BergerABAM 2016, SolsticeAK 2018). A total of 32 harbor porpoises were observed from June to October during construction of the 2015 cruise ship berth at Icy Strait (BergerABAM 2016). During monitoring within the action area, the largest group size reported was 4 individuals, with most group sizes consisting of 3 or fewer animals (BergerABAM 2016, SolsticeAK 2018).

4.8 HARBOR SEAL

4.8.1 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 2018). They 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).

4.8.2 Status

Harbor seals are not listed as depleted under the MMPA or as threatened or endangered under the ESA. In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). The status of the 12 stocks relative to their Optimum Sustainable Population size is unknown. The Glacier Bay/Icy 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 Glacier Bay/Icy Strait stock is 7,210 (Muto et al. 2018). The current population trend for this stock is an increase of 179 seals per year, with a probability that the stock is decreasing of 0.40 (Muto et al. 2018).

4.8.3 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 Glacier Bay/Icy Strait stock, the only stock considered in this application, ranges along the coast from Cape Fairweather and Glacier Bay south through Icy Strait to Tenakee Inlet on Chichagof Island (Muto et al. 2018).

4.8.4 Presence in Project Area

The Glacier Bay/Icy Strait stock of harbor seals are common residents of the action area and can occur on any given day in the area, although they tend to be more abundant during the fall months (Womble and Gende 2013). A total of 63 harbor seals were seen during the 2015 project, while none were seen during the 2018 test pile program (BergerABAM 2016, SolsticeAK 2018). In the action area harbor seals typically occur in groups of 1-3 animals, although larger groups (16 and 22 individuals each) were observed on two occasions during the 2015 construction of the first cruise ship berth (BergerABAM 2016).

There are two known harbor seal haulouts within the project area. According to the AFSC list of harbor seal haul-out locations, the closest listed haulout (id 1,349: name CF39A) is located in Port Frederick, approximately 1,850 meters west (AFSC 2018). The group of 22 animals was observed using Halibut Rock (approximately 2,000 meters from any potential pile-driving activities) as a haulout.

4.9 STELLER SEA LION

4.9.1 Hearing Ability

Steller sea lions are classified by NMFS as otariid pinnipeds with a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2018). 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, van Schie, Verboom & de Haan 2005) and in air between 250 Hz and 30 kHz (Muslow and Reichmuth 2010).

4.9.2 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). The WDPS remains on the ESA's endangered list.

The most recent population assessment for the U.S. portion of the WDPS and EDPS Steller sea lion stocks is 53,303 and 41,638 animals, respectively, based on aerial photographic and land-based survey data (Muto et al. 2018).

4.9.3 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 2018h). Both WDPS and EDPS Steller sea lions are considered in this application because the WDPS are common within the geographic area under consideration (north of Summer Strait) (Fritz et al. 2013, 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), leading to intermixing of stocks (Jemison et al. 2013; Allen and Angliss 2015).

4.9.4 Presence in Project Area

Steller sea lions are common in the inside waters of Southeast Alaska. They are residents of the project vicinity and are common year-round in the action area, moving their haulouts based on seasonal concentrations of prey from exposed rookeries nearer the open Pacific Ocean during the summer to more protected sites in the winter (Alaska Department of Fish & Game [ADF&G] 2018). The Marine Mammal Monitoring Report for the construction of the existing Icy Strait cruise ship berth reported a total of 180 Steller sea lion sightings over 135 days in 2015, amounting to an average of 1.3 sightings per day (BergerABAM 2016). During a test pile program performed at the project location by the Hoonah Cruise Ship Dock Company in May 2018, a total of 15 Steller sea lions were seen over the course of 7 hours in one day (SolsticeAK 2018). According to NMFS (2018h), they typically occur in groups of 1-10 animals, but may congregate in larger groups near rookeries and haulouts. No documented rookeries or haulouts are near the project area.

4.9.5 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 on the White Sisters Islands near Sitka and the nearest major haulouts are at Benjamin Island, Cape Cross, and Graves Rocks (NMFS No date). The White Sisters rookery is located on the west side of Chichagof Island, about 72 kilometers southwest of the project area. Benjamin Island is about 60 kilometers northeast of Hoonah. Cape Cross and Graves Rocks are both about 70 kilometers west of Hoonah. Steller sea lions are known to haul out on land, docks, buoys, and navigational markers. However, during the summer months when the proposed project would be constructed Steller sea lions are less likely to be in the protected waters around the project area, preferring exposed rookeries on the western shores of Southeast Alaska. Identified critical haulout sites are far beyond in-air noise disturbance threshold for hauled-out pinnipeds as described in Section 1.3.

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.

DPD requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level B harassment of nine species (humpback whale, minke whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion) and Level A take of three species (harbor porpoise, harbor seal, and Steller sea lion) that may occur in the DPD Hoonah Berth II Project harassment zones during construction.

The activities outlined in Section 1 have the potential to take marine mammals by exposure to in-water sound. Level B take of the nine species listed above will potentially result from noise associated with pile installation (and temporary pile removal) using the methods mentioned above (vibrating, impacting, down-hole drilling, and rock anchoring). Pile driving will be shut down if species enter or appear likely to enter within shutdown zones for pile driving activities (varies by species and activity, see Table 8), thereby decreasing potential Level A take of marine mammals. However, zones where Level A take could occur are larger than the shutdown zones for some species and activities. Please see Section 11 for a description of mitigation measures including shutdown zones and procedures that will prevent most Level A take of all species.

The applicant requests an IHA for incidental take of marine mammals described within this application for 1 year, beginning on March 1, 2019 (or the issuance date, whichever is later). DPD is not requesting a Letter of Authorization 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.

We used the Marine Mammal Monitoring Summary Report from the Icy Strait Point Cruise Ship Terminal, referred to as Hoonah Berth I monitoring (BergerABAM 2016), and available scientific literature to estimate the density or occurrence of marine mammals in the action area.

For Level A take of harbor porpoise, harbor seal, and Steller sea lion, we based the take calculation on typical group size multiplied by the number of days of impact pile driving. Since distances to Level A thresholds for other project activities (vibratory pile driving/removal, socketing, rock anchoring) are considerably smaller, we expect the project will be shut down if mammals are observed within these zones.

Throughout all pile driving activity, the Level B monitoring zone will be scanned to monitor for the presence of MMPA- and/or ESA-listed species. If the entire Level B monitoring zone is not visible, pile driving activities may continue, and the number of individual listed animals within the Level B zone will be estimated and recorded. Estimated numbers of individuals will be extrapolated by dividing the number of observed individuals by the percentage of the monitoring zone that was visible.

- For example, if wind and sea state increased causing visibility to diminish to a point that only 40 percent of the monitoring zone were visible, and 2 humpback whales were observed entering the Level B zone, the PSO would estimate that 5 humpback whales were present in the Level B zone (2 whales observed in Level B zone ÷ 40 percent of zone visible = 5 whales estimated to be within Level B zone). (Note that the estimated number of individuals does not equal the estimated number of takes for humpback whales. See next bullet for further explanation.)
- Estimated takes for ESA-listed humpback whales will be calculated based on the total number of humpback whales observed (or estimated) in the Level B monitoring zone in a month multiplied by 6.1 percent [the percentage of humpback whales in the action area estimated to be from the listed Mexico Distinct Population Segment (DPS;Wade et al. 2016)].
- Estimated takes for ESA-listed Western DPS (WDPS) Steller sea lions will be calculated based on the total number of Steller sea lions observed (or estimated) in

the Level A or B monitoring zones in a month multiplied by 0.0703 %[the percentage of Steller sea lions in the action area estimated to be from the listed WDPS (Lauri Jemison DRAFT)].

Species occurrence information used to estimate take and the take calculation are shown in Table 6.

Table 6. Species Occurrence Information and Take Calculation

Species	Occurrence Information	Level B Take Calculation	Level A Take Calculation
Minke Whale	NMFS 2018d: Minke whales individually or in small groups of 2-3, but there are reports of loose aggregations of hundreds of animals. Hoonah Berth I monitoring (BergerABAM 2016): One sighting of a minke whale.	We conservatively estimate a small group to be 3 minke whales 3 minke whales per group x 3 sightings in 6 months= 9	N/A
Humpback Whale	Bettridge et al. 2015: Humpback whales migrate to tropical calving and breeding grounds in winter; however, they have been observed in Southeast Alaska in all months of the year. Hoonah Berth I monitoring (BergerABAM 2016): Humpback whales observed on 84 of the 135 days of monitoring; most often in September and October.	427 non-listed and 26 listed humpback whales could be taken from the start of work through October (when humpback whales could be feeding in the project area) and 6 non-listed and 1 listed humpback whale could be encountered in November (when most whales have migrated) for a total take of 433 non-listed and 27 listed (listed percentage 0.0601 %)[1]	N/A
Gray Whale	NMFS 2018e: Gray whales frequently observed traveling alone or in small, unstable groups, although large aggregations may be seen in feeding and breeding grounds (NMFS (2018e). (Keller et al 2017): Observations in Glacier Bay and nearby waters recorded two sightings of 1 gray whale per sighting over a 10-year period.	We conservatively estimate a small group to be 3 gray whales. 3 gray whales per group x 1 sightings in 6 months= 3	N/A
Killer Whale	Dahlheim 2015: group size of resident killer whale pods in the Icy Strait area range from 42 to 79 and occur in every month of the year. Dalheim et al 2008: greatest number of transient sightings occurred in 1993 with 32 sightings over two months for an average of 16 sightings per month.	We conservatively estimate a group size of 79 resident killer whales and sightings of 16 transient killer whales in a month. 95 killer whales per month x 6 months= 570	N/A
Pacific White-Sided Dolphin	Muto et al. 2018: 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.	164 animals per group x 2 sightings in 6 months= 328	N/A

Species	Occurrence Information	Level B Take Calculation	Level A Take Calculation
Dall's Porpoise	Jefferson et al. 2019: Dall's porpoise most abundant in spring, observed with lower numbers in summer, and lowest in fall; common in Icy Strait and sporadic with very low densities in Port Frederick (Jefferson et al. 2019). Dahlheim et al. 2008: 346 sightings of Dall's porpoise in Southeast Alaska during the summer (June/July) of 2007, average of 173 sightings per month.	We conservatively estimate sightings of 173 Dall's porpoise in a month. 173 Dall's porpoise per month x 6 months= 1,038	N/A
Harbor Porpoise	Dahlheim et al 2015: 332 resident harbor porpoises occur in the Icy Strait area, and are known to use the Port Frederick area as part of their core range. Hoonah Berth I monitoring (BergerABAM 2016): harbor porpoises observed in small groups; largest group size reported was 4 individuals, with most group sizes consisting of 3 or fewer animals.	We conservatively estimate that 322 harbor porpoises could occur in the action area each month. 322 harbor porpoise per month X 6 months=1,932	We conservatively estimate a group size of 4 harbor porpoises. 4 animals per group x 2 groups every day x 8 days= 64
Harbor Seal	Keller et al 2017: an average of 26 sightings occurred each month between June and August of 2014 in Glacier Bay and Icy Strait. Hoonah Berth I monitoring (BergerABAM 2016): harbor seals typically occur in groups of 1-3 animals.	We conservatively estimate that 26 harbor seals could occur in the action area each month. 26 harbor seals per month x 6 months=156	We conservatively estimate a groups size of 3 harbor seals. 3 harbor seals per group x 2 groups every day x 8 days= 48
Steller Sea Lion	The Marine Mammal Monitoring Report for the construction of the existing Icy Strait cruise ship berth reported a total of 180 Steller sea lion sightings over 135 days in 2015, amounting to an average of 1.3 sightings per day (BergerABAM 2016). During a test pile program performed at the project location by the Hoonah Cruise Ship Dock Company in May 2018, a total of 15 Steller sea lions were seen over the course of 7 hours in one day (SolsticeAK 2018). According to NMFS (2018h), they typically occur in groups of 1-10 animals, but may congregate in larger groups near rookeries and haulouts.	We conservatively estimate that from the start of work through July (SSL breeding season) take of 171 non-listed and 12 listed Steller sea lions. For August and after SSL non-breeding season we estimate 388 takes of non-listed and 27 takes of listed for a total take of 559 non-listed and 39 listed (DPS percentage 0.0703 %).[2]	We conservatively estimate a group size of 2 Steller sea lions. 2 Steller sea lions per group x 1 group every day x 8 days = 16

Notes:

Proposed take estimates are conservative and for Level B take in most cases are based on what available literature reports as the maximum number of animals observed in a group. Because the Level A take zones are much smaller than the Level B zones, in most cases Level A take estimates rely on group sizes observed during construction of Berth I.

[1]Take calculated based on NMFS AK recommendation where the following data sources were used to determine seasonal exposure estimates:

Neilson, J., C Gabrielle, P Vanselow. 2014. Humpback Whale Monitoring in Glacier Bay and Adjacent Waters 2014. Natural Resource Report NPS/GLBA/NRR—2015/949, Fort Collins, Colorado (and subsequent annual updates).

opportunistic sightings reported in Whale Alert 2016-2018 (unpublished)

unpublished records of bubblenet feeding in Port Frederick maintained by NPS
expert opinion by local species research biologists
Percentage of Mexico dps in action area is 0.0601 (Wade et al 2016).
[2]Take calculated based on NMFS AK recommendation where the following data sources were used to determine seasonal exposure estimates: SSL move to rookeries on outer coast for breeding/pupping season and start coming back into action area around beginning of August (Womble pers. comm), percentage of western dps in action area is 0.0702 (Lauri Jemison DRAFT).

6.2 All Marine Mammal Takes Requested

This analysis for the DPD Hoonah Berth II Project predicts 9 potential takes of minke whales, 433 potential take of non-listed and 27 potential takes of listed humpback whales , 3 potential takes of gray whales, 570 potential takes of killer whales, 328 potential takes of Pacific white-sided dolphins, 1,038 potential takes of Dall's porpoises, 1,932 potential takes of harbor porpoises, 156 potential takes of harbor seals, and 559 potential take of non-listed and 39 potential takes of listed Steller sea lions classified as Level B harassment under the MMPA. Potential Level A takes are predicted for three species; harbor porpoise (64 takes), harbor seal (48 takes), and Steller sea lion (16 takes; Tables 6 and 7). To mitigate for the large action area and potential periods of limited visibility, the takes requested include extrapolated take. The calculation for extrapolating take is described in Section 11.3.

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

Species	Stock (N_{EST}) [a]	Level A	Level B	Percent of Stock [b]
Minke Whale	N/A	0	9	N/A
Humpback Whale	Hawaii DPS (9,487) [c] Mexico DPS (606) [c]	0	433 27	4.6 4.5
Gray Whale	Eastern North Pacific (20,990) [d]	0	3	0.01
Killer Whale	Alaska Resident (2,347) Northern Resident (261) West Coast Transient (243)	0	469 52 49	19.9[e] 19.9 [e] 19.9 [e]
Pacific White-Sided Dolphin	North Pacific (26,880)	0	328	1.2
Dall's Porpoise	Alaska stock in Southeast Alaska (2,680) [f]	0	1,038	38.7
Harbor Porpoise	Southeast Alaska (6,980) [g]	64	1,932	0.9 (Level A) 27.7 (Level B)
Harbor Seal	Glacier Bay/Icy Strait (7,210)	48	156	0.7 (Level A) 2.2 (Level B)
Steller Sea Lion	Eastern U.S. (41,638) Western U.S. (53,303)	15 1	559 39	.04 (Level A) 1.3 [h] (Level B) .002 (Level A) 0.07 [h] (Level B)

[a] Stock estimate from Muto, M. M. et al. 2018. Appendix 2. Stock Summary Table (last revised 12.30.17). NOAA-TM-AFSC-378 unless otherwise noted.

[b] Percent of stock refers to Level B take. Level A take of harbor porpoise represents 0.7% of stock, Level A take of harbor seal represents 0.7% of stock, and Level A take of Steller sea lion represents 0.002% of stock (Eastern and Western U.S. combined).

[c] 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. Using the stock assessment from Muto et al. 2018 for the Central North Pacific stock (10,103 whales) and calculations in Wade et al. 2016; 9,487 whales are expected to be from the Hawaii DPS and 606 from the Mexico DPS.

[d] Carretta, J.V. et al. 2018.

[e] Take estimates are weighted based on calculated percentages of population for each distinct stock, assuming animals present would follow same probability of presence in project area.

[f] Jefferson et al. 2019 presents the first abundance estimates for Dall's porpoise in the waters of Southeast Alaska with highest abundance recorded in spring (N=5,381, CV= 25.4%), lower numbers in summer (N=2,680, CV=19.6%), and lowest in fall (N=1,637, CV=23.3%). NMFS currently recognizes a single stock of Dall's porpoise in Alaskan waters and an estimate of 83,400 Dall's porpoises is used by NMFS for the entire stock (Muto et al. 2018). However, this estimate does not include coastal or inland waters of Southeast Alaska. For this application, we use the most current estimate for Southeast Alaska in the summer, when construction is most likely to occur.

[g] Estimate is the lower 95% confidence limit from Hobbs and Waite 2010.

[h] Take estimate based on 0.0702 percent of Steller sea lions in action area from the WDPS (Lauri Jemison DRAFT).

7 ANTICIPATED IMPACT OF THE ACTIVITY

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

DPD 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 Tables 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.

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 75 days when pile driving and removal occurs. Because of the limited time that marine mammals could be exposed to Level B harassment, the Hoonah Berth II project 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.

DPD is requesting minimal Level A take that may occur for harbor porpoises and harbor seals during impact pile driving of 36- and 42-inch piles (see Table 8). Most Level A take of Steller sea lions should be prevented by shutdowns as described in Section 11; however, DPD is requesting a minimal amount of Level A take for the species. Incidental Level A take can cause injury including permanent, partial, or full hearing loss if marine mammals are exposed to underwater sounds exceeding the injury threshold, which vary by species. Marine mammals exposed to high received sound levels may experience non-auditory physiological effect such as increased stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage.

Because of the limited area and time over which harbor porpoises, harbor seals, and Steller sea lions could experience Level A harassment (impact pile driving would only occur for approximately 10 minutes per day during 8 days), it is not expected that there would be any impact on stock recruitment or survival, and therefore, there would be no 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 (Wolfe et al. 2013). In Hoonah specifically, the number of hunters participating in subsistence harvest of harbor seals has decreased in recent years. Native households in Hoonah reporting participation in subsistence take of harbor seals declined from 30 households in 2000 to 15 households in 2012, but average take estimates have increased, possibly reflecting an improvement in the efficiency of those participating (Wolfe et al. 2013). Subsistence harvest data for the Glacier Bay/Icy Strait stock indicates an average annual harvest in the years 2004-2008 of 52 harbor seals and an average annual harvest in the years 2011-2012 of 104 harbor seals (summarized in Muto et al. 2018 from Wolfe et al. 2013). For the most recent years of collected data (2005-2008 and 2012) the average number of EDPS Steller sea lions harvested from 16 Southeast Alaska communities is 11 animals (Muto et al. 2018). In 2012, Hoonah had an estimated subsistence take of 40 harbor seals and 7 Steller sea lions (Wolf et al. 2013).

