Endangered Species Act Section 7 Biological Assessment for Listed Species under the Jurisdiction of the National Marine Fisheries Service

Turnagain Marine Construction
Alaska Railroad Corporation Seward Passenger Terminal Development Project
Resurrection Bay, Seward, Alaska

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ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AMHS	Alaska Marine Highway Service
ARRC	Alaska Railroad Corporation
DPS	Distinct Population Segment
dB	Decibel
EDPS	Eastern Distinct Population Segment
ESA	Endangered Species Act
ESCA	Endangered Species Conservation Act
Hz	Hertz
IHA	Incidental Harassment Authorization
kHz	Kilohertz
LCRA	Lower Columbia River Management Area Testing Parameters
LOA	Length Overall
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
NMML	National Marine Mammal Laboratory
NOAA	National Oceanic and Atmospheric Administration
NPS	National Parks Service
PMEL	Pacific Marine Environmental Laboratory
PTS	Permanent Threshold Shift
RMS	Root Mean Square
SEL	Sound Exposure Level
SOSUS	Sound Surveillance System
SPL	Sound Pressure Level
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
TS	Threshold Shift
TTS	Temporary Threshold Shift
USACE	U.S. Army Corps of Engineers
WDPS	Western Distinct Population Segment
WNP	Western North Pacific
µPa	Micropascal
4MP	Marine Mammal Monitoring and Mitigation Plan

EXECUTIVE SUMMARY

ACTIONS AND PARTICIPANTS

The actions that are the subject of this Biological Assessment are: (a) National Marine Fisheries Service (NMFS) Office of Protected Resources - Permits and Conservation Division's proposed issuance of an Incidental Harassment Authorization (IHA) to take marine mammals by harassment under the Marine Mammal Protection Act (MMPA) incidental to Turnagain Marine Construction's (TMC) proposed Alaska Railroad Corporation (ARRC) Seward Passenger Terminal Development Project (the Project) in Seward, Alaska; and (b) the U.S. Army Corps of Engineers (USACE), Alaska District proposed issuance of a Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permit for the Project (Reference Number: POA-1965-00034). The action agencies and their proposed actions for the Project are:

- National Marine Fisheries Service (NMFS) Office of Protected Resources Permits and Conservation Division (PR1) is proposing issuance of an Incidental Harassment Authorization (IHA) to take marine mammals by harassment under the Marine Mammal Protection Act (MMPA) incidental to construction of the Project; and

- U.S. Army Corps of Engineers (USACE), Alaska District is proposing issuance of a Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permit for the construction of a dock and associated construction activities (POA-1965-00034).

Additional roles and agency involvement include the following:

- The consulting agency for the proposed actions is NMFS's Alaska Region Protected Resources Division (NMFS AKR);
- The applicant is the Turnagain Marine Consulting, Inc.; and
- The non-Federal representative is Solstice Alaska Consulting, Inc. (Solstice).

PROJECT SUMMARY

Under contract to ARRC, Turnagain Marine Construction proposes to upgrade and expand the Seward Passenger Terminal in Resurrection Bay in Seward, Alaska. Changes to the structure would include the removal of the existing passenger terminal building and some of the existing steel piles; dredging; installation of piles and concrete panels; and placement of fill to support the new 1,200 foot by 120-foot bulkhead dock. The proposed upgrades would provide safe harbor for cruise ships during the visitor season and freight and non-cruise vessels in the off-season.

Expansion of the Seward Passenger Terminal includes in-water pile driving, dredging, and the placement of fill in marine waters. These activities have the potential to affect species and habitat protected under the Endangered Species Act (ESA).

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. The project action area encompasses approximately 70 square kilometers in Resurrection Bay.

SPECIES, LISTING STATUS, DETERMINATION

The proposed action has the potential to affect the endangered Western North Pacific (WNP) Distinct Population Segment (DPS) humpback whale (*Megaptera novaeangliae*), the threatened Mexico DPS humpback whale, the endangered fin whale (*Balaenoptera physalus)*, the endangered North Pacific right whale (*Eubalaena japonica)*, the endangered sperm whale (*Physeter macrocephalus*), and the endangered Western DPS (WDPS) Steller sea lion (*Eumetopias jubatus*) (Table 1). Critical habitat has been designated for the WNP and Mexico DPS humpback whale, North Pacific Right Whale, and WDPS Steller sea lion in the project area (NMFS 2021).

Table 1. ESA-Listed Species, Statues, and Determination of Effects

ESA-Listed Species	Status	Species Determination	Critical Habitat	Critical Habitat Determination
WNP DPS Humpback Whale (*Megaptera novaeangliae*)	Endangered	Likely to Adversely Affect	Designated	Not Likely to Adversely Affect
Mexico DPS Humpback Whale (*M. novaeangliae*)	Threatened	Likely to Adversely Affect	Designated	Not Likely to Adversely Affect
Fin Whale (*Balaenoptera physalus)*	Endangered	Likely to Adversely Affect	Not Designated	No Effect
North Pacific Right Whale (*Eubalaena japonica)*	Endangered	Not Likely to Adversely Affect	Designated	No Effect
Sperm Whale (*Physeter macrocephalus*)	Endangered	Not Likely to Adversely Affect	Not Designated	No Effect
WDPS Steller Sea Lion (*Eumetopias jubatus*)	Endangered	Likely to Adversely Affect	Designated	No Effect

1 PROJECT DESCRIPTION

1.1 LOCATION

The proposed Seward Passenger Terminal Development Project would be located within the City of Seward on the Kenai Peninsula at the head of Resurrection Bay in Southcentral Alaska; Township 1S, Range 1W, Seward Meridian, USGS Quadrangle Seward A-7 SE; latitude 60.119058 and longitude -149.428333 (**Figures 1-3; Appendix A**).