In September 2018, we contacted the Indigenous People's Council for Marine Mammals (IPCoMM), the Alaska Sea Otter and Steller Sea Lion Commission, and the Hoonah Indian Association (HIA) to determine potential project impacts on local subsistence activities. No comments were received from IPCoMM or the Alaska Sea Otter and Steller Sea Lion Commission.

On October 23, 2018, a conference call between representatives from DPD, Turnagain Marine Construction, SolsticeAK, and the HIA (Robert Starbard, Ian Johnson, and David See) was held to discuss tribal concerns regarding subsistence impacts.

The tribe confirmed that Steller sea lions and harbor seals are harvested in and around the project area.[5] Mr. Johnson referenced the 2012 subsistence technical paper by Wolf et al. (2013) as the most recent information available on marine mammal harvesting in Hoonah. They agreed that the proposed construction activities are unlikely to have significant impacts to marine mammals as they are used in subsistence applications; however, future operations of the proposed facilities and associated increase in tourist and vessel traffic could impact the availability of fish and marine mammals in the area.

Mr. Starbard, HIA's Tribal Administrator, expressed the concern that the location of the proposed cruise ship berth is in the vicinity of a fishing area that is frequented by Hoonah

[5] The tribe also mentioned that sea otters, not covered under this IHA application, are a subsistence resource taken in the project area.

locals. He was also concerned about the impact of increased tourist and vessel traffic spurred by the addition of a second berth and lightering float to subsistence resources in and around Hoonah. Mr. Johnson, HIA's Environmental Coordinator, echoed these concerns, adding that HIA would want to consider the longer-term effects that the projected increase in tourism would have on community subsistence activities, mainly fishing.

As requested during the meeting, information on the timing of the IHA issuance was provided via email to the tribe on October 23, 2018. As of April 9, 2019, 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:

- construction activities are localized and temporary;
- mitigation measures will be implemented 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

The construction of a second cruise ship berth facility would cause some permanent removal of habitat available to marine mammals. The area lost would be small, approximately equal to the area of the cruise ship berth and associated pile placements. These impacts are anticipated to be minor, and have been minimized by use of a floating, pile-supported design rather than a design requiring dredging or fill. The proposed design would not impede migration through the action area.

Marine mammals may be permanently deterred from using habitat near to the project area, as vessel traffic and tourist activity in this area would increase. Habitat impacts may also occur from alterations in sunlight penetration (overwater shading) and water flow in the vicinity of the proposed structures.

The small lightering facility nearer to the cannery would likely not impact any marine mammal habitat since its proposed location is in between two existing, heavily-traveled docks, and within an active marine commercial and tourist area.

9.1.2 Turbidity/Sedimentation

Throughout the duration of pile driving and removal, a temporary and localized increase in turbidity near the seafloor would occur in the immediate area surrounding the area where piles are placed. 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 (NMFS 2018i) and other species of marine fish such as halibut, rock sole, sculpins, Pacific cod, herring, and eulachon (NMFS 2018j).

The following essential fish habitat (EFH) species may occur in the project area during at least one phase of their lifestage: Chum Salmon (*Oncorhynchus keta*), Pink Salmon (*O. gorbuscha*), Coho Salmon (*O. kisutch*), Sockeye Salmon (*O. nerka*), and Chinook Salmon (*O. tshawytscha*). No habitat areas of particular concern or EFH areas protected from fishing are identified near the project area (NMFS 2018i). There are no documented anadromous fish streams in the project area. The closest documented anadromous fish steam is approximately 2.5 miles southeast of the project area (ADF&G 2018a).

Since the proposed project has a small benthic footprint and does not require dredging or fill, 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 in Port Frederick Inlet and Icy Strait. 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 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 most likely effects on marine mammal habitat from the proposed project would 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 construction noise is not expected to be permanent nor is it anticipated to have long-term effects on the species. Project activities are 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 construction-related noise sources will be temporary and intermittent. However, increased vessel traffic (cruise ships, small excursion craft) currently occurring in the area may result in an overall increased level of ambient noise in near Hoonah. This may deter marine mammals from inhabiting or traveling through the area and result in a minor loss of habitat.

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 Icy Strait. 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 or turbidity generated 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 Hoonah Berth II Project Marine Mammal Monitoring and Mitigation Plan (Appendix C).

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.
- The project uses a design that places the cruise ship berth and piles at or beyond the 50-foot contour to avoid impacts to the nearshore zone and disturbance to important ecological resources such as submerged aquatic vegetation and diverse substrate composition.
- Floats or barges will not be grounded at any tidal stage.

11.2 Oil and Spill Prevention

- The contractor will provide and maintain a spill cleanup kit on-site at all times, to be implemented as part of the DB Brightwater Shipboard Oil Pollution Emergency Plan for oil spill prevention and response (Turnagain Marine Construction 2018).
- Fuel hoses, oil drums, oil or fuel transfer valves and fittings, and similar equipment will be checked regularly for drips or leaks, and would be maintained and stored properly to prevent spills.
- Oil booms will be readily available for oil or other fuel spill containment should any release occur.
- All chemicals and petroleum products will be properly stored to prevent spills.
- No petroleum products, cement, chemicals, or other deleterious materials will be allowed to enter surface waters.

11.3 Mitigation Measures Designed to Reduce Impacts to Marine Mammals

- To minimize noise during 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.

- There will be a nominal 10-meter 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: (1) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull); or (4) 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.

- PSOs will be present in the action area during all vibratory pile removal and vibratory, impact, socketing, and anchoring installation. The Marine Mammal Monitoring and Mitigation Plan for the proposed project is included as Appendix C.
- 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 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.
- 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, DPD 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 a marine mammal appears likely to enter a shutdown zone (Section 11.3).
- The U.S. Fish and Wildlife Service (USFWS) manages northern sea otters (*Enhydra lutris kenyoni*) and lists them as a species that can occur in the action area (USFWS 2014). A separate IHA request is being submitted to USFWS concurrently with this application to obtain permission to take to sea otters.

11.4 Shutdown and Monitoring Zones

DPD is requesting Level B take for minke whale, humpback whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion and Level A take of harbor porpoise, harbor seal, and Steller sea lion incidental to construction of Hoonah Berth II. DPD is not requesting take for any other marine mammal. Shutdown and monitoring zones are described in the following sub-sections.

11.4.1 Level A Shutdown and Monitoring Zones

There will be a nominal 10-meter 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); 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.

DPD will implement additional shutdowns to protect marine mammals from Level A harassment and prevent auditory injury to all hearing groups during pile installation, removal, and rock anchoring project activities as shown in Table 8 and Figure 10. (Level A area figure for the lightering float is not shown due to scale.) For impact pile-driving of 36- and 42-inch piles, the Level A harassment zone radius for harbor porpoise and harbor seal is larger than the proposed shutdown zones. Because they are more difficult to see and due to the high likelihood of their presence within the project area, Level A take has been requested for harbor porpoises and harbor seals in those instances in which they occur within the Level A harassment zone but outside of the shutdown zone *or* if they were to occur within the shutdown zone and were not visualized in time for the project to be shut down.[6,7]

Steller sea lions also occur in the action area with high frequency. Level A take has been requested for Steller sea lions in the rare case that they were not visualized in the Level A harassment zone before the project was shut down.

[6] Level A take for Dall's porpoise is not requested. This species is infrequently sighted in the action area. During the 2015 construction of the first cruise ship berth, a total of two Dall's porpoise were observed during construction activities.

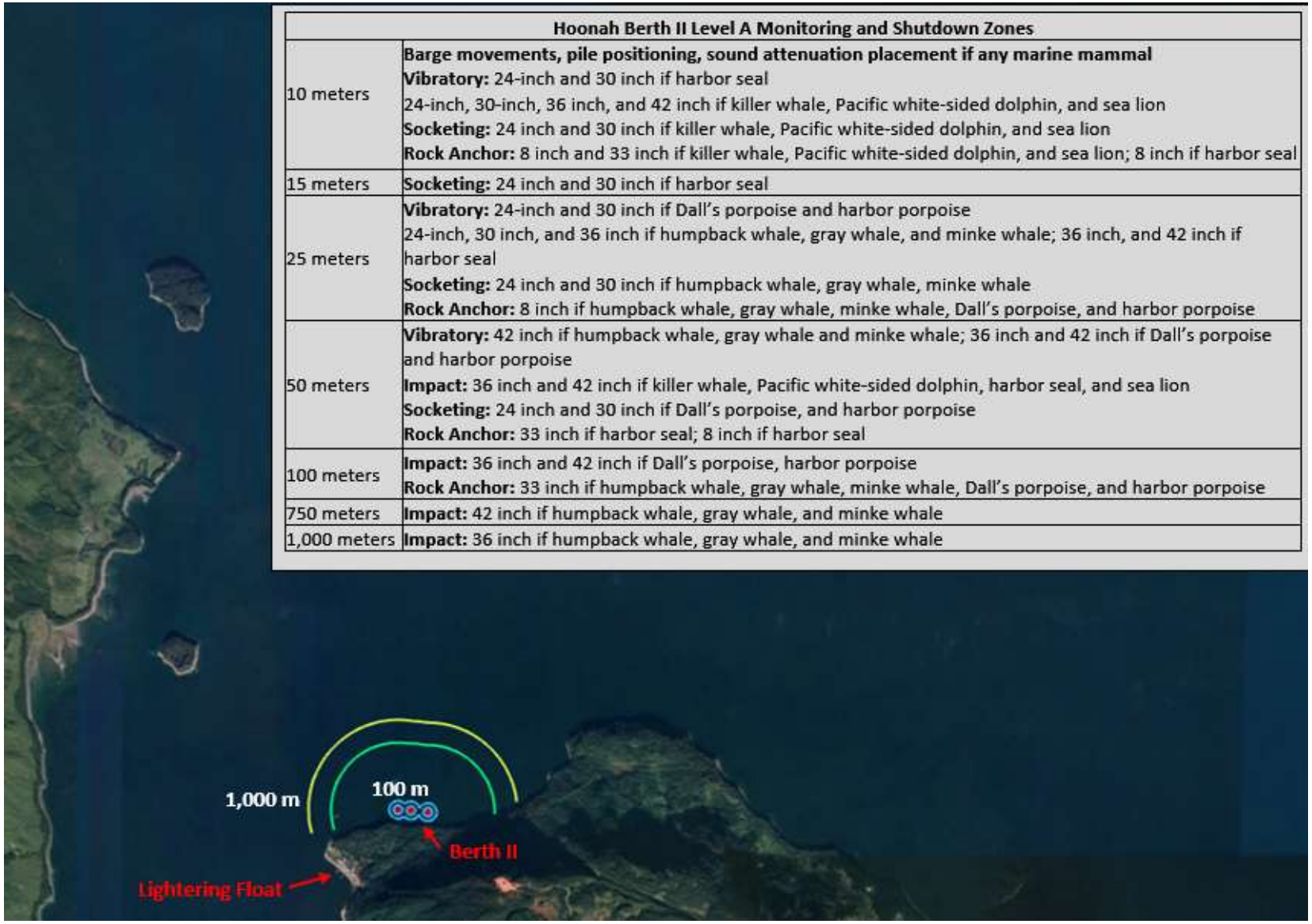
[7] Although humpback whales are also common in the action area, the proposed shutdown zone is equal to the Level A threshold for this species since 1,000 meters is considered to be a reasonable monitoring distance for these larger animals.

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

Source	Shutdown Zones in Meters (*monitoring zone, if different, in meters*)				
	Low-Frequency Cetaceans (humpback whale, gray 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, sound attenuation placement*	10	10	10	10	10
Vibratory Pile Driving/Removal					
24-inch steel installation (18 piles; ~40 minutes per day on 4.5 days)	25	10	25	10	10
30-inch steel temporary installation (62 piles; ~2 hours per day on 10.5 days)	25	10	25	10	10
30-inch steel removal (62 piles; ~1 hour per day on 10.5 days)	25	10	25	10	10
30-inch steel permanent installation (3 piles; ~1 hour per day on 1.5 days)	25	10	25	10	10
36-inch steel permanent installation (16 piles; ~1 hour per day on 8 days)	25	10	50	25	10
42-inch steel permanent installation (8 piles; ~2 hours per day on 4 days)	50	10	50	25	10
Impact Pile Driving					
36-inch steel permanent installation (16 piles; ~10 minutes per day on 4 days)	1,000	50	100 (*1,200*)	50 (*525*)	50
42-inch steel permanent installation (8 piles; ~6 minutes per day on 4 days)	750	50	100 (*900*)	50 (*400*)	50
Socketed Pile Installation					
24-inch steel permanent installation (18 piles; ~2 hours per day on 9 days)	25	10	50	15	10
30-inch steel temporary installation (up to 10 piles; ~2 hours per day on 5 days)	25	10	50	15	10
Rock Anchor Installation					
8-inch anchor permanent installation (for 24-inch piles, 2 anchors; ~1 hour per day on 2 days)	25	10	25	10	10
33-inch anchor permanent installation (for 36- and 42-inch piles, 24 anchors; ~8 hours per day on 12 days)	100	10	100	50	10

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 10. Berth II Level A Monitoring and Shutdown Zones



Hoonah Berth II Level A Monitoring and Shutdown Zones	
10 meters	**Barge movements, pile positioning, sound attenuation placement if any marine mammal** **Vibratory:** 24-inch and 30 inch if harbor seal 24-inch, 30-inch, 36 inch, and 42 inch if killer whale, Pacific white-sided dolphin, and sea lion **Socketing:** 24 inch and 30 inch if killer whale, Pacific white-sided dolphin, and sea lion **Rock Anchor:** 8 inch and 33 inch if killer whale, Pacific white-sided dolphin, and sea lion; 8 inch if harbor seal
15 meters	**Socketing:** 24 inch and 30 inch if harbor seal
25 meters	**Vibratory:** 24-inch and 30 inch if Dall's porpoise and harbor porpoise 24-inch, 30 inch, and 36 inch if humpback whale, gray whale, and minke whale; 36 inch, and 42 inch if harbor seal **Socketing:** 24 inch and 30 inch if humpback whale, gray whale, minke whale **Rock Anchor:** 8 inch if humpback whale, gray whale, minke whale, Dall's porpoise, and harbor porpoise
50 meters	**Vibratory:** 42 inch if humpback whale, gray whale and minke whale; 36 inch and 42 inch if Dall's porpoise and harbor porpoise **Impact:** 36 inch and 42 inch if killer whale, Pacific white-sided dolphin, harbor seal, and sea lion **Socketing:** 24 inch and 30 inch if Dall's porpoise, and harbor porpoise **Rock Anchor:** 33 inch if harbor seal; 8 inch if harbor seal
100 meters	**Impact:** 36 inch and 42 inch if Dall's porpoise, harbor porpoise **Rock Anchor:** 33 inch if humpback whale, gray whale, minke whale, Dall's porpoise, and harbor porpoise
750 meters	**Impact:** 42 inch if humpback whale, gray whale, and minke whale
1,000 meters	**Impact:** 36 inch if humpback whale, gray whale, and minke whale

Figure 11. Lightering Float Level A Shutdown Zone

11.4.2 Level B Monitoring Zones

DPD is requesting Level B take of minke whale, humpback whale, gray whale, killer whale, Pacific white-sided dolphin, Dall's porpoise, harbor porpoise, harbor seal, and Steller sea lion incidental to constructing Berth II and the small lightering float 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 Figures 11 and 12.

No other Level B take is authorized, and pile driving would be shut down as summarized in Table 9 and Figures 11 and 12 to avoid Level B take in the unlikely event that a marine mammal species, other than those listed and discussed in this document, were to enter the action area.

Table 9. Level B Monitoring Zones

Source	Monitoring Zones (m)*
Vibratory Pile Driving/Removal	
24-inch steel installation (18 piles) (~40 minutes per day on 4.5 days)	6,215
30-inch steel temporary installation (62 piles) (~2 hours per day on 10.5 days)	6,215
30-inch steel removal (62 piles) (~1 hour per day on 10.5 days)	6,215
30-inch steel permanent installation (3 piles) (~1 hour per day on 1.5 days)	6,215
36-inch steel permanent installation (16 piles) (~1 hour per day on 8 days)	16,345
42-inch steel permanent installation (8 piles) (~2 hours per day on 4 days)	16,345
Impact Pile Driving	
36-inch steel (16 piles) (~10 minutes per day on 4 days)	3,745
42-inch steel (8 piles) (~6 minutes per day on 4 days)	3,745
Socketed Pile Installation	
24-inch steel (18 piles) (~2 hours per day on 9 days)	12,025
30-inch steel temporary installation (up to 10 piles) (~2 hours per day on 5 days)	12,025
Rock Anchor Installation	
8-inch anchor (for 24-inch piles, 2 anchors) (~1 hour per day on 2 days)	12,025
33-inch anchor (for 36- and 42-inch piles, 24 anchors) (~8 hours per day on 12 days)	12,025

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

Figure 12. Lightering Float Level B Monitoring Zone

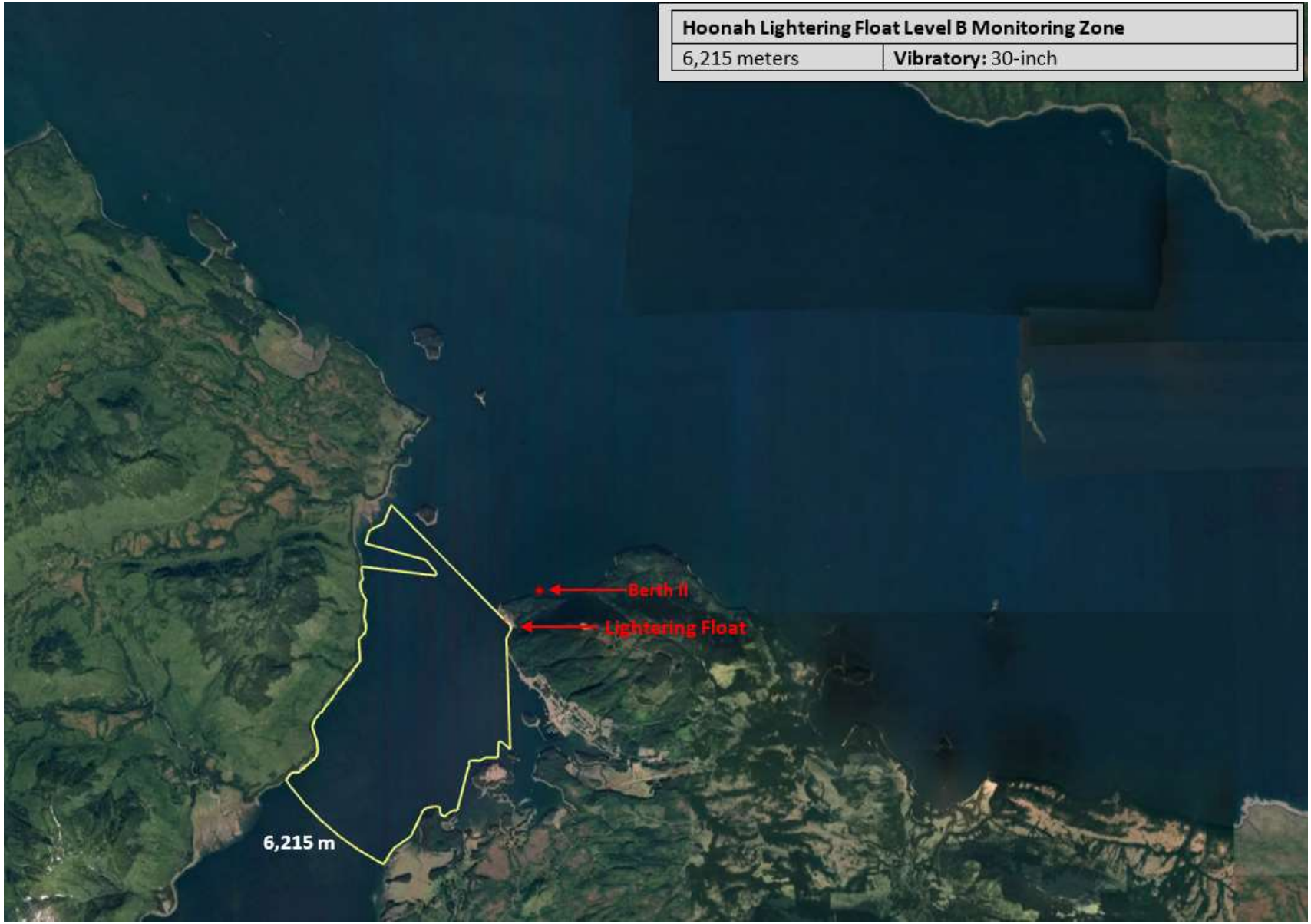
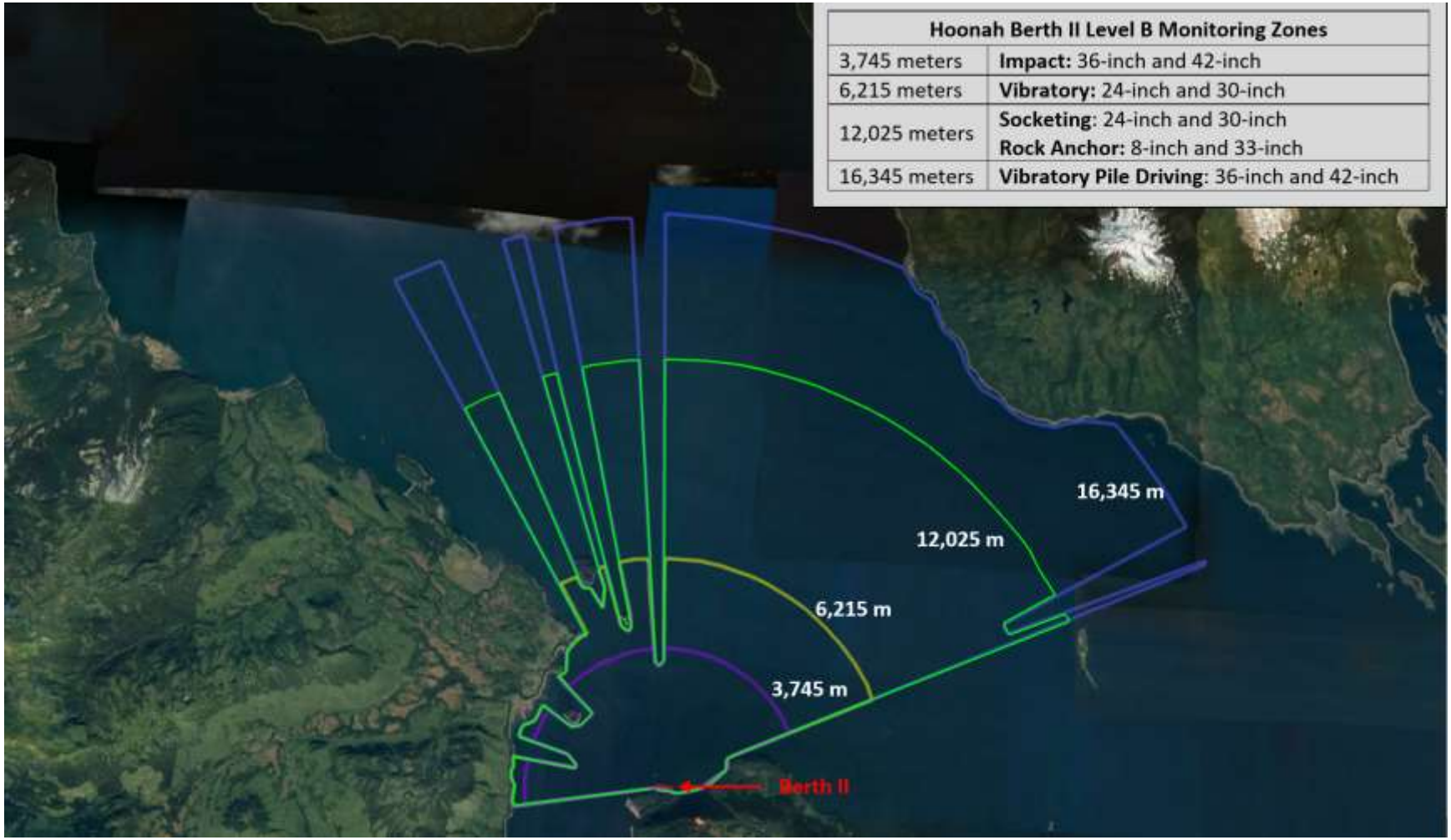


Figure 13. Berth II Level B Monitoring Zones



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 including the community of Hoonah. Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in Southeast Alaska for hundreds of years.

Section 11 describes mitigation measures designed to reduce project impacts and 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.

13.1 Monitoring Protocols

To minimize impacts of project activities on marine mammals, a detailed Marine Mammal Monitoring and Mitigation Plan has been developed for the project and is included as Appendix C. Project shutdown and monitoring zones as outlined in Appendix C and Section 11.3 would be implemented during any in-water pile driving activities associated with the project. If the number of animals of a species exposed to Level A or B harassment approaches the number of takes allowed by the IHA, DPD will notify NMFS and seek further consultation.

13.2 Monitoring Report

DPD will submit a draft report to NMFS not later than 90 days following the end of construction activities or 60 days prior to the issuance of any subsequent IHA for the project. DPD will provide a final report within 30 days following resolution of NMFS' comments on the draft report. Reports will contain, at minimum, the following:

- Date and time that monitored activity begins and ends for each day conducted (monitoring period);
- Construction activities occurring during each daily observation period, including how many and what type of piles driven;
- Deviation from initial proposal in pile numbers, pile types, average driving times, etc.
- Weather parameters in each monitoring period (e.g., wind speed, percent cloud cover, visibility);
- Water conditions in each monitoring period (e.g., sea state, tide state);
- For each marine mammal sighting:
    - Species, numbers, and, if possible, sex and age class of marine mammals;
    - Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
    - Type of construction activity that was taking place at the time of sighting;
    - Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
    - Reason why shutdown was implemented (if needed)
    - If shutdown was implemented, behavioral reactions noted and if they occurred before or after shutdown.
    - Estimated amount of time that the animals remained in the Level A or B zone.

- Description of implementation of mitigation measures within each monitoring period (e.g., shutdown or delay);
- Other human activity in the area within each monitoring period;
- A summary of the following:
  - Total number of individuals of each species detected within the Level B Zone, and estimated as taken if correction factor appropriate.
  - Total number of individuals of each species detected within the Level A Zone and the average amount of time that they remained in that zone.
  - Daily average number of individuals of each species detected within the Level B Zone, and estimated as taken, if appropriate.

DPD 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), DPD will immediately cease pile activities and report the incident to NMFS by calling the NOAA Fisheries statewide 24-hour Stranding Hotline (877) 925-7773.

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 DPD Hoonah Berth II 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 Icy Strait and Port Frederick Inlet, 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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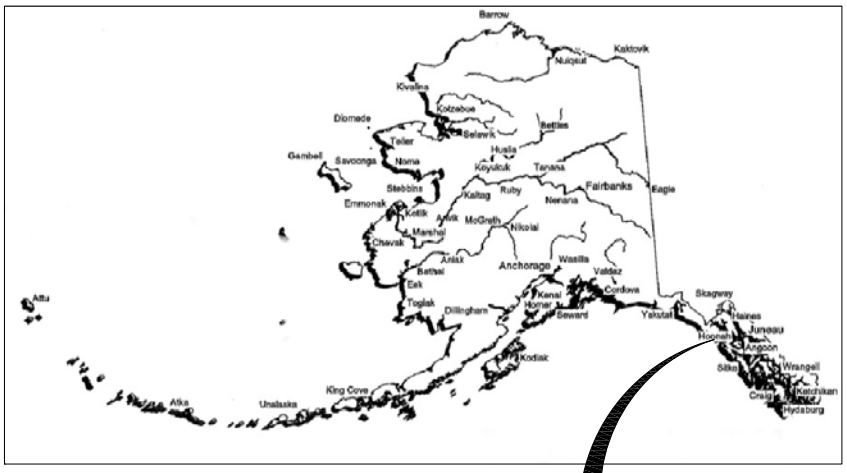
Appendix A. Project Permit Drawings



CRUISE SHIP BERTH 2 LOCATION

PROJECT VICINITY

LIGHTERING FLOAT LOCATION

TRANSPAC MARINAS
N
ANACORTES USA

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0

MTL = 7.82'
MHW = 14.08'
MLLW = 0.0'

VICINITY MAP & LOCATION MAP

JOB NO. 18_119_A

PROPOSED: ICY STRAIT POINT

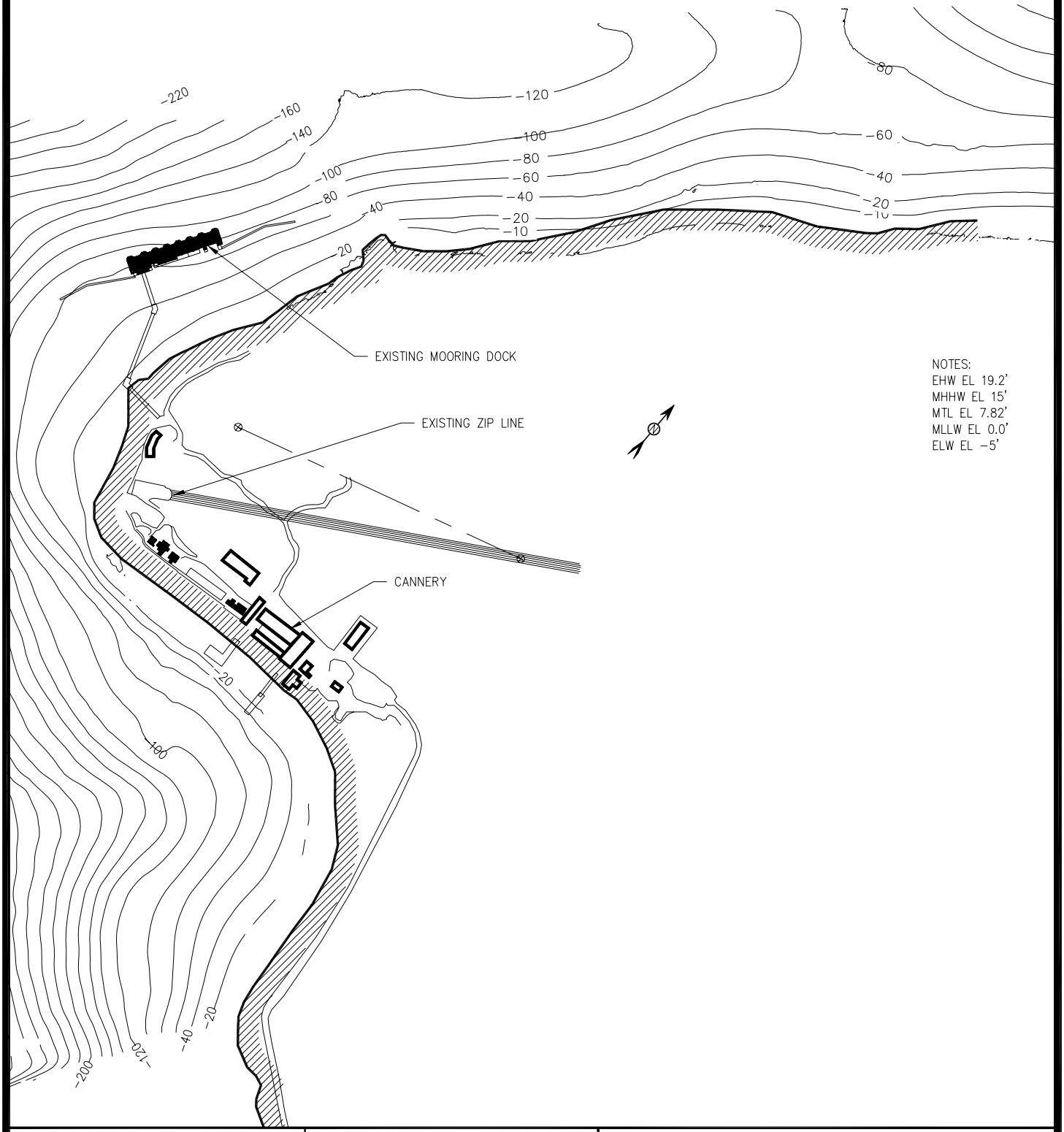
IN: PORT FREDERICK INLET

AT: HOONAH, AK

APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY

DATE: 03 DECEMBER 2018

SHEET: 1 OF 13



PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0'

MTL = 7.82'
MHW = 14.08'
MLLW = 0.0'

EXISTING SITE CONDITIONS

JOB NO. 18_119_A

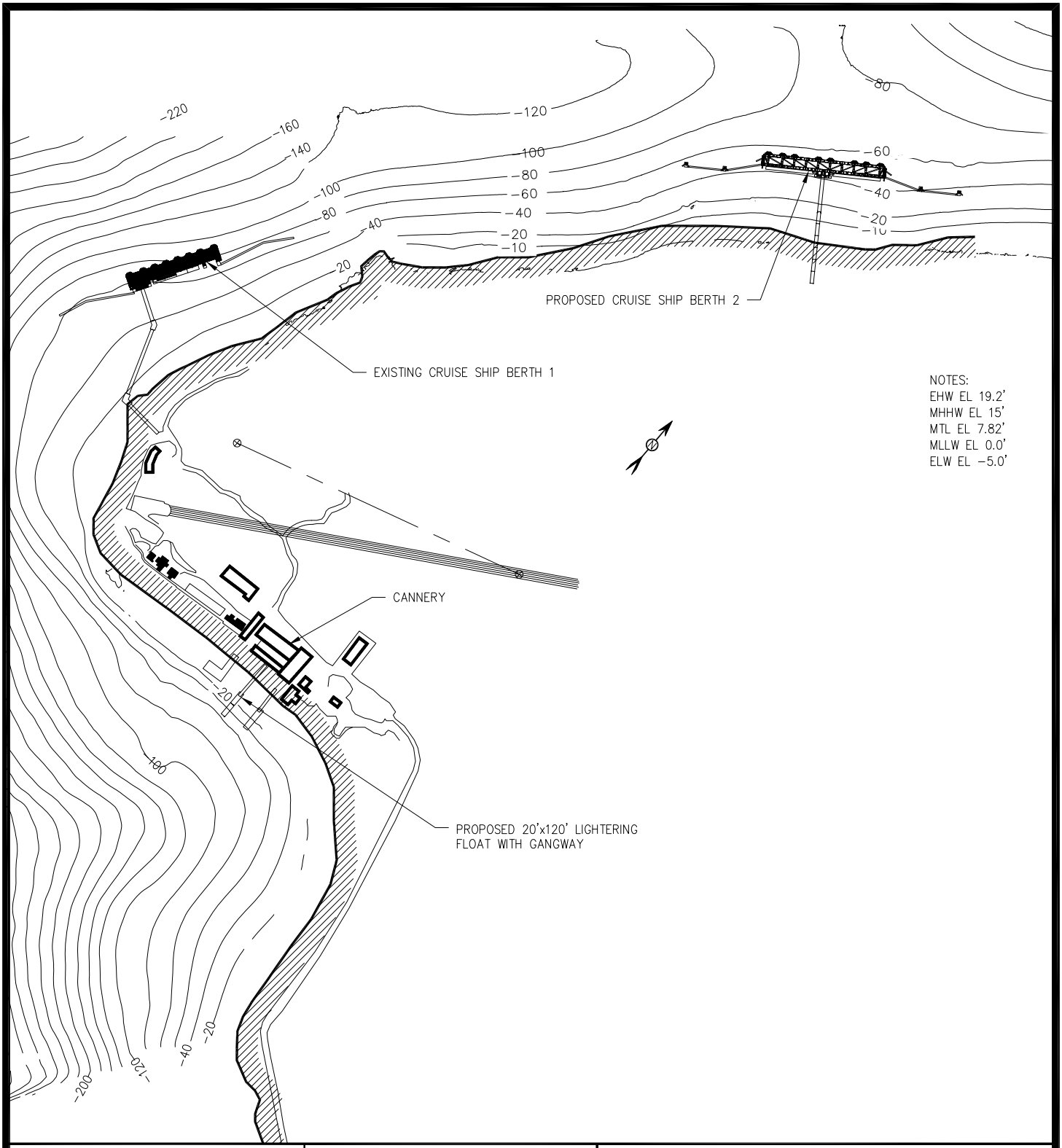
PROPOSED: ICY STRAIT POINT

IN: PORT FREDERICK INLET

AT: HOONAH, AK

APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY

DATE: 03 DECEMBER 2018



NOTES:
EHW EL 19.2'
MHHW EL 15'
MTL EL 7.82'
MLLW EL 0.0'
ELW EL -5.0'

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0'

MTL = 7.82'
MHW = 14.08'
MLLW = 0.0'