Figure 1. Proposed Project Location and Vicinity Map

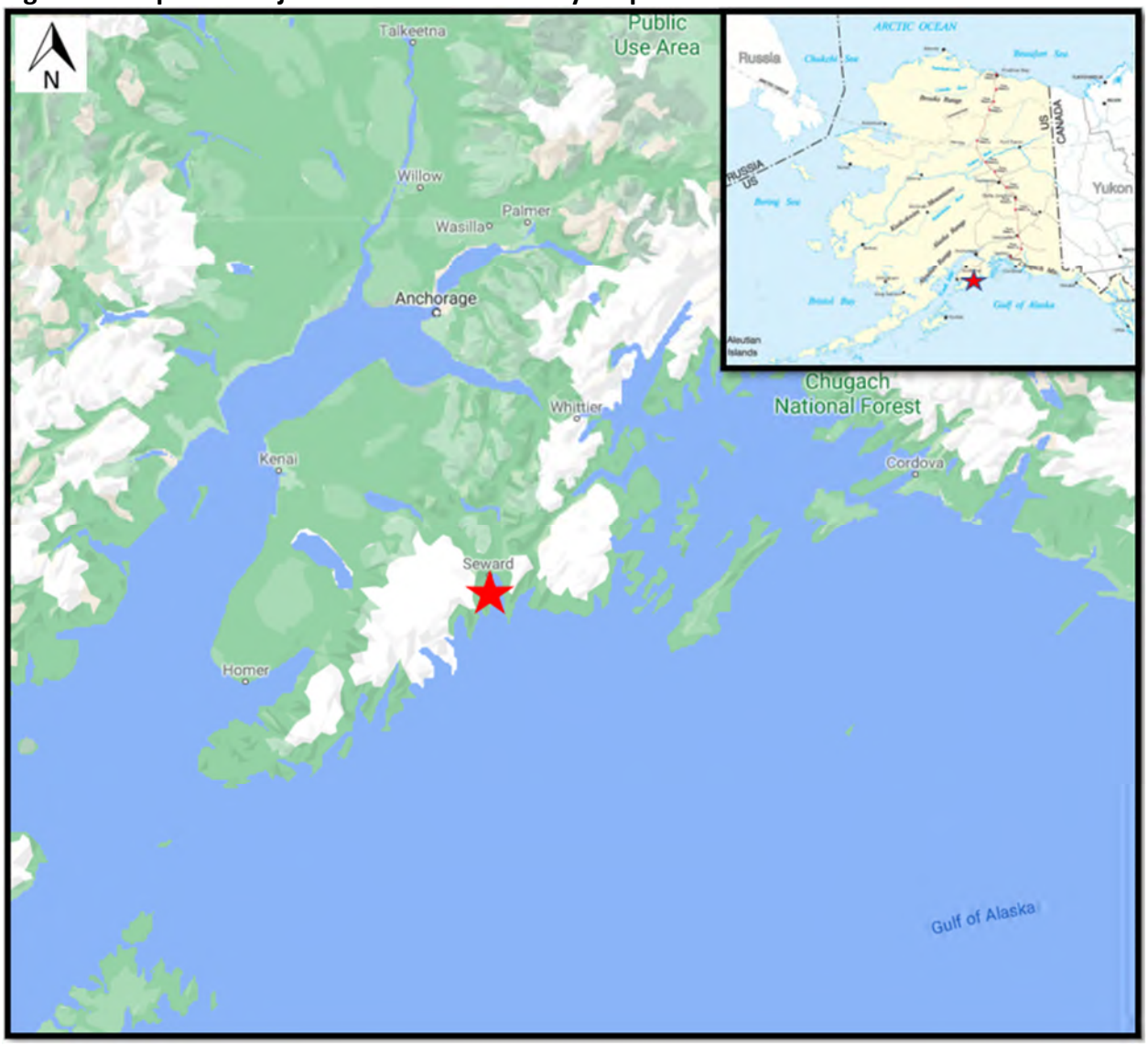


Figure 2. Location of Project Components

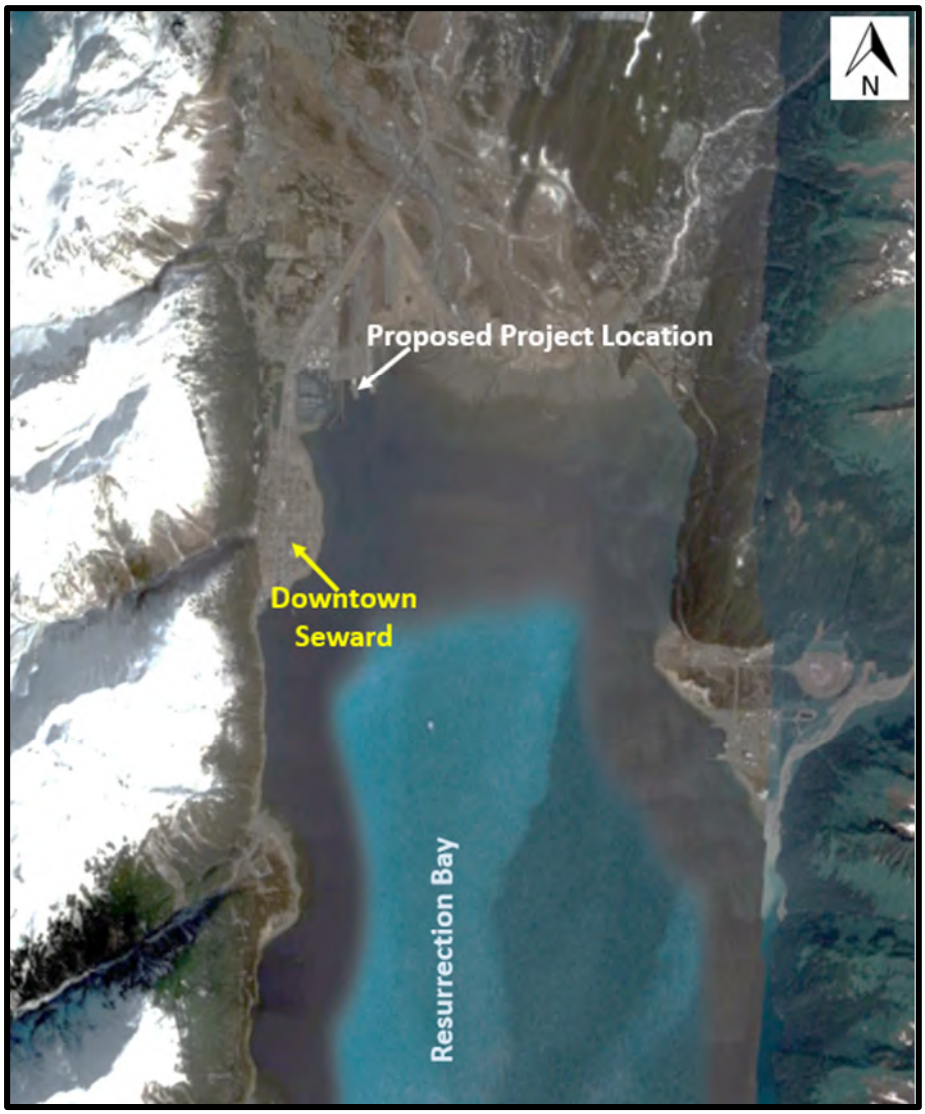


Figure 3. Proposed Project Location

(Source: CruiseMapper 2021)

1.2 PURPOSE AND NEED

The purpose of the Project is to replace the Seward ARRC dock so that it can safely accommodate cruise ships, provide off-season mooring of freight vessels, and maintain a terminal space. This Project is needed because the existing dock is in poor condition and nearing the end of its useful life. Further, the Project is needed to provide a winter mooring area for freight vessels.

Accessible by road, rail, plane, and boat, Seward is the primary embarking and disembarking location for the majority of tourists visiting Southcentral and Interior Alaska. In 2017, cruise ships called at the Port of Seward 97 times (CLIA 2020; ARRC 2019) and 229,509 cruise ship passengers arrived to or departed from Seward. About 101,745 passengers purchased ARRC tickets for the coastal or cruise train. Based on tourism growth prior to the COVID-19 pandemic, cruise ship passengers are expected to increase by 1.9 percent annually for the next decade (ARRC 2017).

Constructed over 55 years ago, the dock has reached the end of its design life and needs to be replaced to maintain safety and function. Additionally, the existing Dale R. Lindsey Alaska Railroad Intermodal Terminal is in poor condition and cannot accommodate current cruise ship passenger capacities (ARRC 2017a).

A 2013 site condition assessment of the ARRC dock found that, on average, the structure's piles are in serious to critical condition with some sections showing over a 50 percent loss of wall

thickness, further supporting that the structure is nearing the end of its useful life. An estimated six years of phase-based rehabilitation projects are needed to maintain dock safety and function (R&M Consultants 2014). The cost of necessary repairs combined with over twenty years of extensive maintenance projects is not practical or sustainable.

The existing passenger dock was originally designed as a multi-use structure to accommodate cargo ships, cruise ships, and the Alaska Marine Highway System (AMHS) ferries. ARRC decreased the dock's allowable load capacity in the early 2000s due to its degraded structure, and constructed the Freight Dock to accommodate freight needs. However, the amount of freight vessel traffic and the average size of freight vessels in Seward have outgrown the existing Freight Dock. The need for an additional dock that can safely accommodate current freight vessels when cruise ships are not in port is paramount (ARRC 2017).

1.3 PROPOSED ACTION

Turnagain Marine Construction proposes to create a safe mooring structure for cruise ships and freight vessels by constructing a new 1,200-foot by 120-foot bulkhead dock at the head of Resurrection Bay (**Figures 4 and 5, Appendix A**).

Figure 4. Seward Passenger Terminal Existing Site Conditions and Proposed Demolition Plan