PROPOSED SITE PLAN

JOB NO. 18_119_A

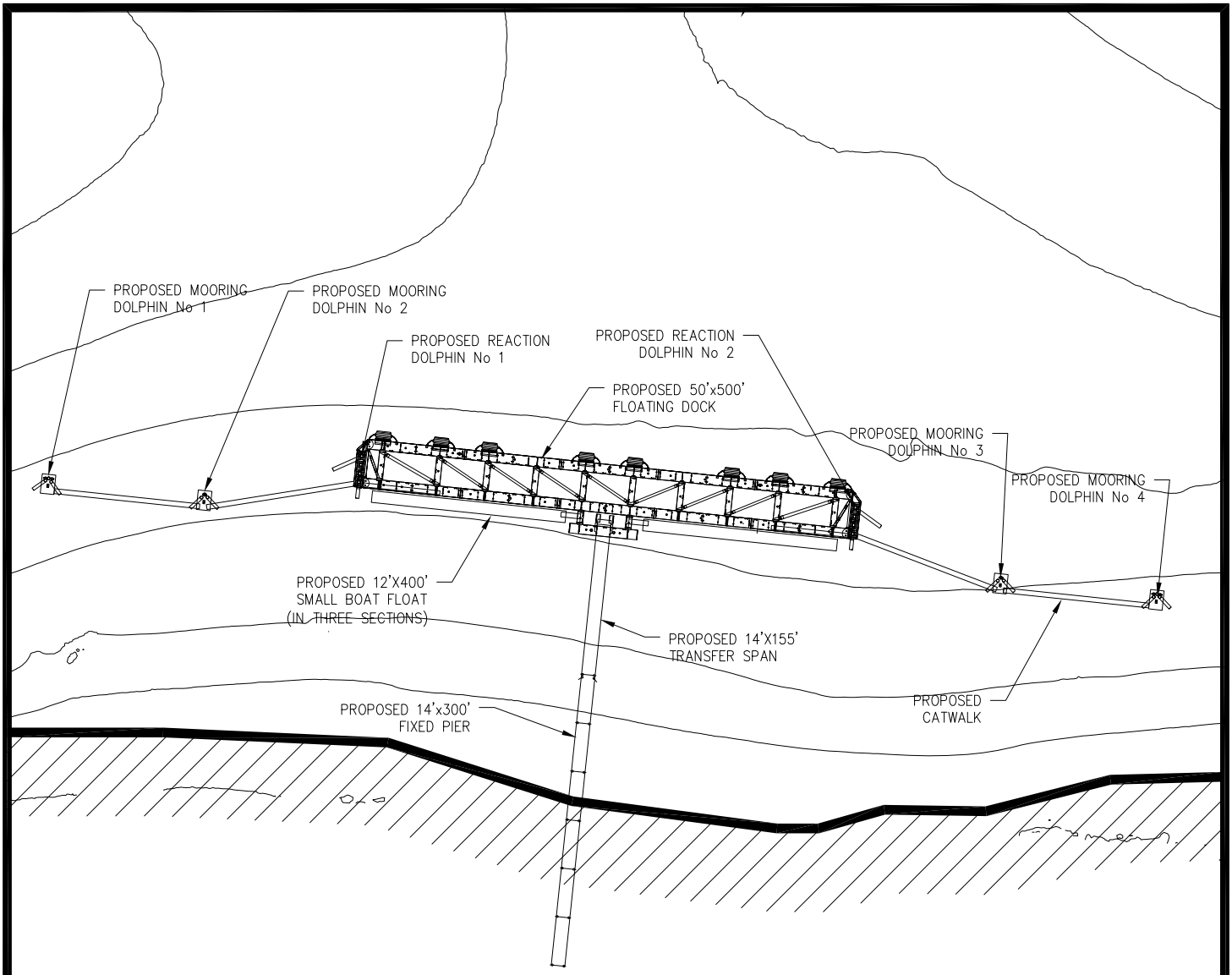
PROPOSED: ICY STRAIT POINT

IN: PORT FREDERICK INLET

AT: HOONAH, AK

APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY

DATE: 03 DECEMBER 2018



PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0'

MTL = 7.82'
MHW = 14.08'
MLLW = 0.0'

PROPOSED BERTH 2
SITE PLAN

JOB NO. 18_119_A

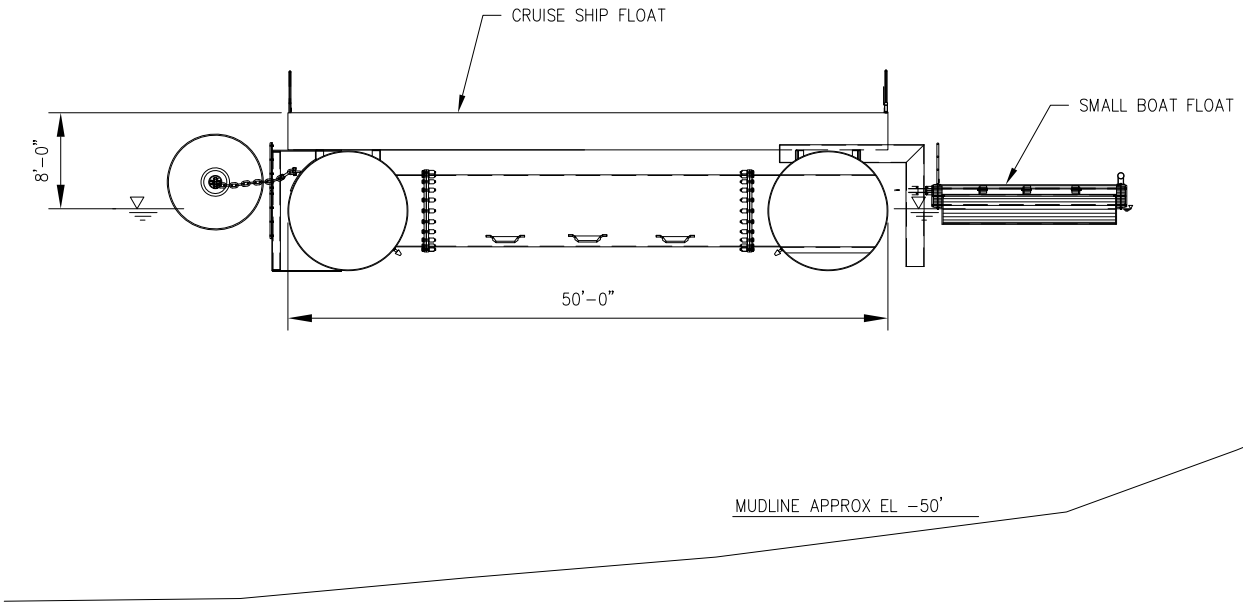
PROPOSED: ICY STRAIT POINT

IN: PORT FREDERICK INLET

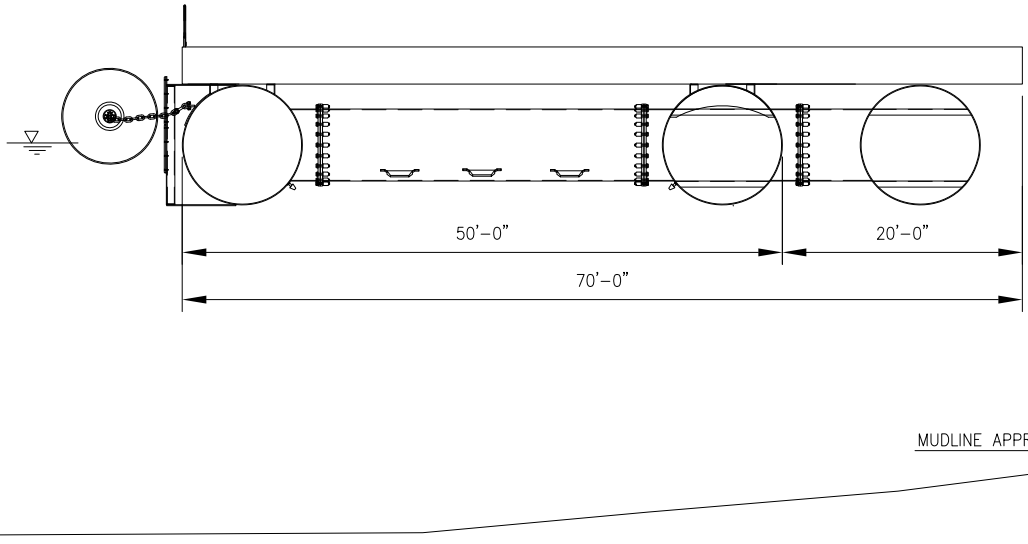
AT: HOONAH, AK

APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY

DATE: 03 DECEMBER 2018

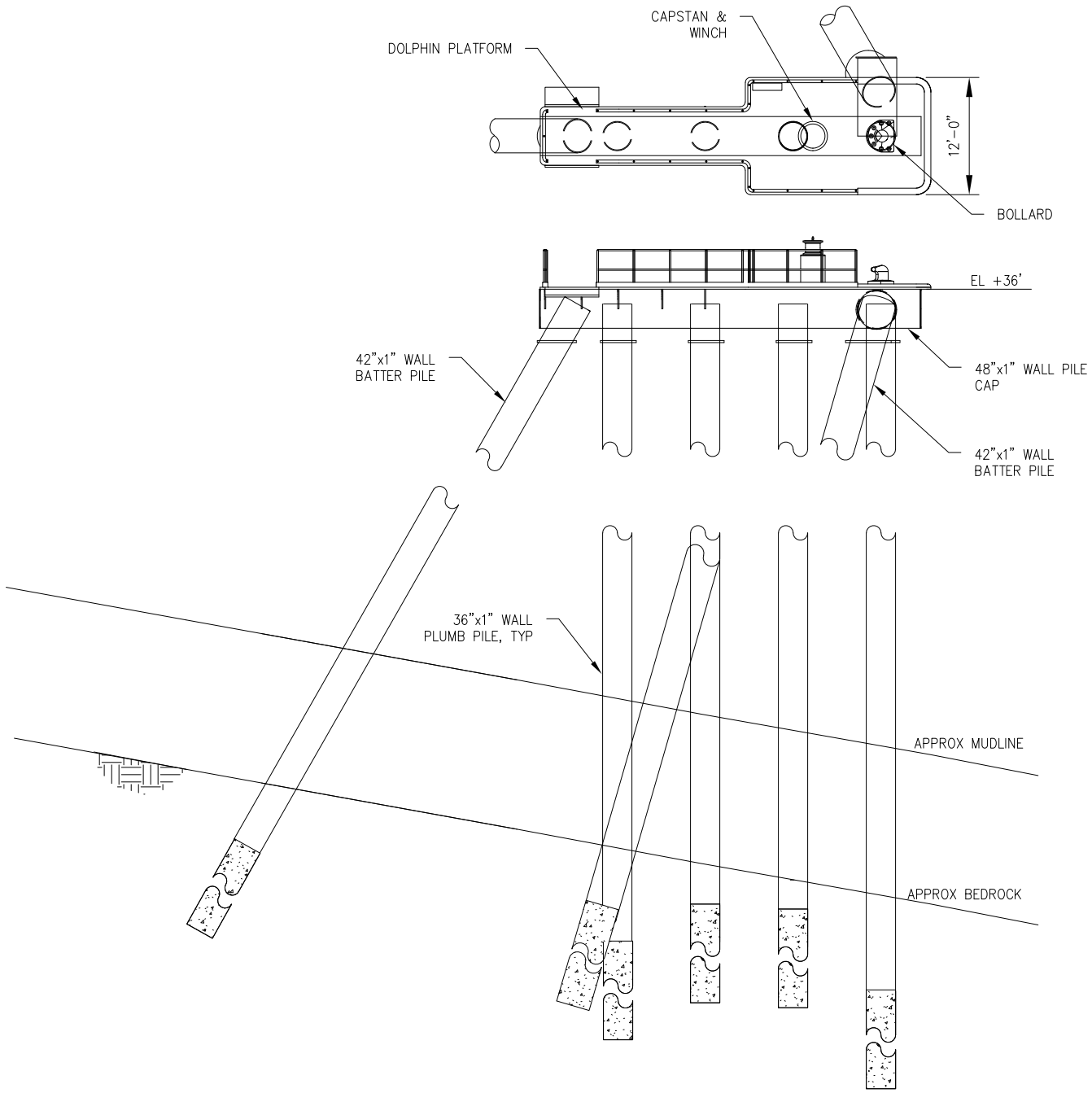


TYPICAL FLOAT SECTION



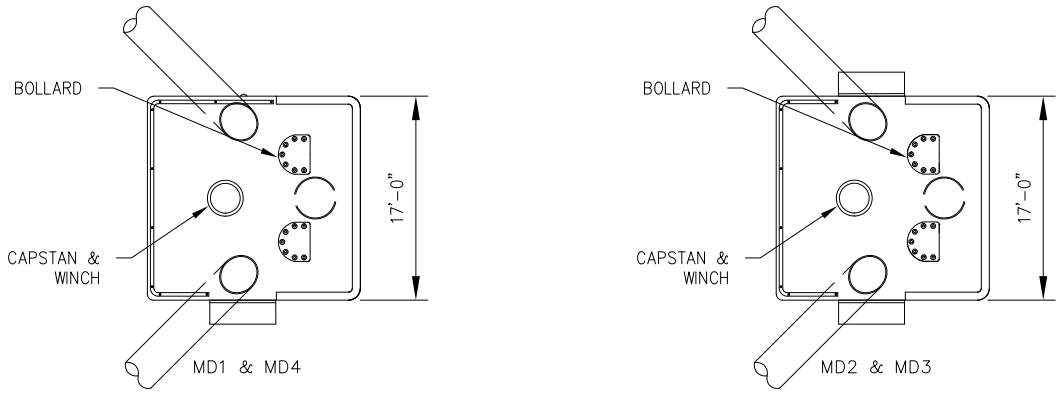
TYPICAL SECTION AT TRANSFER SPAN LANDING

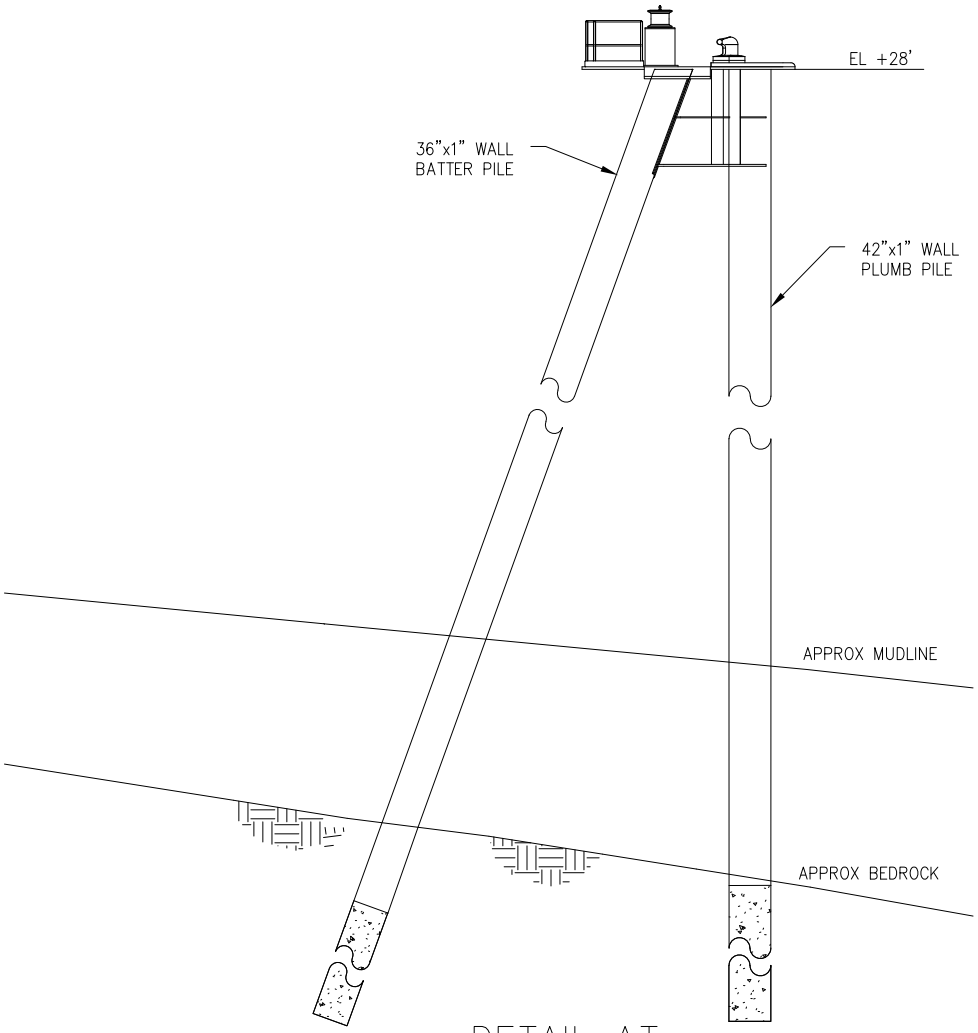
PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED FLOAT SECTION	PROPOSED: ICY STRAIT POINT
		IN: PORT FREDERICK INLET
		AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
		DATE: 03 DECEMBER 2018 SHEET: 5 OF 13