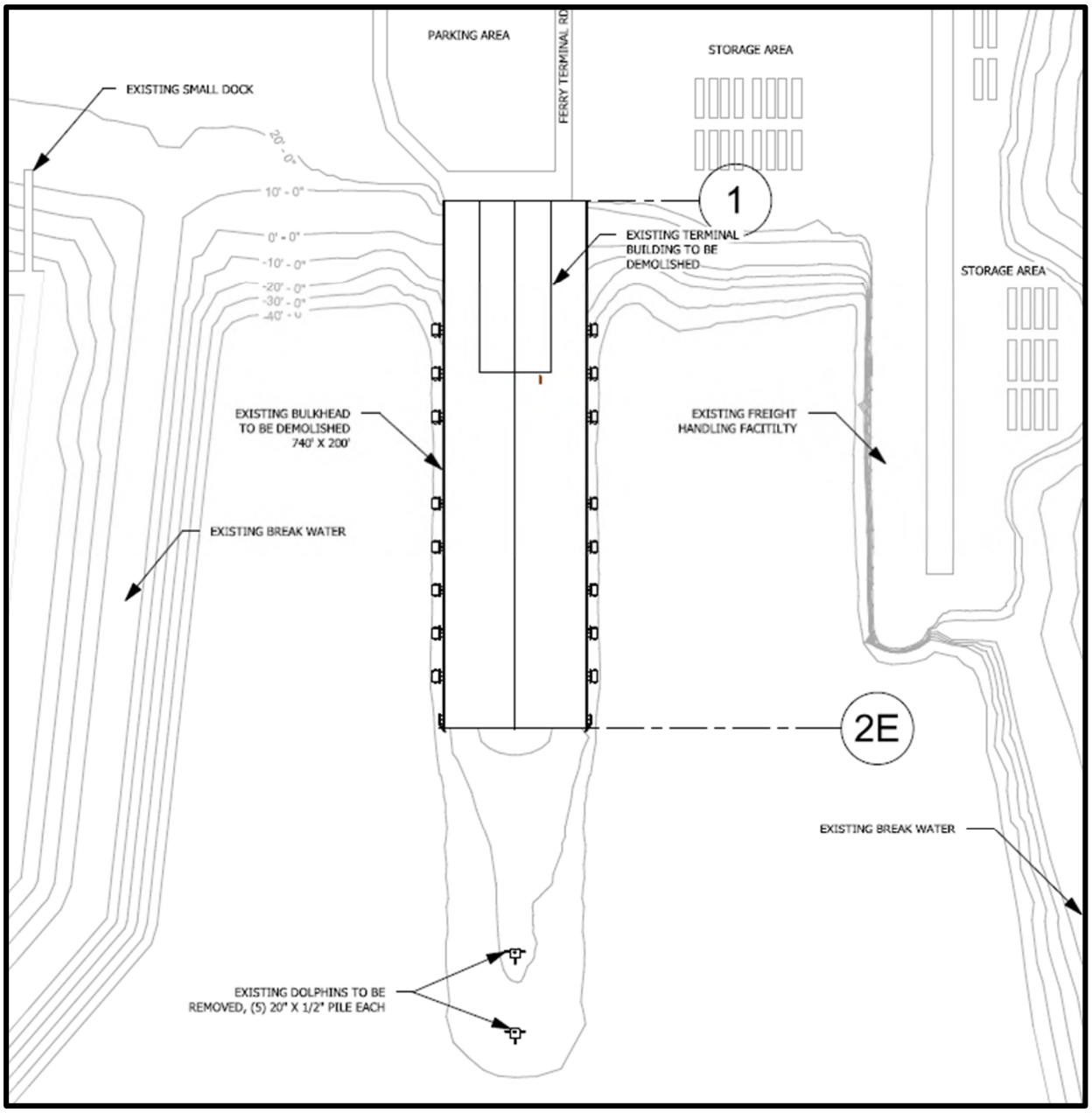
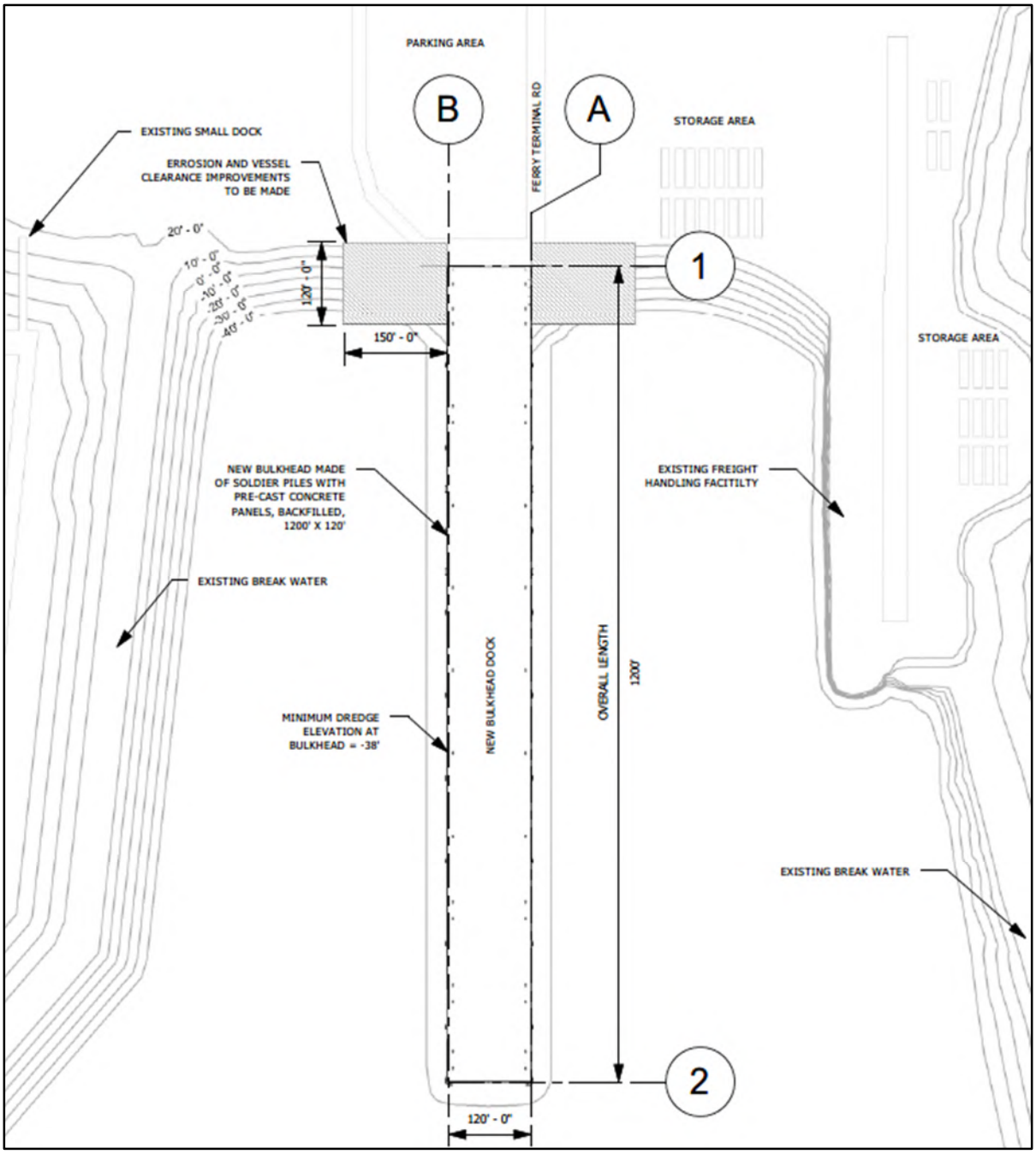


Figure 5. Seward Passenger Terminal Site Plan Including the Proposed Bulkhead Dock



1.3.1 Construction Methods

The Project would involve removing a portion of the existing dock structure, placing fill, dredging, and installing a new bulkhead dock.

1.3.1.1 Existing Structure Removal Methods and Components

The Project would remove:

- The existing passenger terminal building (26,555 square feet)
- The existing (out of water) dock fenders
- Nine hundred 14-inch-diameter steel piles (920 remaining piles will act as soil anchors for the fill)
- Ten 20-inch-diameter steel piles that compose two mooring dolphins
- The entire existing concrete deck will be removed and reused as fill material
- Portions of the concrete pile caps
- Approximately 5,000 cubic yards (CY) of riprap obstructions along 200 feet of shoreline on both sides of the existing dock (approximately 0.09 acres)
- Any navigation obstructions within 120 feet of the proposed dock area
- Approximately 10,000 CY of material (dredging) in the area along the existing dock (approximately 1.10 acres)

1.3.1.2 Bulkhead Dock Construction Methods and Components

The Project would install:

- Three hundred 14-inch-diameter steel piles (reused) to act as additional soil anchors in the material fill
- Two hundred twenty permanent 36-inch H-beam steel soldier piles to guide concrete panels
- Two hundred twenty permanent 12-foot-wide by 24-inch-thick concrete panels
- Two permanent 42-inch-diameter fender piles
- Approximately 350,000 CY of gravel and recycled concrete fill, placed in two phases (about 3.3 acres)
- Dock components such as a bull rail, fenders, mooring cleats, a pre-cast concrete dock surface, a passenger walkway, a hand rail, and mast lights (installed out of the water)
- New passenger terminal building (30,000 square feet), replacing and expanding the capacity of the former structure

1.3.2 Construction Duration

Construction would begin in summer 2022 and continue into spring 2023. Pile installation activities, filling, and dredging are expected to occur for a total of approximately 3,038 hours over 299 days (not necessarily consecutive). Most of the in-water work time would be spent placing fill material (116 days) and using a vibratory hammer to install and remove piles (124 days). See **Table 4** for additional details regarding the installation and removal of piles.
The construction timeline takes into account the mobilization of materials and the Project construction, as well as potential delays due to delayed material deliveries, equipment

maintenance, inclement weather, and shutdowns that may occur to prevent impacts to marine mammals.