DETAIL AT
REACTION DOLPHIN

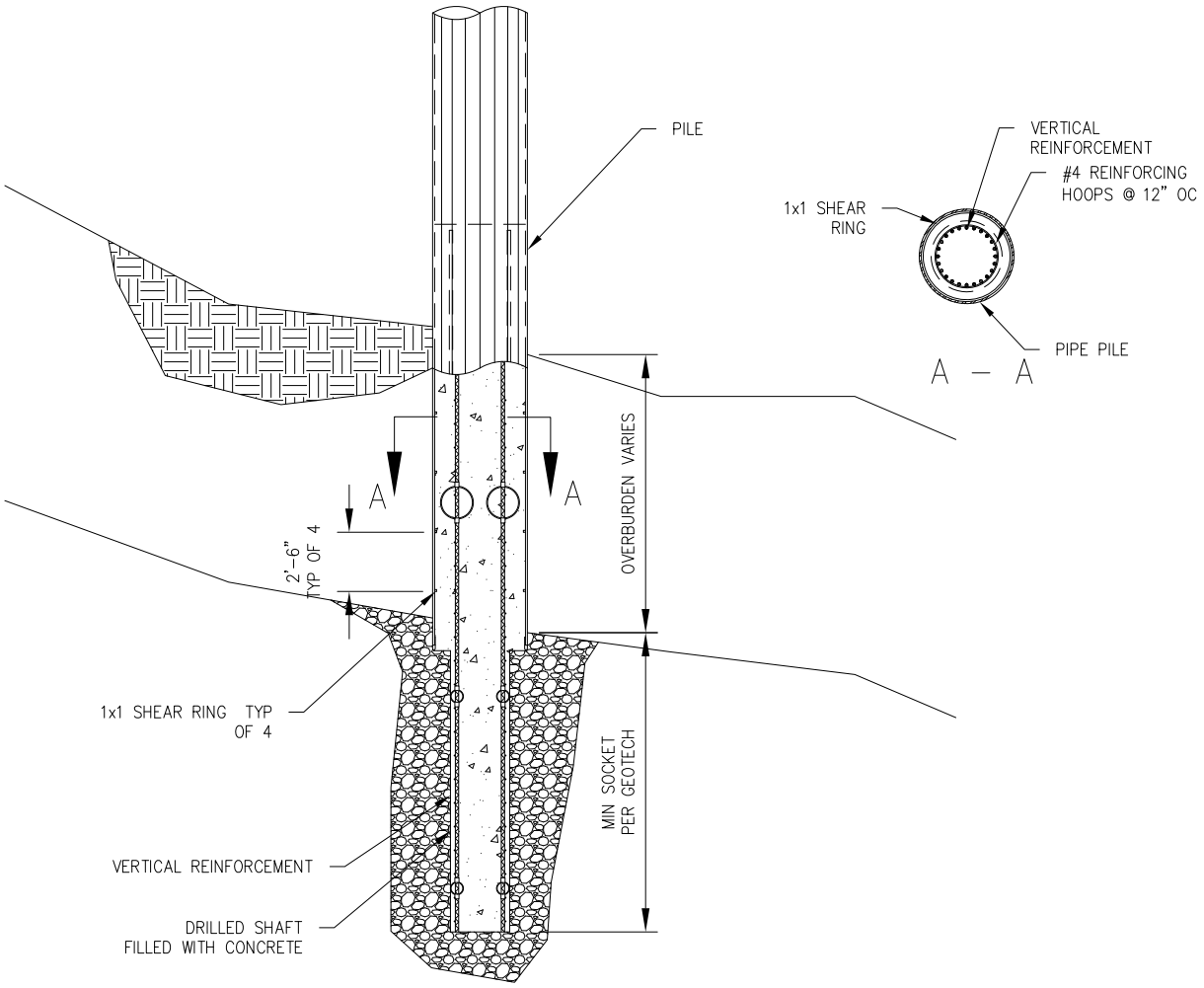
PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED REACTION DOLPHIN	PROPOSED: ICY STRAIT POINT IN: PORT FREDERICK INLET AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY DATE: 03 DECEMBER 2018 SHEET: 6 OF 13





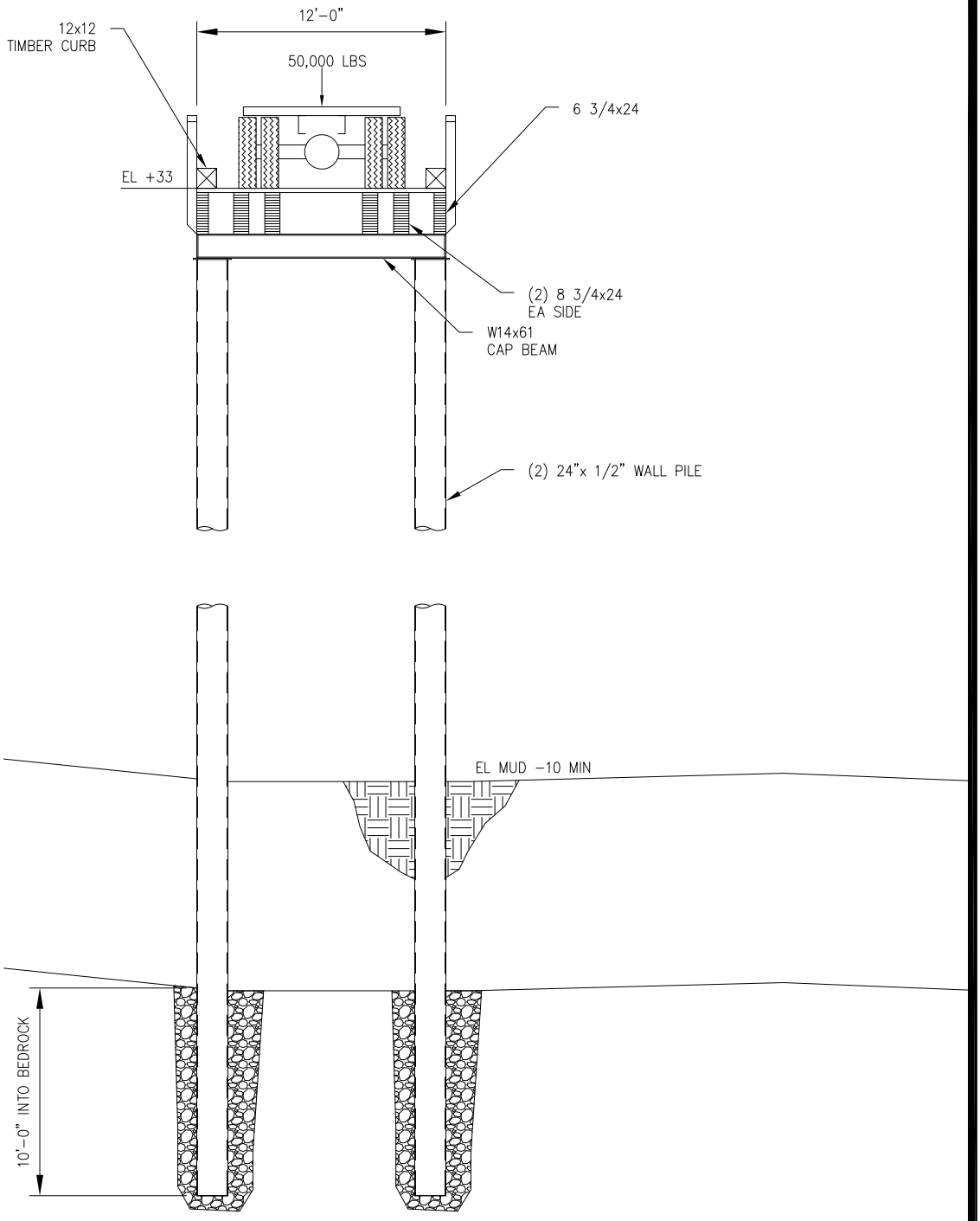
DETAIL AT MOORING DOLPHIN

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED MOORING DOLPHIN	PROPOSED: ICY STRAIT POINT
		IN: PORT FREDERICK INLET
		AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
		DATE: 03 DECEMBER 2018 SHEET: 7 OF 13



TYPICAL ELEVATION AT ROCK ANCHOR

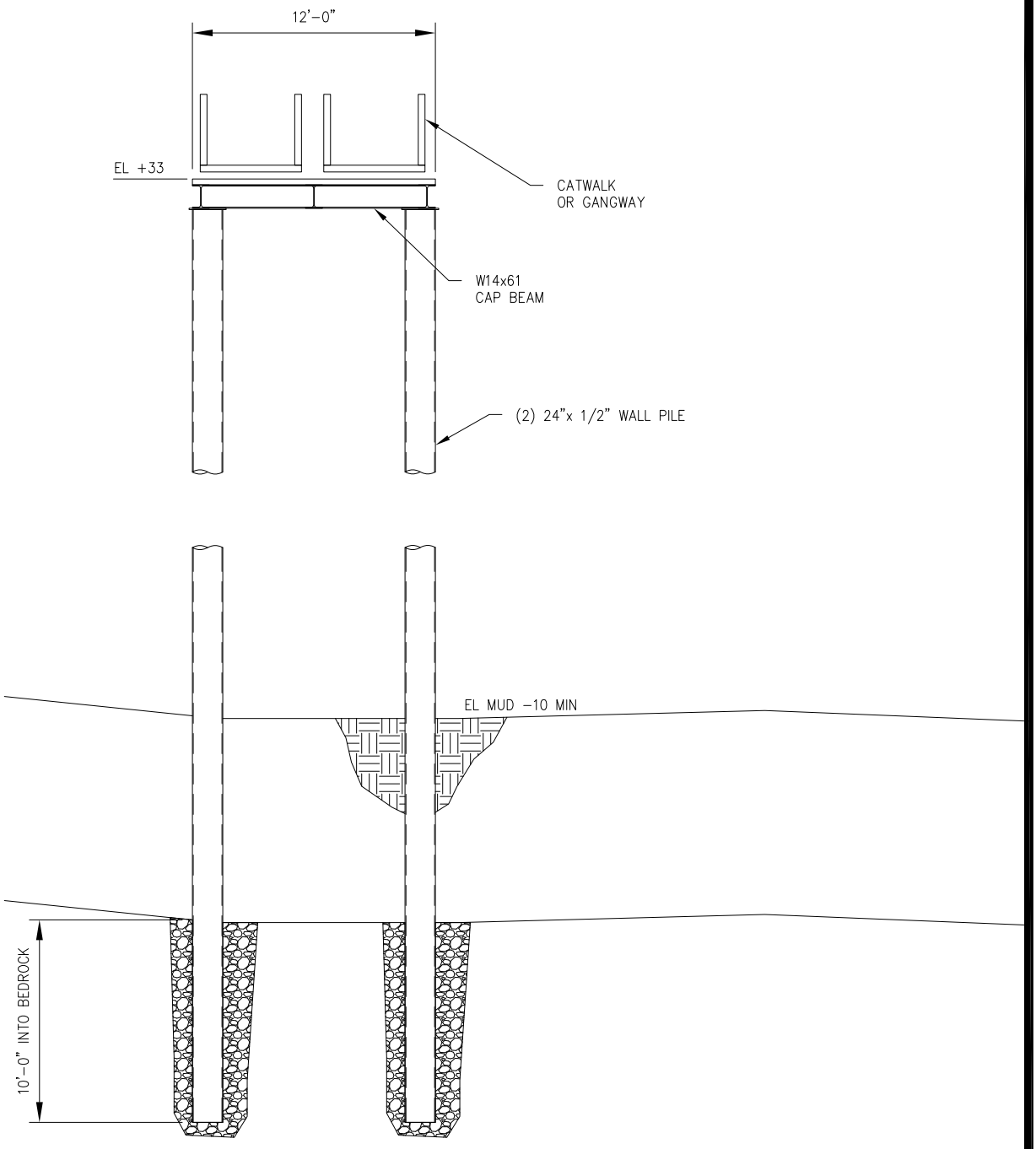
PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED ROCK ANCHOR	PROPOSED: ICY STRAIT POINT
		IN: PORT FREDERICK INLET
		AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
		DATE: 03 DECEMBER 2018 SHEET: 8 OF 13



SECTION AT FIXED PIER

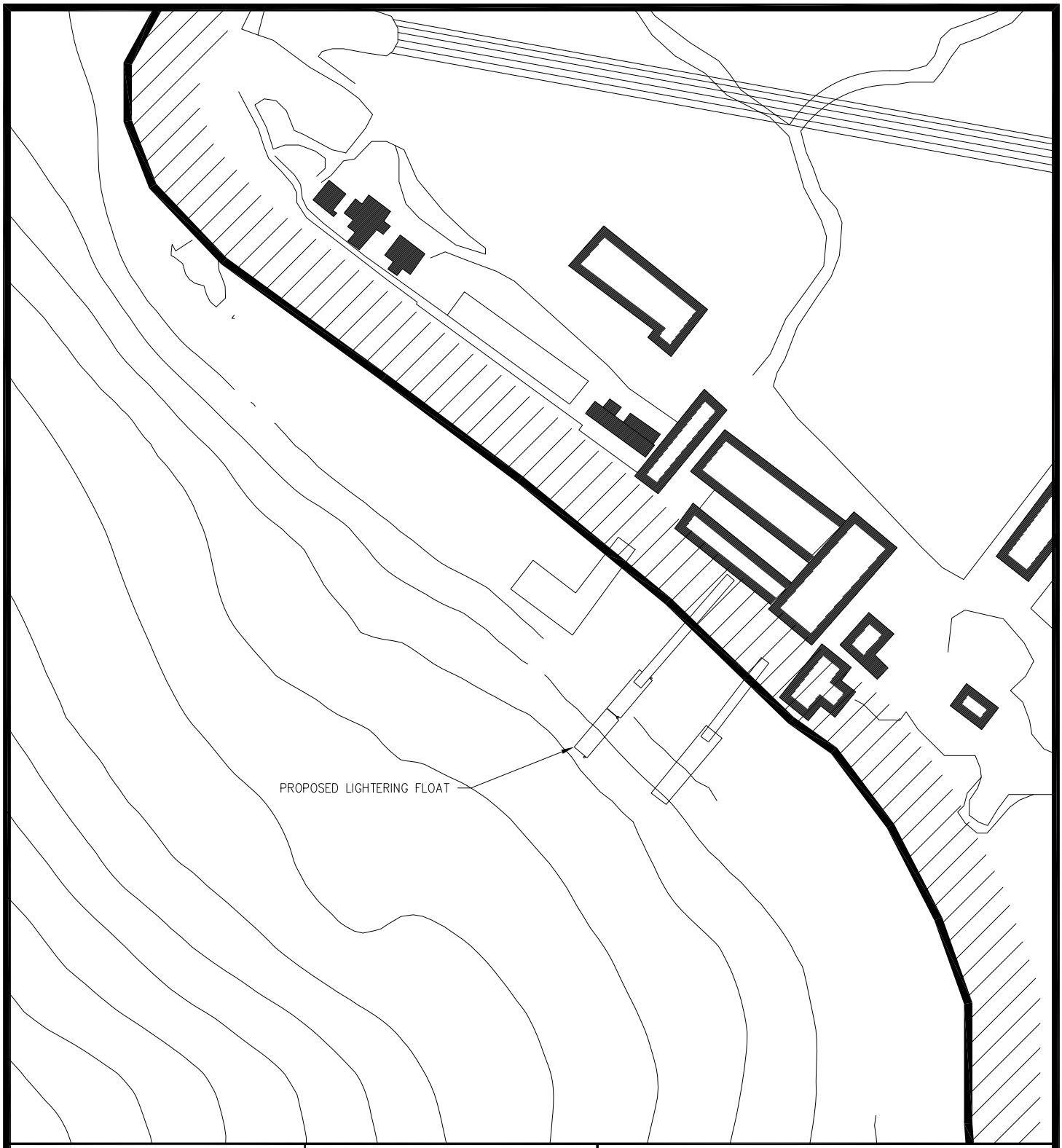
PILE BENTS @ 50' OC

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED FIXED PIER	PROPOSED: ICY STRAIT POINT
		IN: PORT FREDERICK INLET
		AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
		DATE: 03 DECEMBER 2018 SHEET: 9 OF 13



SECTION AT GANGWAY PLATFORM

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED GANGWAY PLATFORM	PROPOSED: ICY STRAIT POINT
		IN: PORT FREDERICK INLET
		AT: HOONAH, AK
DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
		DATE: 03 DECEMBER 2018 SHEET: 10 OF 13



PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0'

MTL = 7.82'
MHW = 14.08'
MLLW = 0.0'

PROPOSED BERTH 2
LIGHTERING FLOAT

JOB NO. 18_119_A

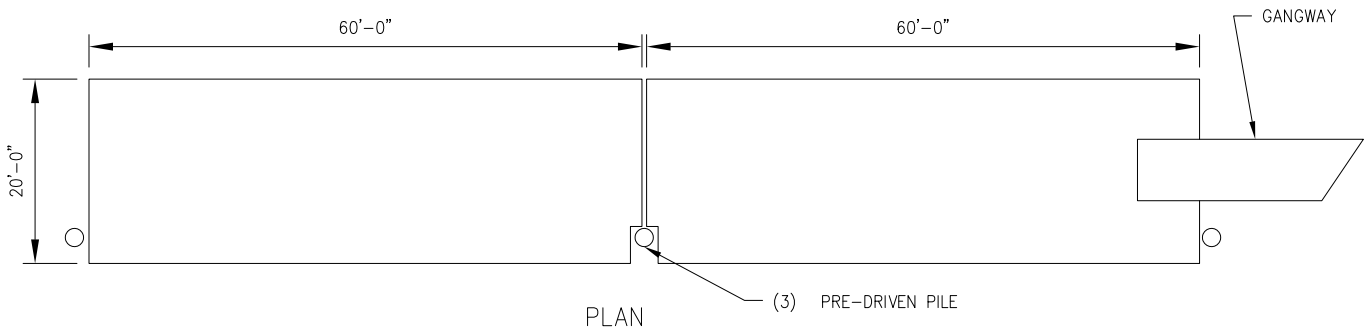
PROPOSED: ICY STRAIT POINT

IN: PORT FREDERICK INLET

AT: HOONAH, AK

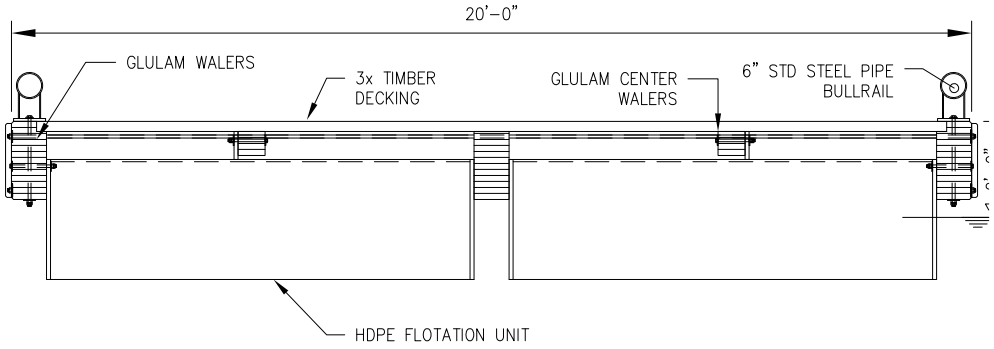
APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY

DATE: 03 DECEMBER 2018

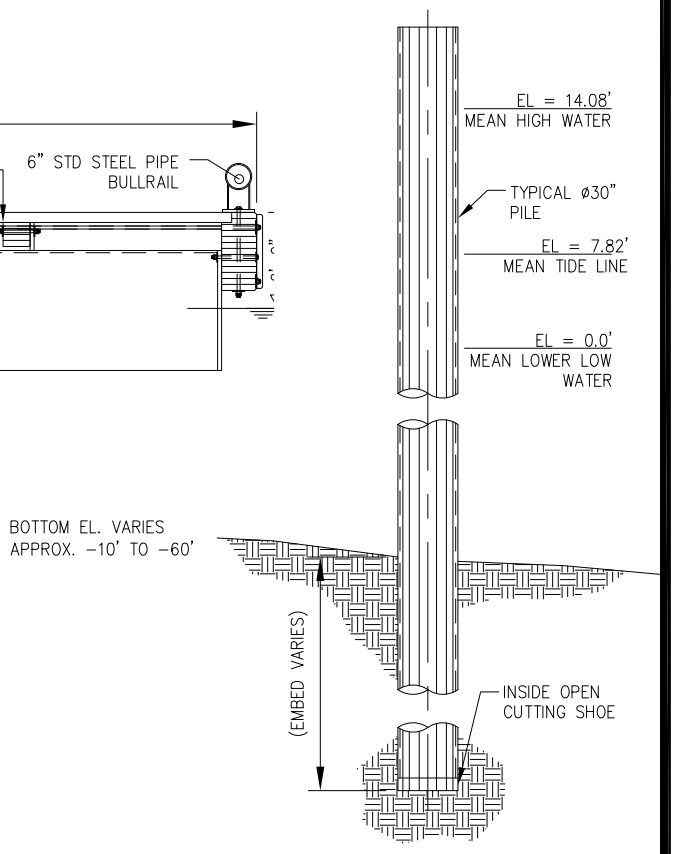


PLAN

PROPOSED 20'X120' LIGHTERING FLOAT



TYPICAL SECTION



TYPICAL PILE

PURPOSE:	INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY	PROPOSED BERTH 2 LIGHTERING FLOAT	PROPOSED: ICY STRAIT POINT
			IN: PORT FREDERICK INLET
			AT: HOONAH, AK
DATUM: 0.0'	MTL = 7.82' MHW = 14.08' MLLW = 0.0'	JOB NO. 18_119_A	APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
			DATE: 03 DECEMBER 2018 SHEET: 12 OF 13

PILE SUMMARY – CRUISE SHIP BERTH			
LOCATION	POSITION	SIZE OD, IN	QUANTITY
MOORING DOLPHIN No 1			
	PLUMB	42"	1
	BATTER	36"	2
MOORING DOLPHIN No 2			
	PLUMB	42"	1
	BATTER	36"	2
REACTION DOLPHIN No 1			
	PLUMB	36"	4
	BATTER	42"	2
REACTION DOLPHIN No 2			
	PLUMB	36"	4
	BATTER	42"	2
MOORING DOLPHIN No 3			
	PLUMB	42"	1
	BATTER	36"	2
MOORING DOLPHIN No 4			
	PLUMB	42"	1
	BATTER	36"	2
FIXED PIER			
	PLUMB	24"	16

PILE SUMMARY – LIGHTERING FLOAT			
LOCATION	POSITION	SIZE OD, IN	QUANTITY
FLOAT PILE			
	PLUMB	30"	3
	PLUMB	16"	4

PURPOSE: INCREASE CRUISE SHIP BERTHING & LIGHTERING CAPACITY

DATUM: 0.0' MTL = 7.82' MHW = 14.08' MLLW = 0.0'

PROPOSED BERTH 2
PILE SCHEDULE

JOB NO. 18_119_A

PROPOSED: ICY STRAIT POINT
IN: PORT FREDERICK INLET
AT: HOONAH, AK
APPLICATION BY: HOONAH CRUISE SHIP DOCK COMPANY
DATE: 03 DECEMBER 2018 SHEET: 13 OF 13

Appendix B. Threshold Calculation Spreadsheets

GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II Project
PROJECT/SOURCE INFORMATIONPlease include any assumptions	24" and 30" vibrating. Source: The 24-inch and 30-inch diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		161.9
Distance =		10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	39	dB = 20*log(R1/R2)	1	12	1245
Cylindrical spreading	0	155	dB = 10*log(R1/R2)	0	15	154882
Practical spreading	0	62	dB = 15*log(R1/R2)	1	13	6213

GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II Project
PROJECT/SOURCE INFORMATIONPlease include any assumptions	36" and 42" vibrating. Source: The 36-inch and 42-inch diameter pile source levels are proxy from median measured source levels from vibratory pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		168.2
Distance =		10

Spreading Model	Fish Meters to Threshold Peak(180 dB)	RMS (150 dB)	Spreading Model	MarMam Meters to Threshold RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	81	dB = 20*log(R1/R2)	3	26	2570
Cylindrical spreading	0	661	dB = 10*log(R1/R2)	1	66	660693
Practical spreading	0	163	dB = 15*log(R1/R2)	2	35	16343

GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II Project
PROJECT/SOURCE INFORMATIONPlease include any assumptions	36" and 42" impacting. Source: The 42-inch diameter pile source levels are proxy from median measured source levels from vibratory driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 9).
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		198.6
Distance =		10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	2692	dB = 20*log(R1/R2)	85	851	85114
Cylindrical spreading	0	724436	dB = 10*log(R1/R2)	724	72444	724435960
Practical spreading	0	17378	dB = 15*log(R1/R2)	174	3744	1737801

GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II Project
PROJECT/SOURCE INFORMATIONPlease include any assumptions	24" and 30" socketing and 24', 36' and 42' rock anchoring Source: The socketing and anchoring source level of 166.2 SPL is proxy from median measured sources levels from down-hole drilling of 24-inch diameter piles to construct the Kodiak Ferry Terminal (Denes et al. 2016, Table 72).
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

Fill in SPL and distances for peak and rms pressures, and read distance to threshold for appropriate model

Measured pressure	Peak	RMS
SPL =		166.2
Distance =		10

	Fish Meters to Threshold		Spreading Model	MarMam Meters to Threshold		
Spreading Model	Peak(180 dB)	RMS (150 dB)		RMS 180 dB	RMS 160 dB	RMS 120 dB
Spherical spreading	0	65	dB = 20*log(R1/R2)	2	20	2042
Cylindrical spreading	0	417	dB = 10*log(R1/R2)	0	42	416869
Practical spreading	0	120	dB = 15*log(R1/R2)	1	26	12023

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	24" Vibratory. Source: The 24-inch and 30-inch diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	161.9
Number of piles within 24-h period	4
Duration to drive a single pile (minutes)	10
Duration of Sound Production within 24-h period (seconds)	2400
10 Log (duration of sound production)	33.80
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**6.0**	**0.5**	**8.8**	**3.6**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	30" vibrating (temporary installation). Source: The 24-inch and 30-inch diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	161.9
Number of piles within 24-h period	6
Duration to drive a single pile (minutes)	20
Duration of Sound Production within 24-h period (seconds)	7200
10 Log (duration of sound production)	38.57
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**12.4**	**1.1**	**18.4**	**7.6**	**0.5**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	30" vibrating (temporary pile removal). Source: The 24-inch and 30-inch diameter source levels for vibratory driving are proxy from median measured source levels from pile driving of 30-inch diameter piles to construct the Ketchikan Ferry Terminal (Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	161.9
Number of piles within 24-h period	6
Duration to drive a single pile (minutes)	10
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**7.8**	**0.7**	**11.6**	**4.8**	**0.3**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	36" vibrating. Source: The 36-inch and 42-inch diameter pile source levels are proxy from median measured source levels from vibratory pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)

Please include any assumptions

PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	168.2
Number of piles within 24-h period	2
Duration to drive a single pile (minutes)	30
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**20.6**	**1.8**	**30.5**	**12.5**	**0.9**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	42" vibrating. Source: The 42-inch diameter pile source levels are proxy from median measured source levels from vibratory pile driving of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 16)

Please include any assumptions

PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	168.2
Number of piles within 24-h period	2
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	7200
10 Log (duration of sound production)	38.57
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**32.7**	**2.9**	**48.4**	**19.9**	**1.4**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	36" impacting. Source: The 36-inch and 42-inch-diameter pile source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Tables 9 and 16). We
Please include any assumptions	
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 75), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: Choose either E1-1 OR E.1-2 method to calculate isopleths (not required to fill in sage boxes for both)

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Source Level (RMS SPL)	186.7
Number of piles per day	135
Strike Duration$^{\Delta}$ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Propagation (xLogR)	15
Distance of source level measurement (meters)*	10

$^{\Delta}$Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	
Distance of source level measurement (meters)*	
Source level at 1 meter	#NUM!

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

E.1-2: ALTERNATIVE METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT)

Unweighted $SEL_{cum\ (at\ measured\ distance)}$ = SEL_{ss} + 10 Log (# strikes)	**212.7**

SEL_{cum}

Source Level (Single Strike SEL)	186.7
Number of strikes per pile	100
Number of piles per day	4
Propagation (xLogR)	15
Distance of single strike SEL measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	212
Distance of source level measurement (meters)*	10
Source level at 1 meter	227.0

*Unless otherwise specified, source levels are referenced 1 m from the source.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**956.7**	**34.0**	**1,139.6**	**512.0**	**37.3**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**3.4**	**NA**	**46.4**	**4.0**	**NA**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

E.1: IMPACT PILE DRIVING (STATIONARY SOURCE: Impulsive, Intermittent)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	42" impacting. Source: The 42-inch diameter pile source levels are proxy from median measured source levels from pile driving (vibratory and impact hammering) of 48-inch piles for the Port of Anchorage test pile project (Austin et al. 2016, Table 9). Estimated 135 strikes
Please include any assumptions	
PROJECT CONTACT	Carrie Connaker; carrie@solsticeak.com

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2	default

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 75), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

NOTE: Choose either E1-1 OR E.1-2 method to calculate isopleths (not required to fill in sage boxes for both)

E.1-1: METHOD TO CALCULATE PK AND SEL_{cum} (USING RMS SPL SOURCE LEVEL)

SEL_{cum}

Source Level (RMS SPL)	
Number of piles per day	
Strike Duration$^{\Delta}$ (seconds)	
Number of strikes per pile	
Duration of Sound Production (seconds)	0
10 Log (duration of sound production)	#NUM!
Propagation (xLogR)	
Distance of source level measurement (meters)*	

$^{\Delta}$Window that makes up 90% of total cumulative energy (5%-95%) based on Madsen 2005

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	
Distance of source level measurement (meters)*	
Source level at 1 meter	#NUM!

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**	**#NUM!**

E.1-2: ALTERNATIVE METHOD TO CALCULATE PK AND SEL_{cum} (SINGLE STRIKE EQUIVALENT)

Unweighted $SEL_{cum\ (at\ measured\ distance)} = SEL_{ss} +$ 10 Log (# strikes)	**211.0**

SEL_{cum}

Source Level (Single Strike SEL)	186.7
Number of strikes per pile	135
Number of piles per day	2
Propagation (xLogR)	15
Distance of single strike SEL measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

PK

Source Level (PK SPL)	212
Distance of source level measurement (meters)*	10
Source level at 1 meter	227.0

*Unless otherwise specified, source levels are referenced 1 m from the source.

RESULTANT ISOPLETHS*

*Impulsive sounds have dual metric thresholds (SELcum & PK). Metric producing largest isopleth should be used.

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	183	185	155	185	203
PTS isopleth to threshold (meters)	**736.2**	**26.2**	**876.9**	**394.0**	**28.7**
PK Threshold	219	230	202	218	232
PTS PK isopleth to threshold (meters)	**3.4**	**NA**	**46.4**	**4.0**	**NA**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.01**	**-19.74**	**-26.87**	**-2.08**	**-1.15**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a\,[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	Socketing of 24" and 30" pile. Proxy source Level of 166.2 SPL @10 meters is median from drilling of 24-inch diameter piles (Kodiak Ferry Terminal, Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Kate Arduser, Solstice Alaska Consulting, Inc.

STEP 2: WEIGHTING FACTOR ADJUSTMENT

		Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value
Weighting Factor Adjustment (kHz)¥	2.5	

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	166.2
Number of piles within 24-h period	2
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	7200
10 Log (duration of sound production)	38.57
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**24.1**	**2.1**	**35.6**	**14.6**	**1.0**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	Rock anchoring of 8" anchors for 24" piles. Proxy source Level of 166.2 SPL @10 meters is median from drilling of 24-inch diameter piles (Kodiak Ferry Terminal, Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Kate Arduser, Solstice Alaska Consulting, Inc.

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2.5	

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	166.2
Number of piles within 24-h period	1
Duration to drive a single pile (minutes)	60
Duration of Sound Production within 24-h period (seconds)	3600
10 Log (duration of sound production)	35.56
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**15.2**	**1.3**	**22.4**	**9.2**	**0.6**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

A.1: Vibratory Pile Driving (STATIONARY SOURCE: Non-Impulsive, Continuous)

VERSION 2.0: 2018

KEY

	User Provided Information
	NMFS Provided Information (Technical Guidance)
	Resultant Isopleth

STEP 1: GENERAL PROJECT INFORMATION

PROJECT TITLE	Hoonah Berth II
PROJECT/SOURCE INFORMATION	Rock anchoring of 33" anchors for 36" and 42" piles. Proxy source Level of 166.2 SPL @10 meters is median from drilling of 24-inch diameter piles (Kodiak Ferry Terminal, Denes et al. 2016, Table 72).

Please include any assumptions

PROJECT CONTACT	Kate Arduser, Solstice Alaska Consulting, Inc.

STEP 2: WEIGHTING FACTOR ADJUSTMENT

Specify if relying on source-specific WFA, alternative weighting/dB adjustment, or if using default value

Weighting Factor Adjustment (kHz)¥	2.5	

¥ Broadband: 95% frequency contour percentile (kHz) OR Narrowband: frequency (kHz); For appropriate default WFA: See INTRODUCTION tab

† If a user relies on alternative weighting/dB adjustment rather than relying upon the WFA (source-specific or default), they may override the Adjustment (dB) (row 48), and enter the new value directly. However, they must provide additional support and documentation supporting this modification.

*** BROADBAND Sources: Cannot use WFA higher than maximum applicable frequency (See GRAY tab for more information on WFA applicable frequencies)**

STEP 3: SOURCE-SPECIFIC INFORMATION

Source Level (RMS SPL)	166.2
Number of piles within 24-h period	2
Duration to drive a single pile (minutes)	240
Duration of Sound Production within 24-h period (seconds)	28800
10 Log (duration of sound production)	44.59
Propagation (xLogR)	15
Distance from source level measurement (meters)*	10

*Unless otherwise specified, source levels are referenced 1 m from the source.

NOTE: The User Spreadsheet tool provides a means to estimates distances associated with the Technical Guidance's PTS onset thresholds. Mitigation and monitoring

requirements associated with a Marine Mammal Protection Act (MMPA) authorization or an Endangered Species Act (ESA) consultation or permit are independent management decisions made in the context of the proposed activity and comprehensive effects analysis, and are beyond the scope of the Technical Guidance and the User Spreadsheet tool.

RESULTANT ISOPLETHS

Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
SEL_{cum} Threshold	199	198	173	201	219
PTS Isopleth to threshold (meters)	**60.7**	**5.4**	**89.7**	**36.9**	**2.6**

WEIGHTING FUNCTION CALCULATIONS

Weighting Function Parameters	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds
a	1	1.6	1.8	1	2
b	2	2	2	2	2
f_1	0.2	8.8	12	1.9	0.94
f_2	19	110	140	30	25
C	0.13	1.2	1.36	0.75	0.64
Adjustment (dB)†	**-0.05**	**-16.83**	**-23.50**	**-1.29**	**-0.60**

$$W(f) = C + 10\log_{10}\left\{\frac{(f/f_1)^{2a}}{[1+(f/f_1)^2]^a[1+(f/f_2)^2]^b}\right\}$$

Appendix C. Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

Duck Point Development II, LLC
Hoonah Berth II Project
Icy Strait, Hoonah, Alaska

Updated April 2019

Prepared for:
Duck Point Development II, LLC
9301 Glacier Highway, Suite 200
Juneau, Alaska 99801

Prepared by:
2607 Fairbanks Street Suite B
Anchorage, Alaska 99503

Submitted to:
National Marine Fisheries Service
and
U.S. Fish and Wildlife Service

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ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
BO	Biological Opinion
DPD	Duck Point Development II, LLC
DPS	distinct population segment
ESA	Endangered Species Act
HDPE	high-density polyethylene
IHA	Incidental Harassment Authorization
ITS	Incidental Take Statement
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NMFS AKR	National Marine Fisheries Service Alaska Region
OPR	Office of Protected Resources (NMFS)
PSO	protected species observer
rms	root mean square
SPL	sound pressure level
UHMW	ultra-high-molecular-weight polyethylene
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service
WDPS	Western Distinct Population Segment

1 INTRODUCTION

Duck Point Development II, LLC (DPD) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation to construct a second cruise ship berth and a small-craft lightering float at Cannery Point (Icy Strait Point) on Chichagof Island near Hoonah, 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 reduce Level A and 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 (PSOs) 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 POA-2018-576, Port Frederick for activities in Waters of the U.S. (requested);
- NMFS Office of Protected Resources (OPR) Incidental Harassment Authorization (IHA) (requested);
- NMFS Alaska Region Protected Resources Division (NMFS AKR) ESA Section 7(a)(2) Biological Opinion (BO) and Incidental Take Statement (ITS) (requested); and
- U.S. Fish and Wildlife Service (USFWS) IHA (requested).

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
Minke Whale (*Balaenoptera acutorostrata*)	0	9
Humpback Whale (*Megaptera novaeangliae*)	0	460
Gray Whale (*Eschrichtius robustus*)	0	3
Killer Whale (*Orcinus orca*)	0	570
Pacific White-Sided Dolphin (*Lagenorhynchus obliquidens*)	0	328
Dall's Porpoise (*Phocoenoides dalli*)	0	1,038
Harbor Porpoise (*Phocoena phocoena*)	64	1,932
Harbor Seal (*Phoca vitulina*)	48	156
Steller Sea Lion (*Eumatopia jubatus*	598	16
Northern Sea Otter (*Enhydra lutris*)	0	1,116

2 MONITORING AND SHUTDOWN ZONES

Because species are impacted by noise in different ways, species-specific monitoring and shutdown zones have been calculated for this project. These monitoring and shutdown zones are shown in Figures 1 - 8 and are summarized in Tables 2, 3, and 4. The zones shown in Figures 1-4 apply to all marine mammal species other than sea otters. The zones shown in Figure 5-8 apply to northern sea otters.

2.1 Level A Shutdown and Monitoring Zones

Level A shutdown zones are intended to protect marine mammals from auditory injury. They define an area in which sound pressure levels (SPLs) equal or exceed the level that would cause auditory injury to marine mammals present. Pile driving activity would be halted upon sighting of a marine mammal within the zone (or in anticipation of an animal entering the zone).

Because of their small size, harbor seal, harbor porpoise, and Dall's porpoise can be difficult to see at great distances. During impact pile driving, their Level A harassment zone is large enough that they may be difficult to spot. Level A take has been requested for Dall's porpoises, harbor porpoises and harbor seals in those instances in which they occur within the Level A harassment zone but outside of the shutdown zone *or* if they were to occur within the shutdown zone and were not visualized in time for the project to be shut down.[1,2] Steller sea lions also occur in the action area with high frequency. Level A take has been requested for Steller sea lions in the rare case that they are not visualized in the Level A harassment zone before the project is shut down.

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) movement of the barge to the pile location; (2) positioning of the pile on the substrate via a crane (i.e., stabbing the pile); (3) removal of the pile from the water column/substrate via a crane (i.e., deadpull); or (4) 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. Radial distances to Level A shutdown zone boundaries are defined in Table 2 and shown in Figures 1-2.