1.3.3 Equipment

The following equipment is expected to be used:

- Vibratory Hammer: ICE 44B/Static weight 12,250 pounds and APE 200-6/Static weight 19,000 pounds
- Diesel Impact Hammer: Delmag D46/Max Energy 107,280 feet-pounds and Delmag D80/Max Energy 202,825 feet-pounds
- Fill: CAT D4 dozer, CAT D6 dozer, CAT 349 Excavator, CAT CS64B Vibratory Soil Compactor, and Vibro Compaction w/ crane and 44B vibratory hammer
- Dredging: *Swiftwater* and *Brightwater* Crane Barge with a 5 cubic yard bucket
- Jetting: Godwin Dri-Prime HL150M pump

See **Table 2** and **Appendix B** for detailed specifications of the expected construction equipment

Table 2. Construction Equipment That Will Produce Noise

Driving mechanism	Pile driver/Equipment Type	Properties
Impact pile driving	Diesel Delmag D46	Max Energy 107,280 feet-pounds Speed (blows per minute) 34-53
	Diesel Delmag D80	Max Energy 202,825 feet-pounds Speed (blows per minute) 34-53
Vibratory pile driving	ICE 44B/Static weight 12,250 pounds	202 tons centrifugal force 207 tons driving force
	APE 200-6/Static weight 19,000 pounds	255 tons driving force
Excavator	349 Excavator	295 kW/396 hp net power
Soil Compactor	CAT CS64B Vibratory Soil Compactor	29900 lb to 52600 lb Centrifugal force; 30.5 Hz vibratory
Jetting	Godwin Dri-Prime HL150M pump	374 m^3/hr and discharge heads to 148 meters
Dredging	Anvil Heavy Duty Round Nose Crane Clamshell Bucket with Teeth	5 cubic yard capacity (100 yards per hour)/21,500 pounds total weight

1.3.4 Transport of Materials and Equipment

Three material barges would transport materials from Washington to the Project site over the course of the Project. The construction barges would travel from a location in Southeast Alaska to the Project site. The barge types travel these routes frequently. The construction barge would be secured at the Project site by four mooring anchors which would remain below the surface and would not cause hazards to navigation. The staging barge would be tied to the existing dock structure, and materials would be moved from the staging barge by crane (located on the construction barge) to the construction barge and project site. Barge movements between fill and pile installation areas would occur at a speed of less than 2 miles per hour in approximately 50-foot increments.

1.3.5 Transport of Workers to and from Work Platform

Construction workers would be transported from shore to the construction barge, a travel distance of less than 300 feet, by skiff. There may be several of these short shore-to-barge trips each day, remaining close to the shore.

Protected Species Observers (PSOs) may use a skiff to observe the action area. Observer protocols including potential skiff-based monitoring is in included in the Marine Mammal Monitoring and Mitigation Plan (4MP) found in **Appendix C**.

1.3.6 Other In-water Construction and Heavy Machinery Activities

The proposed action will involve in-water construction and heavy machinery activities in addition to the activities described above. These include using standard barges and tug boats; positioning piles on the substrate using a crane (i.e., “stabbing the pile”); and using heavy machinery to place fill material.

1.3.7 Construction Sequence

In water construction of the bulkhead dock will begin with the demolition of the concrete deck and removal of a portion of the existing piles. Once demolition is complete, construction of the new bulkhead dock will use the following sequence:

1. Install 300 14-inch-diameter piles (reused from the existing dock) in the new dock’s material fill footprint using a vibratory hammer. This action may occur at any point throughout construction.
2. Dredge around the perimeter of the new dock’s footprint. About 15,000 CY of dredged material will be reused as material fill.
3. Install six temporary 30-inch-diameter template piles at least ten feet into the overburden using a vibratory hammer to guide the installation of permanent soldier piles.
4. Weld a frame around the temporary piles.
5. Within the frame, install a permanent 36-inch-diameter soldier pile using vibratory and impact hammers.
6. Remove the frame and temporary piles and install the next soldier pile, repeating this process for the placement of all of the soldier piles.

7. Using the soldier piles as a guide, jet the 12-foot by 24-inch-thick concrete panels into place. This process could occur concurrently with the placement of the remaining soldier piles.
8. Backfill the new dock area with 350,000 CY of recycled concrete, gravel, and alluvial fill with a bulldozer and soil compactor.
9. Install six temporary 30-inch-diameter template piles at least ten feet into overburden with a vibratory hammer to guide the installation of permanent fender piles.
10. Weld a frame around the temporary piles.
11. Within the frame, install a permanent 42-inch-diameter fender pile using vibratory and impact hammers.
12. Remove the template piles and move to the second fender pile following the same procedure.

See **Table 3** for a conservative estimate of the time required for filling and dredging. **Table 4** provides an estimate of time required for pile installation and removal and the Dates and Duration section above details construction duration.

1.3.7.1 Dredging and Filling Methods

Dredging Components

ARRC regularly dredges the basin at the Seward Passenger Dock to accommodate the draft of the vessels utilizing the facility; however, due to the redepositing of soil by natural ocean processes, approximately 10,000 CY of soil along the existing dock (approximately 1.10 acres) will need to be removed to ensure a depth of -37 foot mean lower low water (MLLW) to be able to accommodate the design vessels.[1]

All navigation obstructions within 120 feet of the proposed dock area would be removed, mainly by dredging. Approximately 5,000 CY of riprap obstructions along 200 feet of shoreline on either side of the existing dock (approximately 0.09 acres) will also be removed.

The dredged material will be removed with a crane-barge-based 5 CY bucket. The material will be reused as fill in the newly constructed bulkhead dock.

Fill Components

Fill will be placed after the new bulkhead dock has been constructed. Approximately 100,000 CY of gravel fill and 250,000 CY of recycled concrete and alluvial fill will be deposited with an excavator and dozer. The fill will be compacted using a vibratory soil compacter prior to placing the new dock surface.

[1] The design vessel is similar to the Norwegian Bliss (approximate LOA: 997 feet; beam: 136 feet; max draft: 29 feet; min draft: 27 feet) or the Quantum of the Seas (approximate LOA: 1,140 feet; beam: 136 feet; max draft: 29 feet; min draft: 27 feet).

Table 3. Seward Passenger Terminal Expansion Project Dredging and Filling Summary

Project Component	Description				
	Soil Type	Area (acres)	Total Quantity (cubic yards)	Total Time (hours)	# of Days
Dredging (6 days)	Alluvial, Gravel, and Riprap	1.10	15,000	72	6
Fill (116 days)	Gravel	3.25	100,000	850	36
	Alluvial, Gravel, and recycled concrete		250,000	1,900	80

1.3.7.2 Pile Installation/Removal Methods

Removal of Existing Piles

The existing 14-inch- and 20-inch-diameter piles will be removed by crane using the deadpull method. A vibratory hammer will be used if the deadpull method is not possible.

Installation of Permanent Piles

Some of the removed 14-inch-diameter piles that are in good condition will be reinstalled with the vibratory hammer within the filled area to act as additional soil anchors.

The concrete panels will be pre-fabricated with three to four 3- or 4-inch jet lines that will cycle pressurized water to displace and liquify the soil, facilitating the installation of the panels (i.e., "jetting").

The permanent 36-inch-diameter soldier piles and 42-inch-diameter fender piles will be installed with vibratory and impact hammers through sandy silt and sandy gravel to reach approximately 38 feet below the mudline (**Appendix A**).

Table 4 provides a conservative estimate of the amount of time required for pile removal and installation.

Table 4. Seward Passenger Terminal Expansion Project Pile Size, Quantity, and Installation Method

Description	Project Component							
	Existing Pile Removal	Existing Pile Removal	Temp Pile Installation	Temp Pile Removal	Perm Pile Installation	Perm Pile Installation	Perm Pile Installation	Perm Pile Installation
Diameter of Steel Pile (inches)	14	20	30	30	14	36	42	Conc Panel
# of Piles	910	10	100	100	300	220	2	220
Vibratory Pile Driving								
Total Quantity	910	10	100	100	300	220	2	
Max # Piles Vibrated per Day	30	3	6	6	30	5	2	
Vibratory Time per Pile	5 min	10 min	5 min	5 min	5 min	10 min	10 min	
Vibratory Time per Day	150 min	30 min	30 min	30 min	150 min	50 min	20 min	
Number of Days (124 days)	31	4	17	17	10	44	1	
Vibratory Time Total (157 hours)	76 hours	1.7 hours	8.5 hours	8.5 hours	25 hours	37 hours	20 min	
Impact Pile Driving								
Total Quantity						220	2	
Max # Piles Impacted per Day						5	2	
# of Strikes per Pile						40	40	
Impact Time per Pile						1 min	1 min	
Impact Time per Day						5 min	2 min	
Number of Days (45 days)						44	1	
Impact Time Total (4 hours)						3.7 hours	2 min	
Jetting								
Total Quantity								220
Max # of Panels Installed per Day								30
Time per Panel								15 min
Time per Day								7.5 hours
Number of Days (8 days)								8 days
Jetting Time Total (55 hours)								55 hours

1.4 ACOUSTIC THRESHOLDS AND ENSONIFIED AREA

Vibratory pile driving and removal, impact pile driving, dredging, and filling would generate in-water and in-air noise that may result in takes of ESA-Listed Species.

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 shift (PTS) to some degree (equated to Level A harassment).

1.4.1 Level A Harassment

NMFS' *Technical Guidance for Assessing the Effects of Anthropogenic Sounds on Marine Mammal Hearing* identifies dual criteria to assess auditory injury (Level A harassment) to three different marine mammal groups (organized by hearing sensitivity) as a result of exposure to noise from two source types (NMFS 2018). Project construction would include the use of both impulsive (impact pile driving) and non-impulsive (vibratory pile driving and removal) sources. The thresholds for auditory injury for ESA-listed species are provided in **Table 5**.

Table 5. Thresholds Identifying the Onset of Permanent Threshold Shift

	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
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 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 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.

1.4.2 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 root mean square (rms) for continuous sources and above 160 dB re 1µPa rms for non-explosive impulsive sources.

1.4.3 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 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 **Tables 6 and 7** and range from approximately 1 meter to 16.4 kilometers.

1.5 ACTION AREA

The action area is located adjacent to the City of Seward at the head of Resurrection Bay in Southcentral Alaska. The new bulkhead dock is partially within the footprint of the existing dock approximately two kilometers (1.24 miles) north of downtown Seward.

Resurrection Bay is a 56-kilometer-long (35 mile) deep fjord on the southeastern coast of the Kenai Peninsula that opens into the Gulf of Alaska. The bay varies between 3 and 6 kilometers wide with a depth of over 293 meters. According to the charts published by the National Oceanic and Atmospheric Administration (NOAA), the bay is 1 to 20 meters deep near the proposed Project (NOAA 2018).

The NMFS ShoreZone Mapper details the proposed project site as a protected/partially mobile/sediment or rock and sediment habitat class with a mixed sand and gravel beaches environmental sensitivity index (NMFS 2021a).

The vicinity of the project area that will be affected directly by the action (the action area) includes the area of water that will be ensonified above acoustic thresholds during a day of construction. The action area for this project reaches to where noise levels from vibratory hammer installation of 36-inch and 42-inch piles (the farthest-reaching noise associated with the Project) are expected to decline to 120 dB. As shown in **Table 7**, this area extends 16.4 kilometers from the source. The action area would be truncated where land masses obstruct underwater sound transmission. The action area extends approximately 16.4 kilometers into Resurrection Bay and encompasses approximately 70 square kilometers (**Figure 6**).[4] The transit routes to be taken by the material and construction barges are also considered a part of the action area due to the noise impacts of large vessels on the marine environment (**Figures 7-8**).

In addition to in-water noise, pinnipeds such as Steller sea lions can be adversely affected by in-air noise. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to

[2] Sound pressure is the sound force per unit µPa, where 1 pascal 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 re 1 µPa (NMFS 2018).

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

[4] Note, this document also refers to the project vicinity. This term refers to an area larger than the action area, which includes Resurrection Bay and adjacent waterbodies. This term is used because some of the information available about ESA-listed species is based on some sightings outside the action area.

disturbance and possible injury. NMFS has established an in-air noise disturbance threshold of 100 dB rms for Steller sea lions. Pile driving and removal associated with the Project will generate in-air noise above ambient levels within Resurrection Bay; however, the anticipated in-air noise that meets the disturbance threshold for hauled-out Steller sea lions will not extend more than 22 meters from the noise source.[5] The closest sea lion haulouts to the project area (Cape Resurrection and Rugged Island) are more than 30 kilometers away (NMFS no date). No in-air disturbance to hauled-out Steller sea lions are anticipated as a result of the proposed Project; thus, land area is not included in the action area for this analysis.

To minimize impacts to ESA-listed species, shutdown and monitoring of harassment zones will be implemented to protect and document these species in the action area. Please see **Tables 6** and **7** for calculated distances to the Level A and B thresholds and Section 1.6 for mitigation information including shutdown and monitoring zones. The attached 4MP details mitigation, shutdown, and monitoring procedures (**Appendix C**).

[5] 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 (36-inch-diameter) piles. In-air sound levels for impact hammering of 36-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 6. Seward Passenger Terminal Expansion Project Proposed Action Area