[1] Level A take for Dall's porpoise is not requested. This species is infrequently sited in the action area. During the 2015 construction of the first cruise ship berth, a total of two Dall's porpoise were observed during construction activities. In the rare event that Dall's porpoise are observed within the Level A zone during pile driving, construction operations would be shut down until the animals have vacated the zone.

[2] Although humpback whales are also common in the action area, the proposed shutdown zone is equal to the Level A threshold for this species since 1,000 m is considered to be a reasonable monitoring distance for these larger animals.

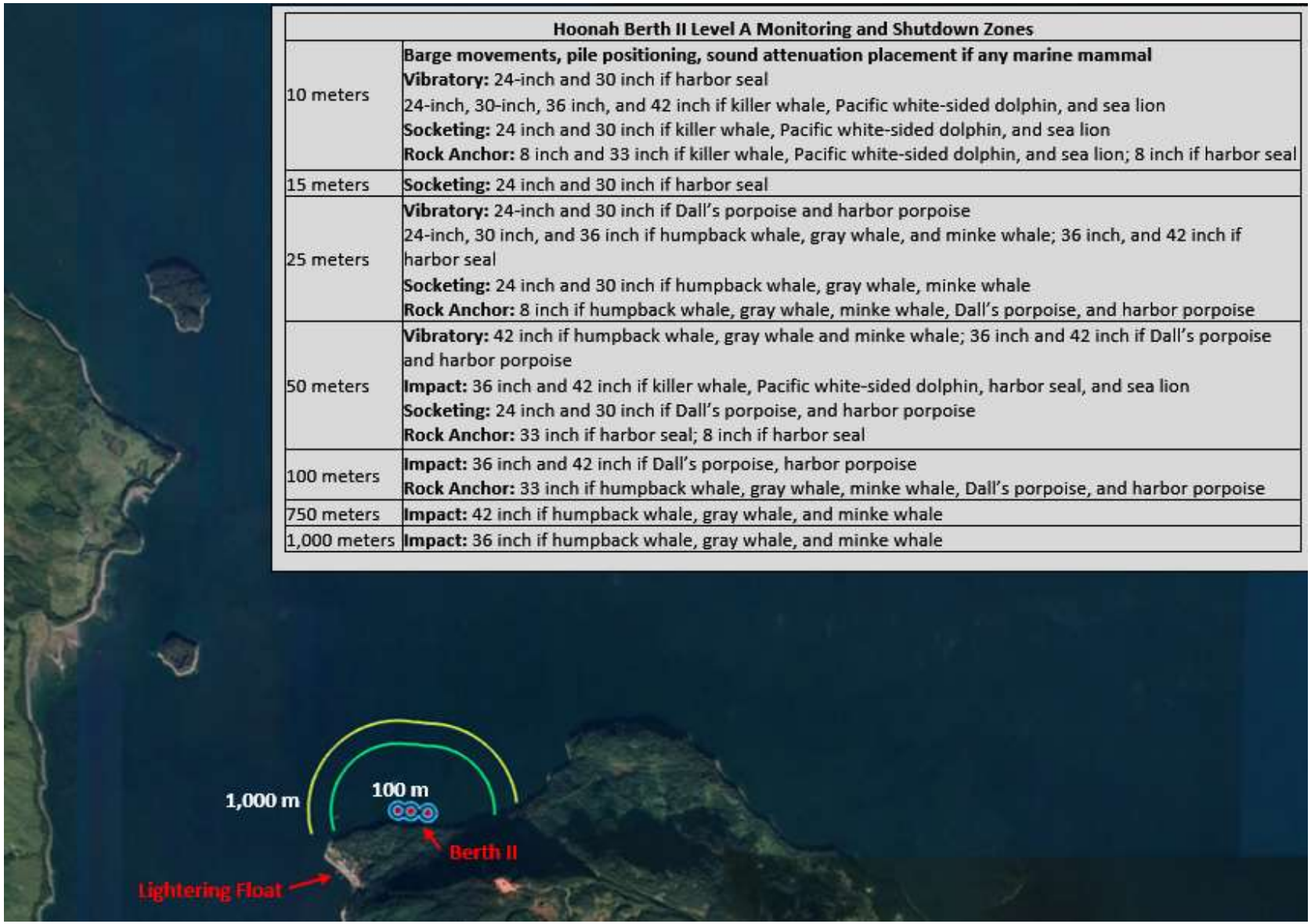
Table 2. Pile Driving Shutdown and Monitoring Zones Designed to Avoid Level A Take

Source	Shutdown Zones in Meters (*monitoring zone, if different, in meters*)				
	Low-Frequency Cetaceans (humpback whale, gray 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, sound attenuation placement*	10	10	10	10	10
Vibratory Pile Driving/Removal					
24-inch steel installation (18 piles; ~40 minutes per day on 4.5 days)	25	10	25	10	10
30-inch steel temporary installation (62 piles; ~2 hours per day on 10.5 days)	25	10	25	10	10
30-inch steel removal (62 piles; ~1 hour per day on 10.5 days)	25	10	25	10	10
30-inch steel permanent installation (3 piles; ~1 hour per day on 1.5 days)	25	10	25	10	10
36-inch steel permanent installation (16 piles; ~1 hour per day on 8 days)	25	10	50	25	10
42-inch steel permanent installation (8 piles; ~2 hours per day on 4 days)	50	10	50	25	10
Impact Pile Driving					
36-inch steel permanent installation (16 piles; ~10 minutes per day on 4 days)	1,000	50	100 (*1,200*)	50 (*525*)	50
42-inch steel permanent installation (8 piles; ~6 minutes per day on 4 days)	750	50	100 (*900*)	50 (*400*)	50
Socketed Pile Installation					
24-inch steel permanent installation (18 piles; ~2 hours per day on 9 days)	25	10	50	15	10
30-inch steel temporary installation (up to 10 piles; ~2 hours per day on 5 days)	25	10	50	15	10
Rock Anchor Installation					
8-inch anchor permanent installation (for 24-inch piles, 2 anchors; ~1 hour per day on 2 days)	25	10	25	10	10
33-inch anchor permanent installation (for 36- and 42-inch piles, 24 anchors; ~8 hours per day on 12 days)	100	10	100	50	10

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 1. Lightering Float Level A Shutdown Zones for NMFS-Managed Species

Figure 2. Berth II Level A Shut Down Zones for NMFS-Managed Species



Hoonah Berth II Level A Monitoring and Shutdown Zones	
10 meters	**Barge movements, pile positioning, sound attenuation placement if any marine mammal** **Vibratory:** 24-inch and 30 inch if harbor seal 24-inch, 30-inch, 36 inch, and 42 inch if killer whale, Pacific white-sided dolphin, and sea lion **Socketing:** 24 inch and 30 inch if killer whale, Pacific white-sided dolphin, and sea lion **Rock Anchor:** 8 inch and 33 inch if killer whale, Pacific white-sided dolphin, and sea lion; 8 inch if harbor seal
15 meters	**Socketing:** 24 inch and 30 inch if harbor seal
25 meters	**Vibratory:** 24-inch and 30 inch if Dall's porpoise and harbor porpoise 24-inch, 30 inch, and 36 inch if humpback whale, gray whale, and minke whale; 36 inch, and 42 inch if harbor seal **Socketing:** 24 inch and 30 inch if humpback whale, gray whale, minke whale **Rock Anchor:** 8 inch if humpback whale, gray whale, minke whale, Dall's porpoise, and harbor porpoise
50 meters	**Vibratory:** 42 inch if humpback whale, gray whale and minke whale; 36 inch and 42 inch if Dall's porpoise and harbor porpoise **Impact:** 36 inch and 42 inch if killer whale, Pacific white-sided dolphin, harbor seal, and sea lion **Socketing:** 24 inch and 30 inch if Dall's porpoise, and harbor porpoise **Rock Anchor:** 33 inch if harbor seal; 8 inch if harbor seal
100 meters	**Impact:** 36 inch and 42 inch if Dall's porpoise, harbor porpoise **Rock Anchor:** 33 inch if humpback whale, gray whale, minke whale, Dall's porpoise, and harbor porpoise
750 meters	**Impact:** 42 inch if humpback whale, gray whale, and minke whale
1,000 meters	**Impact:** 36 inch if humpback whale, gray whale, and minke whale

2.2 Level B Monitoring Zones

DPD will establish and observe different Level B monitoring zones depending on the type of pile driving activity that is occurring. Level B monitoring zones represent areas where the SPLs generated from pile driving activities meet or exceed 120 dB root mean square (rms) during vibratory pile driving and 160 dB rms during impact pile driving. These monitoring zones serve as an area within which to document instances of marine mammal harassment, and enable PSOs to be aware of the presence of marine mammals near the project's shutdown zone and prepare for communication of required shutdowns.

Level B monitoring zones for the project are presented in Table 3 below and shown in Figures 3 and 4.

Table 3. Level B Monitoring Zones for NMFS-Managed Species*

Source	Monitoring Zones (m)
Vibratory Pile Driving/Removal	
24-inch steel installation (18 piles) (~40 minutes per day on 4.5 days)	6,215
30-inch steel temporary installation (72 piles) (~2 hours per day on 12 days)	6,215
30-inch steel removal (72 piles) (~1 hour per day on 12 days)	6,215
30-inch steel permanent installation (3 piles) (~1 hour per day on 2 days)	6,215
36-inch steel permanent installation (20 piles) (~1 hour per day on 10 days)	16,345
42-inch steel permanent installation (10 piles) (~2 hours per day on 5 days)	16,345
Impact Pile Driving	
36-inch steel (20 piles) (~10 minutes per day on 5 days)	3,745
42-inch steel (10 piles) (~6 minutes per day on 5 days)	3,745
Socketed Pile Installation	
24-inch steel (18 piles) (~2 hours per day on 9 days)	12,025
30-inch steel temporary installation (up to 10 piles) (~2 hours per day on 5 days)	12,025
Rock Anchor Installation	
8-inch anchor (for 24-inch piles, 2 anchors) (~1 hour per day on 2 days)	12,025
33-inch anchor (for 36- and 42-inch piles, 30 anchors) (~8 hours per day on 15 days)	12,025

* Numbers rounded up to nearest 5 meters; see Table 4 for calculated distances. These monitoring zones apply to all species other than northern sea otters (see Table 4 and Figure 7 for sea otter shutdown zones).

Figure 3. Lightering Float Level B Monitoring Zone for NMFS-Managed Species

Figure 4. Berth II Level B Monitoring Zones for NMFS-Managed Species

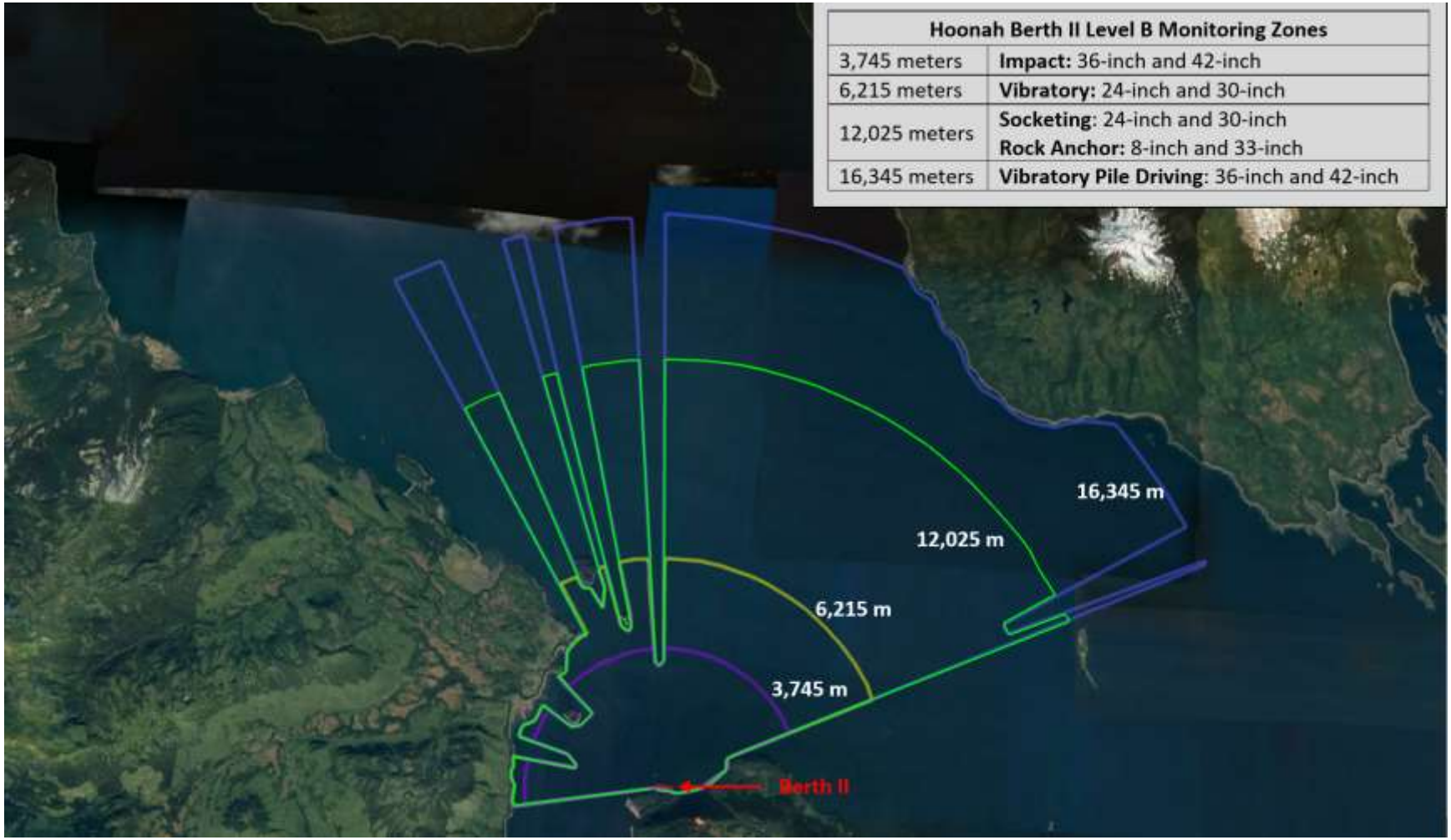


Table 4. Level A Shutdown Zones and Level B Monitoring Zones for Northern Sea Otters

Source	Shutdown Zones to Prevent Level A take (meters)	Monitoring Zones for Level B Take (meters) [1]
In-Water Construction Activities[2]		
Barge movements, pile positioning, sound attenuation placement	10	n/a
Vibratory Pile Driving/Removal[3]		
24-inch steel installation (18 piles; ~40 minutes per day on 4.5 days)	10	25
30-inch steel temporary installation (72 piles; ~2 hours per day on 12 days)	10	25
30-inch steel removal (72 piles; ~1 hour per day on 12 days)	10	25
30-inch steel permanent installation (3 piles; ~1 hour per day on 2 days)	10	25
36-inch steel permanent installation (20 piles; ~1 hour per day on 10 days)	10	50
42-inch steel permanent installation (10 piles; ~2 hours per day on 5days)	10	50
Impact Pile Driving		
36-inch steel permanent installation (20 piles; ~10 minutes per day on 5 days)	50	3,745
42-inch steel permanent installation (510 piles; ~6 minutes per day on 5 days)	50	3,745
Socketed Pile Installation		
24-inch steel permanent installation (18 piles; ~2 hours per day on 9 days)	10	50
30-inch steel temporary installation (up to 10 piles; ~2 hours per day on 5 days)	10	50
Rock Anchor Installation		
8-inch anchor permanent installation (for 24-inch piles, 2 anchors; ~1 hour per day on 2 days)	10	50
33-inch anchor permanent installation (for 36- and 42-inch piles, 30 anchors; ~8 hours per day on 15 days)	10	50

Numbers are rounded up to for ease of monitoring; see Table 4 for calculated distances.

[1] DBD is not proposing shutdowns associated with Level B disturbance.

[2] Although acoustic injury is not the primary concern with these in-water construction activities, shutdowns will be implemented to avoid impacts to sea otters.

[2] Construction of the lightering float only requires in-water construction activities and vibratory pile driving; construction of Berth II requires all the installation methods listed.

Figure 5. Berth II Level A Shut Down Zones for Northern Sea Otters

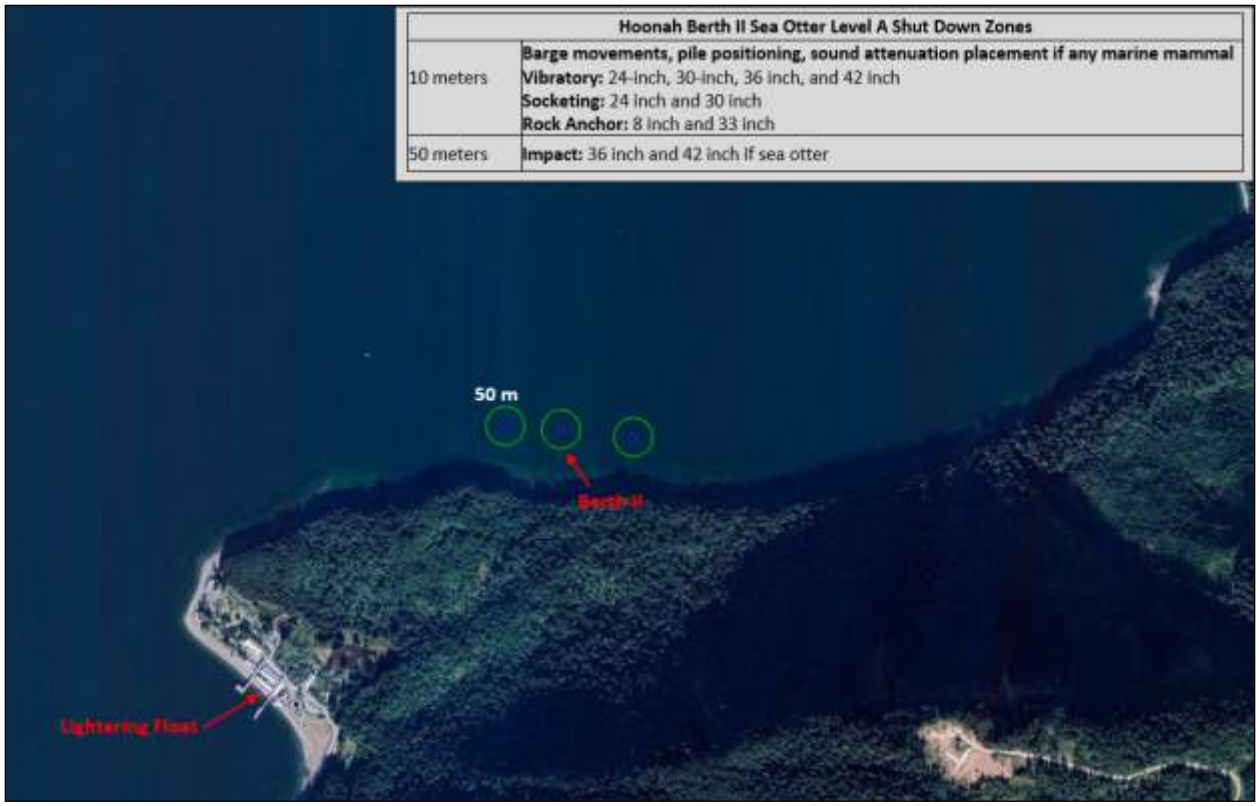


Figure 6. Berth II Level B Monitoring Zones for Northern Sea Otters

Figure 7. Lightering Float Level A Shutdown Zone and Level B Monitoring Zone for Northern Sea Otters

3 MITIGATION MEASURES

In order to limit impacts to marine mammals, including ESA-listed species, DPD would implement the following mitigation measures during pile driving activities.