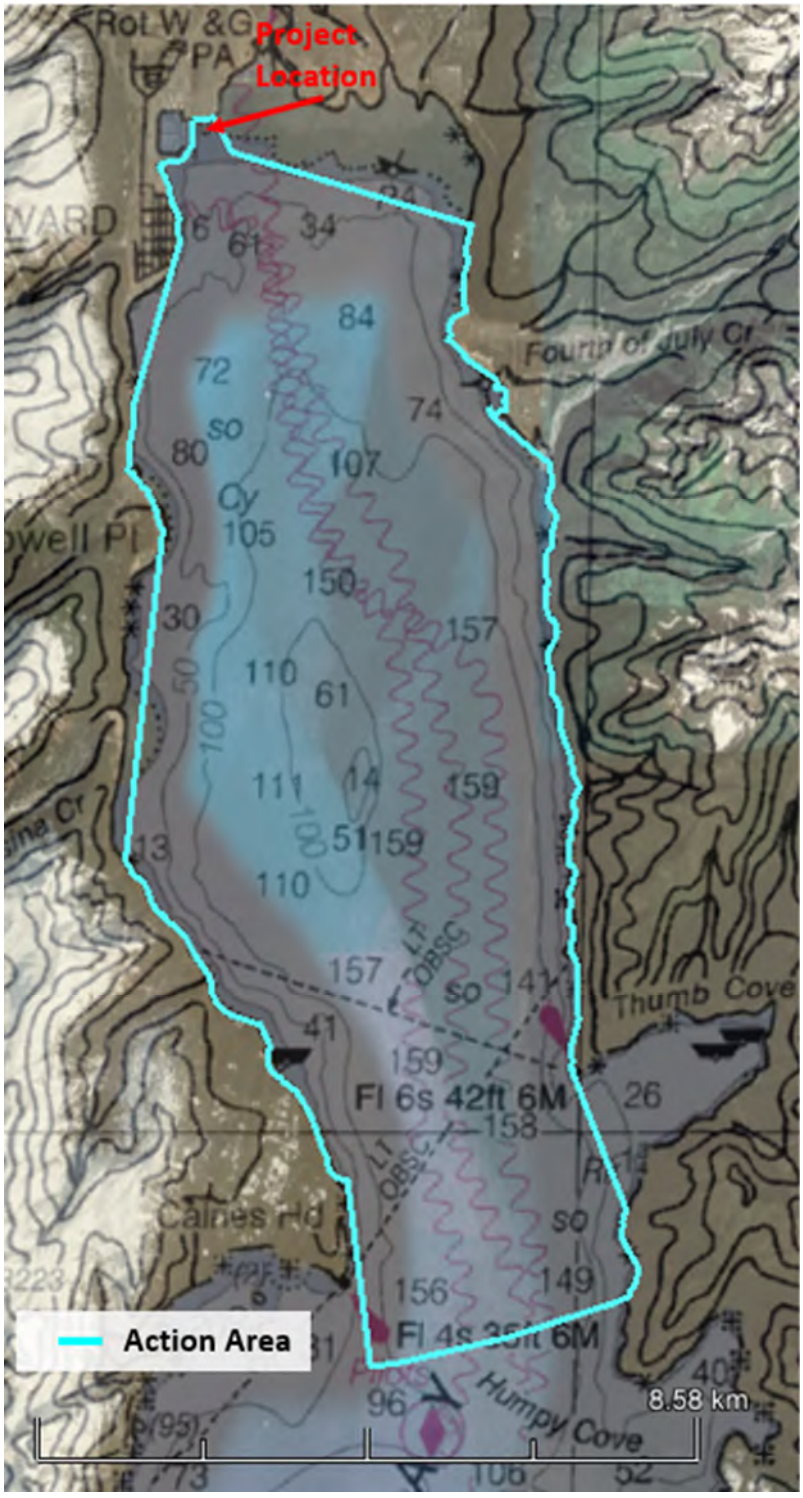


Figure 7. Expected Material Barge Route to and from the Project Location

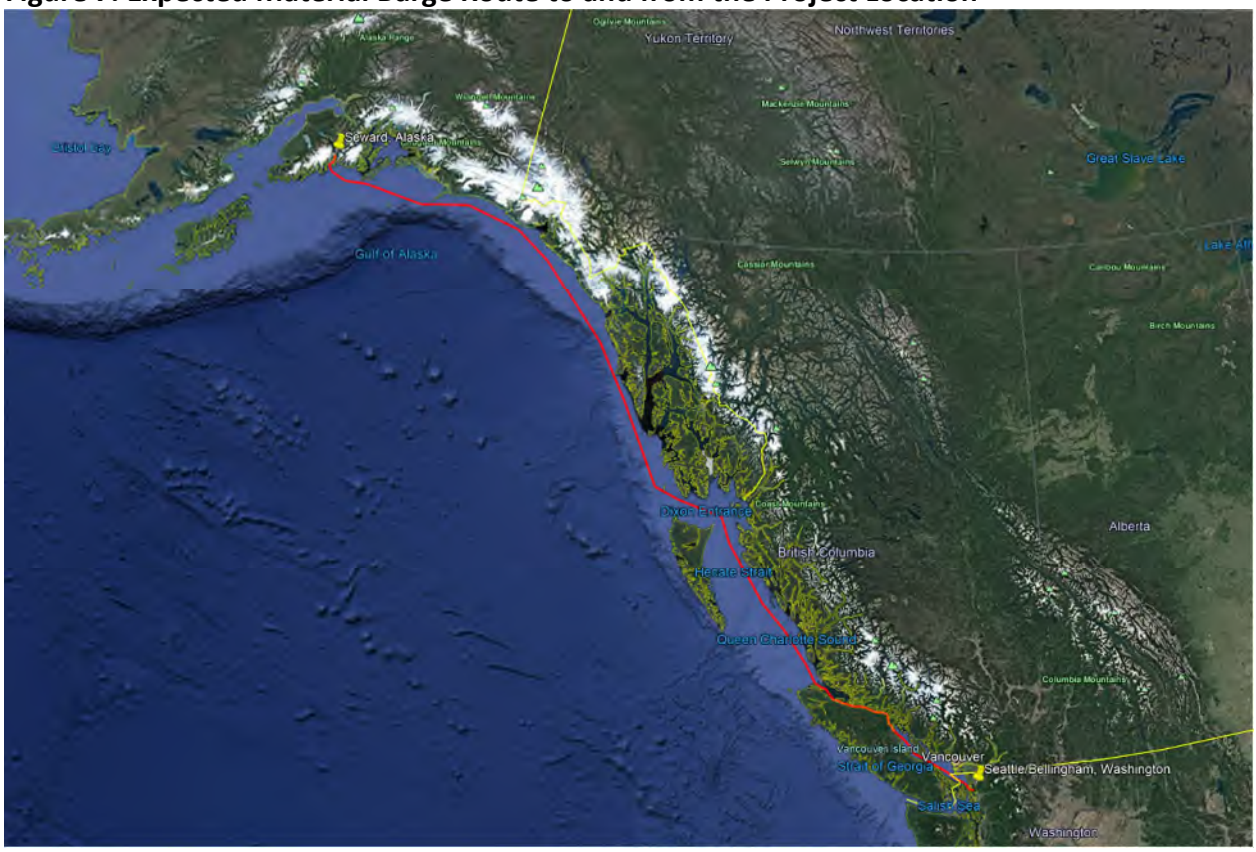
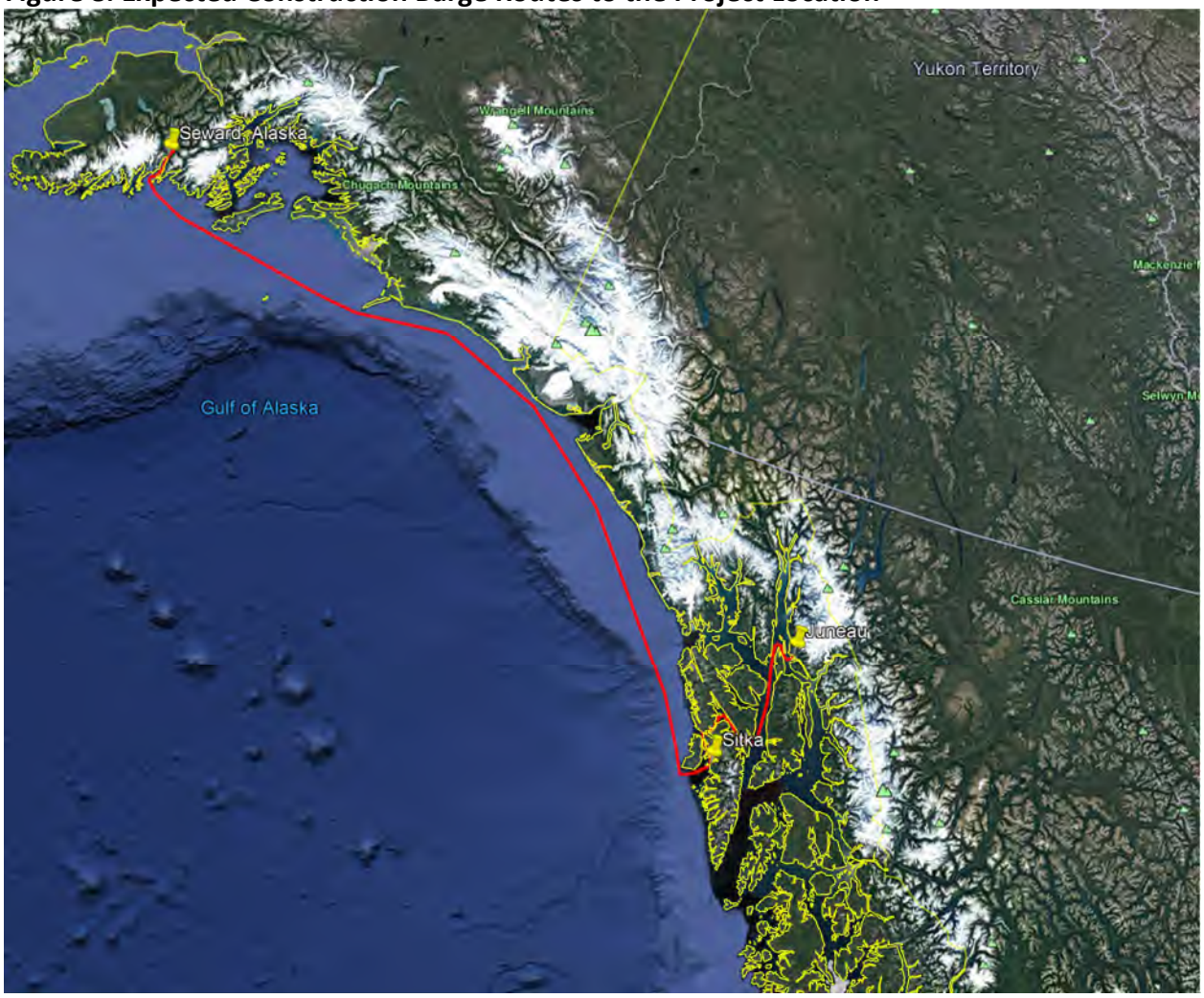


Figure 8. Expected Construction Barge Routes to the Project Location



1.6 PROPOSED MITIGATION MEASURES

To minimize impacts to marine mammals, including ESA-listed species, the mitigation measures outlined below will be implemented during construction and pile driving activities.[6]

1.6.1 Mitigation Measures Designed to Reduce Project Impacts

The Project would use 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 blasting.
- The Project uses a design that incorporates the smallest-diameter piles practicable while still minimizing the overall number of piles.
- Barges will not be grounded at any tidal stage.

[6] Pile driving activities, for purposes of these mitigation measures, include vibratory and impact pile driving, pile removal, and other in-water heavy construction. These activities will be referred to generically as "pile driving activities" for the remainder of this mitigation measures section.