3.1 General Conditions

- To minimize noise during 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 above list provides an overview of requirements for this project. Use the requested USACE Permit and the requested IHAs and BO for detailed terms and conditions.

3.2 Visual Monitoring by PSOs

3.2.1 General requirements – visual monitoring

- DPD, through the use of NMFS-approved PSOs, must monitor for the presence and behavior of marine mammals prior to, during, and after all pile driving and removal.

- All work will be performed during daylight hours to allow for visual monitoring. Pile driving activities will not be conducted when weather conditions or darkness do not allow for observation of all waters within Level A zones.

- To aid in observing, determining the location of, and communicating the presence of protected species within the action area, PSOs will have the following supplies:
    - binoculars
    - range finder
    - GPS
    - compass
    - two-way radio communication with construction foreman/superintendent
    - log book to record all activities that may be submitted to agencies (NMFS, USACE) upon request

- DPD is required to conduct briefings between construction supervisors and crews, marine mammal monitoring team, and DPD 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. The crew will be requested to alert the PSO when a marine mammal is spotted in the action area.

- Each day prior to commencing pile driving activities, the lead PSO will conduct a radio check with the construction foreman or superintendent to confirm the activities and zones to be monitored that day. The construction foreman and lead PSO will maintain radio communications throughout the day so that the PSOs may be alerted to any changes in the planned construction activities and zones to be monitored.

- On-shift PSOs will have no other primary duties than to watch for and report on events related to marine mammals during monitoring periods.

- 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 (to reduce PSO fatigue).

- Pre-activity monitoring: PSOs shall scan for the presence of marine mammals for 30 minutes before any pile driving activities take place for the day or if more than 30 minutes has elapsed in absence of pile activity.
    - If the shutdown zone has been observed to be clear of marine mammals for 30 minutes, pile driving activities may commence and work can continue even if visibility becomes impaired within the Level B monitoring zone.
    - If any marine mammals are present within the Level A zone, pile driving activities will not begin until the animal(s) has left the shutdown zone or has not been observed in the shutdown zone for 15 minutes.
    - If the monitoring zone has been observed for 30 minutes and no marine mammals (for which take has not been authorized) are present within the zone, work can continue even if visibility becomes impaired within the Level B monitoring zone.
    - When a marine mammal for which for Level B take has been permitted is present in the monitoring zone, pile driving activities may begin and the PSO will record Level B take for that species.

- For all pile driving activities and in-water heavy machinery work, DPD will implement the appropriate shutdown zone (Table 2) around the pile or work zone. If a marine mammal comes within or approaches the shutdown zone, such operations will cease.

- For in-water heavy machinery and construction work (e.g., barge movements, pile positioning, dead-pulling, and sound attenuation), a minimum 10 meter shutdown zone will be implemented. If a marine mammal comes within 10 meters of such operations, operations will cease and vessels will reduce speed to the minimum level required to maintain steerage and safe working conditions.
- After a shutdown occurs, pile driving activities can only begin after the animal is observed leaving the shutdown zone or has not been observed for 15 minutes after the commencement of the shutdown.

- If waters exceed a sea state that restricts the observers' ability to make observations within the marine mammal shutdown zone, pile driving activities will cease. Pile driving activities will not be initiated or continue until the entire largest shutdown zone for the activity is visible.

- Throughout all pile driving activity, the PSO(s) will continuously scan the shutdown zones to monitor for the presence or approach marine mammals.
    - If any marine mammals enter, or appear likely to enter, their respective shutdown zones during pile driving activities, all pile driving activities will cease immediately. Pile driving activities may resume when the animal(s) has been observed leaving the area on its own accord. If the animal(s) is not observed leaving the area, pile-driving activity may begin 15 minutes after the animal is last observed in the area.
        - For Steller sea lions, a small amount of Level A take is authorized, in the unlikely event that an animal were to enter the Level A shutdown zone prior to observation by the PSOs.
        - During impact pile driving of 36- or 42-inch piles, the Level A harassment zone radius for harbor porpoise, Dall's porpoise, and harbor seal is larger than the Level A shutdown zones (Table 2). This is due to the difficulty of visualization of these smaller species at great distances. Because they are more difficult to see and due to the high likelihood of their presence within the project area, a small amount of Level A take has been authorized for harbor porpoises and harbor seals in those instances in which they occur within the Level A harassment zone but outside of the shutdown zone *or* if they were to occur within the shutdown zone and were not visualized in time for the project to be shut down. (Level A take of Dall's porpoise has not been requested or authorized, due to the rarity of their presence within their Level A zones.)

- Throughout all pile driving activity, the Level B monitoring zone will be scanned to monitor for the presence of marine mammals.
    - If the entire Level B monitoring zone is not visible, pile driving activities may continue, and the number of individual listed animals within the Level B zone will be estimated and recorded. Estimated numbers of individuals will be extrapolated by dividing the number of observed individuals by the percentage of the monitoring zone that was visible.
        - For example, if wind and sea state increased causing visibility to diminish to a point that only 40 percent of the monitoring zone were visible, and 2 humpback whales were observed entering the Level B zone, the PSO would estimate that 5 humpback whales were present in the Level B zone (2 whales observed in Level B zone ÷ 40% of zone visible = 5 whales estimated to be within Level B zone). (Note that the estimated number of individuals does not equal the estimated number of takes for humpback whales. See next bullet for further explanation.)

  - Estimated takes for ESA-listed humpback whales will be calculated based on the total number of humpback whales observed (or estimated) in the Level B monitoring zone in a month multiplied by 6.1 percent (the percentage of humpback whales in the action area estimated to be from the listed Mexico Distinct Population Segment [DPS; Wade et al. 2016]).
  - Estimated takes for ESA-listed Western DPS (WDPS) Steller sea lions will be calculated based on the total number of Steller sea lions observed (or estimated) in the Level A or B monitoring zones in a month multiplied by 56 percent (the percentage of Steller sea lions in the action area estimated to be from the listed WDPS [Muto et al. 2018]).
  - If a marine mammal species enters or approaches the Level B zone and that species is either not authorized for take or its number of authorized takes has been met, pile driving activities must shut down immediately using delay and shut-down procedures. Activities must not resume until the animal has been confirmed to have left the area or an observation time period of 15 minutes since the animal was last seen has elapsed.

- Post-construction monitoring will be conducted for 30 minutes beyond the cessation of pile driving activities at the end of the day.

3.2.2 Number and location of PSOs

The number of PSOs will vary from two to four, depending on the type of activity, method of pile driving, and size of pile, all of which contribute to the establishment the size of the harassment zones. Monitoring locations will be selected to provide an unobstructed view of all water within the shutdown zone and as much of the Level B harassment zone as possible for pile driving activities.

- Three PSOs will monitor during all pile driving activities at the lightering float project site, with locations as follows:
  - PSO #1: stationed at or near the site of pile driving;
  - PSO #2: stationed on Long Island (southwest of Hoonah in Port Frederick Inlet) and positioned to be able to view west into Port Frederick Inlet and north towards the project area;
  - PSO #3: stationed on a vessel traveling a circuitous route through the Level B monitoring zone (Figure 4).

- Three PSOs will monitor during all impact pile driving activities at the Berth II project site, with locations as follows:
  - PSO #1: stationed at or near the site of pile driving;
  - PSO #2: stationed on Halibut Island (northwest of the project site in Port Frederick Inlet) and positioned to be able to view east towards Icy Strait and southeast towards the project area.

- Three PSOs will monitoring during vibratory pile driving of 24- and 30-inch-diameter piles at the Berth II project site.
    - PSO #1: stationed at or near the site of pile driving;
    - PSO #2: stationed on Scraggy Island (northwest of the project site in Port Frederick Inlet) and positioned to be able to view south towards the project area;
    - PSO#3: stationed on a vessel traveling a circuitous route through the Level B monitoring zone (Figure 5).

- Four PSOs will monitor during vibratory pile driving of 36- and 42-inch- diameter piles and during all socket/anchor drilling activities.
    - PSO #1: stationed at or near the site of pile driving;
    - PSO #2: stationed on Hoonah Island (northwest of the project site in Port Frederick Inlet) and positioned to be able to view south towards the project site;
    - PSO #3: stationed across Icy Strait north of the project site (on the mainland or the Porpoise Islands) and positioned to be able to view west into Icy Strait and southwest towards the project site;
    - PSO #4: stationed on a vessel traveling a circuitous route through the Level B monitoring zone (Figure 6).

3.2.3 PSO Qualifications

DPD will adhere to the following conditions when selecting PSOs:

- Independent PSOs will be used (i.e., not construction personnel).
- DPD must submit to NMFS OPR (name to be determined) the curriculum vitae (CV) of all observers prior to monitoring.
- At least one PSO must have prior experience working as a marine mammal observer during construction activities.
- Other PSOs may substitute education (degree in biological science or related field) or training for experience.
- 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.
- DPD will ensure that, and observers must have, the following additional qualifications:
    - 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;
    - 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 and reasons for implementation of mitigation (or why mitigation was not implemented when required); and marine mammal behavior;
- 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
- Sufficient training, orientation, or experience with the construction operations to provide for personal safety during observations.

3.3 Reporting

3.3.1 Notification of intent to commence construction

DPD will inform NMFS OPR and the NMFS Alaska Region Protected Resources Division one week prior to commencing construction activities (name to be determined).

3.3.2 Daily activity logs

For each day of construction activity that requires a PSO, the following information will be recorded in a log provided by DPD:

1. Date and time that each monitoring period[3] begins and ends;

2. Prevailing environmental conditions in each monitoring period (e.g., wind speed, percent cloud cover, visibility, sea state, tide state);

3. Construction activities occurring during each monitoring period, including how many and what size of piles were driven; and

4. Indication of whether marine mammals were sighted. For each marine mammal sighting, the PSO will complete a "Marine Mammal Sighting Form" as described below, and shown in Appendix A.

3.3.3 Marine Mammal Sighting Form

For each marine mammal sighting, the PSO will complete a "Marine Mammal Sighting Form". The PSO will record the following information:

- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
- Location and distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Estimated amount of time that the animals remained in the Level B zone;
- Time and description of most recent project activity prior to marine mammal observation;
- Environmental conditions as they existed during each sighting event, including, but not limited to: Beaufort sea state, weather conditions, visibility (km), lighting conditions;

[3] There may be several monitoring periods within a day. If environmental conditions change throughout the day, the PSO should record a new monitoring period to reflect those changes. A new monitoring period would also begin after each break in construction activity.

- Description of implementation of mitigation measures within each monitoring period (e.g., shutdown or delay);
- Other human activity in the area within each monitoring period; and
- A summary of the following:
    - Total number of individuals of each species detected within the Level A zone and the average amount of time that they remained in that zone.

3.3.4 Interim monthly reports

During construction, DPD will submit brief, monthly reports to the NMFS Alaska Region Protected Resources Division that summarize PSO observations and recorded takes. Monthly reporting will allow NMFS to track the amount of take (including extrapolated takes), to allow reinitiation of consultation in a timely manner, if necessary. The monthly reports will be submitted by email to a NMFS representative.

The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by close of business on the fifth day of the month following the end of the reporting period (e.g., the monthly report covering September 1–30, 2019, would be submitted to the NMFS by close of business on October 5, 2019).

3.3.5 Final report

DPD will submit a draft final report by email to NMFS OPR (name to be determined) and NMFS AKR Protected Resources Division (name to be determined) not later than 90 days following the end of construction activities. DPD will provide a final report within 30 days following resolution of NMFS's comments on the draft report. If no comments are received from NMFS within 30 days, the draft final report will be considered the final report.

The final reports will contain, at minimum, the following information:

- Summary of construction activities, including beginning and completion dates;
- Description of any deviation from initial proposal in pile numbers, pile types, average driving times, etc.;
- Table summarizing all marine mammal sightings during the construction period including:
    a. dates, times, species, number, location, and behavior of any observed ESA-listed marine mammals, including all observed humpback whales and Steller sea lions;
    b. daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level A and Level B zones, and estimated as taken, if appropriate;
- Number of shut-downs throughout all monitoring activities;
- Table summarizing any incidents resulting in take of ESA-listed species;
- Brief description of any impediments to obtaining reliable observations during construction period;
- Description of any impediments to complying with these mitigation measures; and
- Appendices containing all PSO daily logs and marine mammal sighting forms.

3.3.6 Reporting Injured or Dead Marine Mammals

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 unauthorized Level A harassment, serious injury, or mortality, DPD shall immediately cease the specified activities and report the incident to NMFS OPR, the NMFS Alaska Region Protected Resources Division, and the NOAA Fisheries statewide 24-hour Stranding Hotline (877) 925-7773.

The report must include the following:

- 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 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) (if available).

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

In the event that DPD discovers an injured or dead marine mammal within the action area, and the lead PSO 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), DPD will immediately report the incident to the NMFS OPR, and the NMFS Alaska Regional Stranding Coordinator or Hotline.

The report must include the same information identified in the paragraph above. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with DPD to determine whether additional mitigation measures or modifications to the activities are appropriate.

In the event that DPD discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), DPD must report the incident to the NMFS OPR and the NMFS Alaska Regional Stranding Coordinator or Hotline within 24 hours of the discovery. DPD will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS.

3.4 Strike Avoidance

Vessels will adhere to the Alaska Humpback Whale Approach Regulations when transiting to and from the project site (see 50 CFR §§ 216.18, 223.214, and 224.103(b)). These regulations require that all vessels:

- Not approach within 100 yards of a humpback whale, or cause a vessel or other object to approach within 100 yards of a humpback whale,
- Not place vessel in the path of oncoming humpback whales causing them to surface within 100 yards of vessel,
- Not disrupt the normal behavior or prior activity of a whale, and
- Operate at a slow, safe speed when near a humpback whale (safe speed is defined in regulation (see 33 CFR § 83.06)).

Vessels will also follow the NMFS Marine Mammal Code of Conduct for other species of marine mammals, which recommend maintaining a minimum distance of 100 yards; not encircling, or trapping marine mammals between boats, or boats and shore; and putting engines in neutral if approached by a whale or other marine mammal to allow the animals(s) to pass.

Appendix A.
Marine Mammal Sighting Forms

Project Name:											**Observer:**	**Date:**
Site Location:	**Time Survey Initiated:**											
	Time Survey Completed:										**Page ____ of ____ Pages**	
Event Number	**Time/Duration (start/end time if continuous)**	**Dist/dir to animal (from observer)**	**Construction Activity Type**	**Cloud Cover**	**Precip.**	**Sea State**	**Species**	**Number**	**Behavior**	**Level B Take?* (Y/N)**	**Notes**	

Cloud Cover: 1=clear (<10% cover); 2=Partly Cloudy (10-50% cloud cover); 3=Cloudy (51=90% cloud cover); 4=Overcast >90% cover

Precipitation Codes: 0=None; 1=Light Rain; 2=Heavy Rain; 3=Hail; 4=Fog; 5=Sleet or snow; 6=Other

*** Record a Level B Take only if pile driving is actively occurring at the time of observation. If observations occur during the pre- or post-clearance periods, do not record as Level B take.**

Data Codes

Species Code

Minke Whale = **MW**
Humpback Whale = **HW**
Gray Whale = GW
Killer Whale = KW
Pacific White-Sided Dolphin = PWD
Dall's Porpoise = DP
Harbor Porpoise = HP
Harbor Seal = HS
Steller Sea Lion = SSL
Sea Otter = SO
Unidentified Phocid = PH
Unidentified Pinniped = UP
Unidentified Whale = UW
Other = O

Age Classifications

Unknown Age = UA
Adults
Juveniles
Calves/Pups

Sex

Female = F
Male = M
Mixed
Unknown = U

Construction Activity Type

No Activity
Soft Start = SS
Impact Pile Driving = I
Vibratory Pile Driving = V
Socketed Pile Driving = S
Anchoring = A
Shutdown = SD

Behavior

Dive = DV
Travelling = TR
Mating Suspected = MS
Milling = MI
Resting = RE
Feeding = FE
Breeching = BR
Tail Slap = TS
Enter Water = EN
Exit Water = EX
Hauled Out = HO
Look = LO
Direction Change = DC
Increased Swimming Rate = IS
Surface Active = SA

Beaufort Sea State Number	Observed Sea Surface Condition	Sailor's Term	Effects on Land	Typical Wind Speed (MPH)
0	Mirror smooth and glassy surface	Calm	Calm; smoke rises straight up.	0
1	Small ripples or capillary waves on glassy surface.	Light Air	Smoke drifts with wind direction.	1 - 3
2	Larger ripples or wavelets on glassy surface.	Light Breeze	Leaves begin to rustle; wind felt on face.	4 - 7
3	Wavelets of irregular direction and shape; a few crests break on glassy surface.	Gentle Breeze	Small flags extend; leaves in constant motion.	8 - 12
4	Small chop, defined direction; numerous whitecaps.	Moderate Breeze	Dust, leaves & loose paper move.	13 - 18
5	Heavy chop; many white foaming crests; some spray.	Fresh Breeze	Small trees begin to sway.	19 - 24
6	Larger surface waves form; whitecaps everywhere; more spray.	Strong Breeze	Large branches move; whistling heard in wires.	25 - 31
7	Sea heaps up; white foam starts to blow in streaks along direction of wind; spindrift forms.	Moderate Gale	Resistance strong when walking.	32 - 38
8	Moderately high waves, crests begin to break into spindrift; well marked streaks of foam.	Gale	Twigs and small branches broken off trees.	39 - 46
9	High waves, sea begins to roll; spray begins to reduce visibility; dense streaks of foam.	Strong Gale	Structural damage occurs esp. to roofs.	47 - 54
10	Sea mostly covered in white foam; visibility reduced; exceptionally large waves.	Storm	Trees uprooted; considerable structural damage.	55 - 63