1.6.2 Contaminant Spill Prevention

- The contractor will provide and maintain a spill cleanup kit on-site at all times, including an Oil Pollution Emergency Plan for oil spill prevention and response.
- 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.
- In the event of an oil spill in the marine environment, the permittees shall immediately report the incident to: the U.S. Coast Guard 17th District Command Center at 907-463-2000, and NMFS AKR, Protected Resources Division Oil Spill Response Coordinator at 907-586-7630 and/or email (sadie.wright@noaa.gov).

1.6.3 General Conditions for Pile Driving Designed to Reduce Impacts to ESA-Listed Species

1. NMFS will be informed of impending in-water activities at least one week prior to the onset of those activities.
2. If construction activities will occur outside of the time window specified in the requested Incidental Harassment Authorization, NMFS will be notified of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
3. PSOs will be approved by NMFS prior to deployment. PSO resumes will be provided to the NMFS consultation biologist for approval at least one week prior to the start of in-water work. The agency will provide a brief explanation in instances where a PSO is not approved.
4. Three to Five (depending on in-water activity) NMFS-approved protected species observers (PSOs), able to accurately identify and distinguish species of Alaska marine mammals, will be present before and during all in-water construction and demolition activities.
5. Prior to in-water construction activities, an exclusion (i.e., shut-down) zone will be established (**Tables 6** and **7**). For this Project, the exclusion zone includes all marine waters within an established distance from the sound source.
6. PSOs will be positioned such that they can collectively monitor the entirety of each activity's shutdown zone and adjacent waters. PSO locations will be coordinated with NMFS prior to PSO deployment.
7. PSOs will have no other primary duties beyond watching for, acting on, and reporting events related to listed species.
8. PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.
9. Prior to commencing in-water work or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the shutdown procedures if listed species are observed likely to enter or within the shutdown zone, and will request that the point of contact instruct the crew to notify the PSO when a

marine mammal is observed. If the point of contact goes "off shift" and delegates his duties, the PSO must be informed and brief the new point of contact.

10. Prior to commencing any in-water work, PSOs will scan waters within the appropriate shutdown zone and confirm that no listed species are within the shutdown zone for at least 30 minutes immediately prior to initiation of the in-water activity. If one or more listed species are observed within the shutdown zone, the in-water activity will not begin until the listed species exit(s) the shutdown zone of their own accord, or until the shutdown zone has remained clear of listed species for 30 minutes.
11. The on-duty PSOs will continuously monitor the shutdown zone and adjacent waters for the presence of listed species during all in-water operations.
12. In-water activities will take place only:
    a. between civil dawn and civil dusk when PSOs can effectively monitor for the presence of marine mammals;
    b. during conditions with a Beaufort Sea State of 4 or less;
    c. when the entire shutdown zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, volcanic ash, etc.).
14. If visibility degrades to where the PSO cannot ensure that the shutdown zone remains devoid of listed species during in-water work, the crew will cease in-water work until the entire shutdown zone is visible and the PSO has indicated that the zone has remained devoid of listed species for 30 minutes.
15. PSOs will have the ability and authority to initiate appropriate mitigation responses, including shutdowns, to avoid takes of listed species.
16. The PSO will order the in-water activities to immediately cease if one or more listed species has entered, or appears likely to enter, the associated shutdown zone.
17. If in-water activities are shut down for less than 30 minutes due to the presence of listed-species in the shutdown zone, in-water work may commence when the PSO provides assurance that listed species were observed exiting the shutdown zone. Otherwise, the activities may only commence after the PSO provides assurance that listed species have not been seen in the shutdown zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).
18. Following a lapse of in-water activities of more than 30 minutes, the PSO will authorize resumption of activities (using soft-start procedures for impact pile driving activities) only after assuring that listed species have not been present in the shutdown zone for at least 30 minutes.
19. If a listed species is observed within a shutdown zone or is otherwise harassed, harmed, injured, or disturbed, PSOs will immediately report that occurrence to the NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964.
20. The PSO(s) will use the following to determine the location of observed listed species, to take action if listed species enter the exclusion zone, and to record these events:
    a. Binoculars (7x50 or higher magnification)
    b. Range finder
    c. Tide table
    d. Watch or chronometer
    e. GPS

f. Compass
g. Legible copy of this LOC and all appendices
h. Legible and fillable observation record form allowing for required PSO data entry
i. Two-way radio communication with construction foreman/superintendent
j. A log book of all activities which will be made available to USACE and NMFS upon request

21. Ramp-up (soft start) procedures will be applied prior to beginning pile-driving activities each day and/or when pile-driving hammers have been idle for more than 30 min:
    a. For impact pile-driving, contractors will be required to provide an initial set of three strikes from the hammer at 40 percent energy, followed by a 30-sec waiting period. This procedure will be repeated twice more prior to operational impact pile driving.
22. All in-water work will be completed within approximately 21 hours over 14 days (not consecutive).
23. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal(s) is injured or killed or is observed entering a shutdown zone before operations can be shut down), it will be reported to NMFS at akr.section7@noaa.gov within one business day. These PSO records will include:
    a. information to be provided in the final report (see Mitigation Measures under the *Data Collecting and Reporting* heading below);
    b. the number and species of listed animals affected;
    c. the date, time, and location of each event (with geographic coordinates);
    d. a description of the event;
    e. the time the mammal(s) was first observed or entered the shutdown zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
    f. mitigation measures implemented before and after the animal was taken;
    g. if a vessel struck a marine mammal, the contact information for the PSO on duty, or the contact information for the individual piloting the vessel if there was no PSO on duty; and
    h. photographs or video footage of the animal(s), if available.
24. If PSOs observe an injured, sick, or dead marine mammal (i.e., stranded marine mammal), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and data that will aid NMFS in determining how to respond to the stranded animal. Data submitted to NMFS in response to stranded marine mammals will include date/time, the location of stranded marine mammal, the species and number of stranded marine mammals, a description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and the behavior of live-stranded marine mammals.
25. If PSOs observe marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement at (1-800-853-1964).
    a. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

26. Lines attached to heavy items on the ocean bottom (e.g., anchors, traps, instruments) will incorporate weak links at the point of connection that can be broken by entangled whales.

1.6.4 Protected Species Observer Requirements

1. PSOs will:
    a. have vision correctable to 20-20;
    b. have the ability to effectively communicate orally, by radio and in person, with project personnel;
    c. have prior experience collecting field observations and recording field data accurately and in accordance with project protocols;
    d. be able to identify species of Alaskan marine mammals;
    e. be able to record marine mammal behavior; and
    f. have technical writing skills sufficient to create understandable reports of observations
2. PSOs will complete PSO training prior to deployment. The training will include:
    a. field identification of marine mammals and marine mammal behavior;
    b. ecological information on Alaska's marine mammals and specifics on the ecology and management concerns of those marine mammals;
    c. ESA and MMPA regulations;
    d. mitigation measures outlined in the LOC;
    e. proper use of equipment;
    f. methodologies in marine mammal observation and data recording and proper reporting protocols; and
    g. an overview of PSO roles and responsibilities.

1.6.5 Data Collecting and Reporting

1. PSOs will record observations on data forms or into electronic data sheets. PSOs will record the following:
    a. the date, shift start time, shift stop time, and PSO identifier;
    b. date and time of each reportable event (e.g., a marine mammal observation, operation shutdown, reason for operation shutdown, change in weather);
    c. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea-state (https://www.weather.gov/mfl/beaufort);
    d. species, numbers, and, if possible, sex and age class of observed marine mammals, along with the date, time, and location of the observation;
    e. the predominant sound-producing activities occurring during each marine mammal observation;
    f. marine mammal behavior patterns observed, including bearing and direction of travel;
    g. behavioral reactions of marine mammals immediately before and during sound producing activities;
    h. initial, closest, and last sighting locations of observed marine mammal(s),

including the distance between the PSO and the mammal(s) and the minimum distance from the sound-producing activity to the mammal(s);

i. whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact, and the duration that normal operations were affected by the presence of marine mammals;
j. geographic coordinates for the observed animal(s), with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees or a similar standard).

2. All observations of North Pacific right whales will be reported to NMFS within 24 hours. These observation reports will include the following information:
    a. date, time, and geographic coordinates of the observation(s);
    b. species observed, number of animals observed per observation event, and number of adults/juveniles/calves per observation event (if determinable); and
    c. because observations of North Pacific right whales are uncommon, and photographs that allow for identification of individual whales from markings are extremely valuable, photographs will be taken if feasible, but in a way that does not involve disturbing the animal (e.g., if vessel speed and course changes are not otherwise warranted, they will not take place for the purpose of positioning a photographer to take better photos). Photographs taken of North Pacific right whales will be submitted to NMFS at AKR.section7@noaa.gov , with information identifying the Project and point of contact.
3. If possible, observations of humpback whales will be transmitted to AKR.section7@noaa.gov , including:
    a. photographs (especially flukes) and video obtained.
    b. geographic coordinates for the observed animals, with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees, or a similar standard).
    c. Number of animals per observation event; and number of adults/juveniles/calves per observation event (if determinable).
    d. Environmental conditions as they existed during each observation event, including sea conditions, weather conditions, visibility, lighting conditions, and percent ice cover.
4. Submit interim monthly PSO monitoring reports, including data sheets. These reports will include a summary of marine mammal species and behavioral observations, shutdowns or delays, and work completed.
    a. Monthly reports will be submitted to AKR.section7@noaa.gov by the 15th day of the month following the reporting period. For example, the report for activities conducted in June, 2023 will be submitted by July 15, 2023.
5. A final report will be submitted to NMFS within 90 calendar days of the completion of the Project summarizing the data recorded and submitted to AKR.section7@noaa.gov. The report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water project activities. The final report will include:
    a. summaries of monitoring efforts including total hours, and marine mammal

distribution through the study period, accounting for sea state and other factors that affect visibility and detectability of marine mammals;

b. analyses on the effects from various factors that may have influenced detectability of marine mammals (e.g., sea state, number of observers, fog, glare, and other factors as determined by the PSOs);
c. species composition, occurrence, and distribution of marine mammal observations, including date, water depth, numbers, age/size/gender categories (if determinable), group sizes, and ice cover;
d. number of marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
e. initial, closest, and last marine mammal observation distances versus project activity at time of observation;
f. observed marine mammal behaviors and movement types versus project activity at time of observation;
g. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
h. distribution of marine mammals around the action area versus project activity at time of observation; and
i. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

1.6.6 Monitoring and Shutdown Zones

1.6.6.1 Level A Shutdown Zones

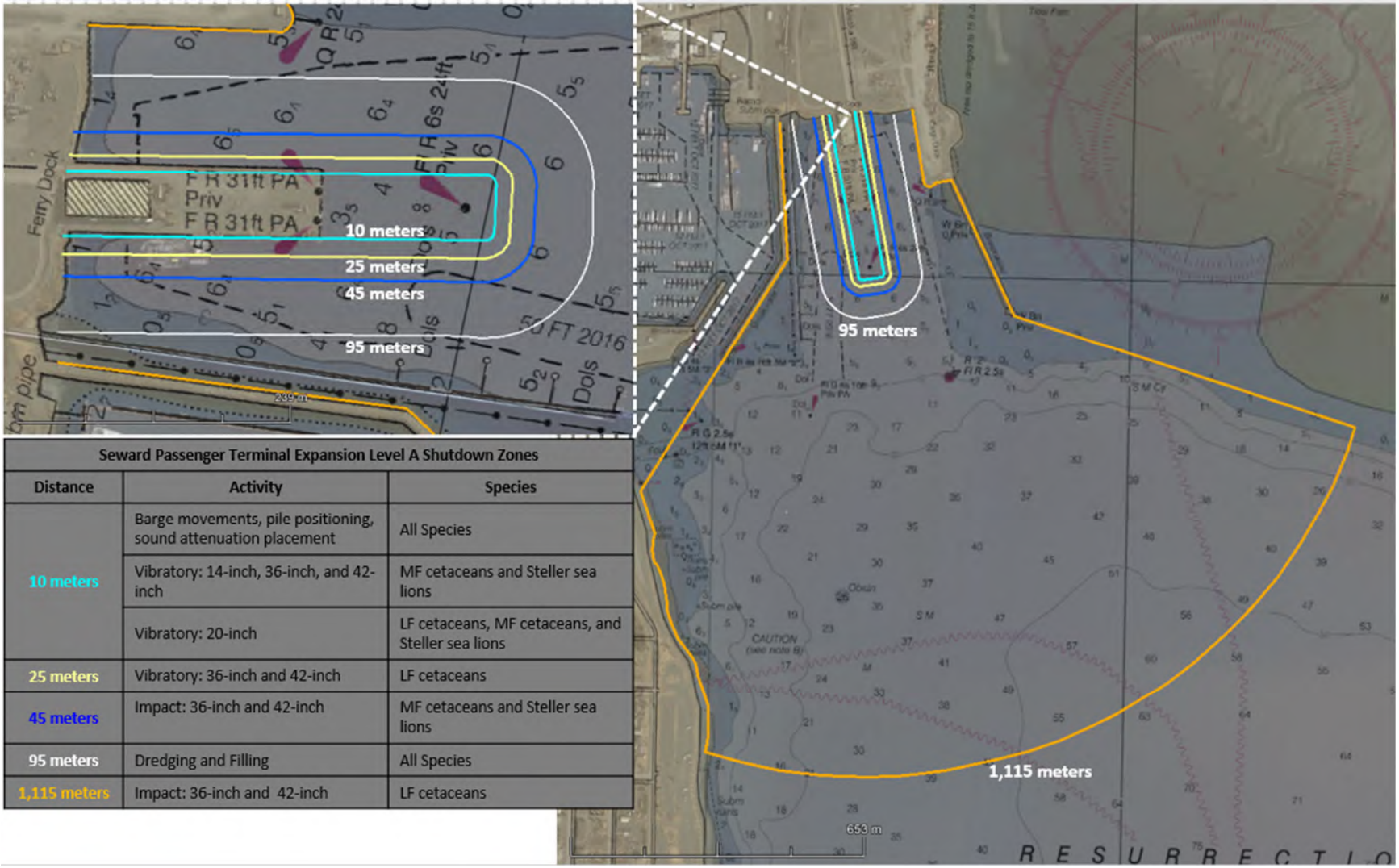
A shutdown zone will be established for a marine mammal species that is greater than its modeled radial distance Level A zone for all pile driving activities. The shutdown zone is intended to encompass the area within which SPLs equal or exceed the auditory injury criteria for cetaceans and pinnipeds. The purpose of a shutdown zone is to define the area within which activity would be halted upon sighting a marine mammal (or in anticipation of an animal entering the defined area), thus preventing injury (Level A harassment) of the mammal(s). The shutdown zones for cetaceans for each of the pile driving and construction activities are shown in **Table 6** and **Figure 7**. Steller sea lions occur in the action area with high frequency. Level A take is requested for Steller sea lions in the case that they are not observed in their Level A harassment zone before the Project can be shut down.

Table 6. Seward Passenger Terminal Expansion Project Distances to NMFS Level A Thresholds

Source	Distance (in meters, m) to Level A		
	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	Otariid
In-water Construction Activities			
Barge movements, pile positioning, etc.* (throughout construction)	10	10	10
Dredging and Filling (~2,822 hours on 122 days)	95	95	95
Vibratory Hammer			
14-inch existing H-pile removal (910 piles; ~150 mins per day on 31 days)	45	10	10
14-inch existing H-pile install (300 piles; ~150 mins per day on 10 days)	45	10	10
20-inch existing steel removal (10 piles; ~30 mins per day on 4 days)	10	10	10
36-inch steel permanent installation (220 piles; ~50 mins per day on 44 days)	25	10	10
42-inch steel permanent installation (2 piles; ~20 mins per day on 1 day)	25	10	10
Impact Hammer			
36-inch steel permanent installation (220 piles; ~5 mins per day on 44 days)	1,115	45	45
42-inch steel permanent installation (2 piles; ~2 mins per day on 1 day)	1,115	45	45

Shutdown zone distances refer to the maximum radius of the zone and are rounded.
*Although acoustic injury is not the primary concern with these activities, shutdowns will be implemented to avoid impacts to species.

Figure 9. Seward Passenger Terminal Expansion Project Level A Shutdown Zones



Seward Passenger Terminal Expansion Level A Shutdown Zones		
Distance	**Activity**	**Species**
10 meters	Barge movements, pile positioning, sound attenuation placement	All Species
	Vibratory: 14-inch, 36-inch, and 42-inch	MF cetaceans and Steller sea lions
	Vibratory: 20-inch	LF cetaceans, MF cetaceans, and Steller sea lions
25 meters	Vibratory: 36-inch and 42-inch	LF cetaceans
45 meters	Impact: 36-inch and 42-inch	MF cetaceans and Steller sea lions
95 meters	Dredging and Filling	All Species
1,115 meters	Impact: 36-inch and 42-inch	LF cetaceans

1.6.6.2 Level B Monitoring Zones

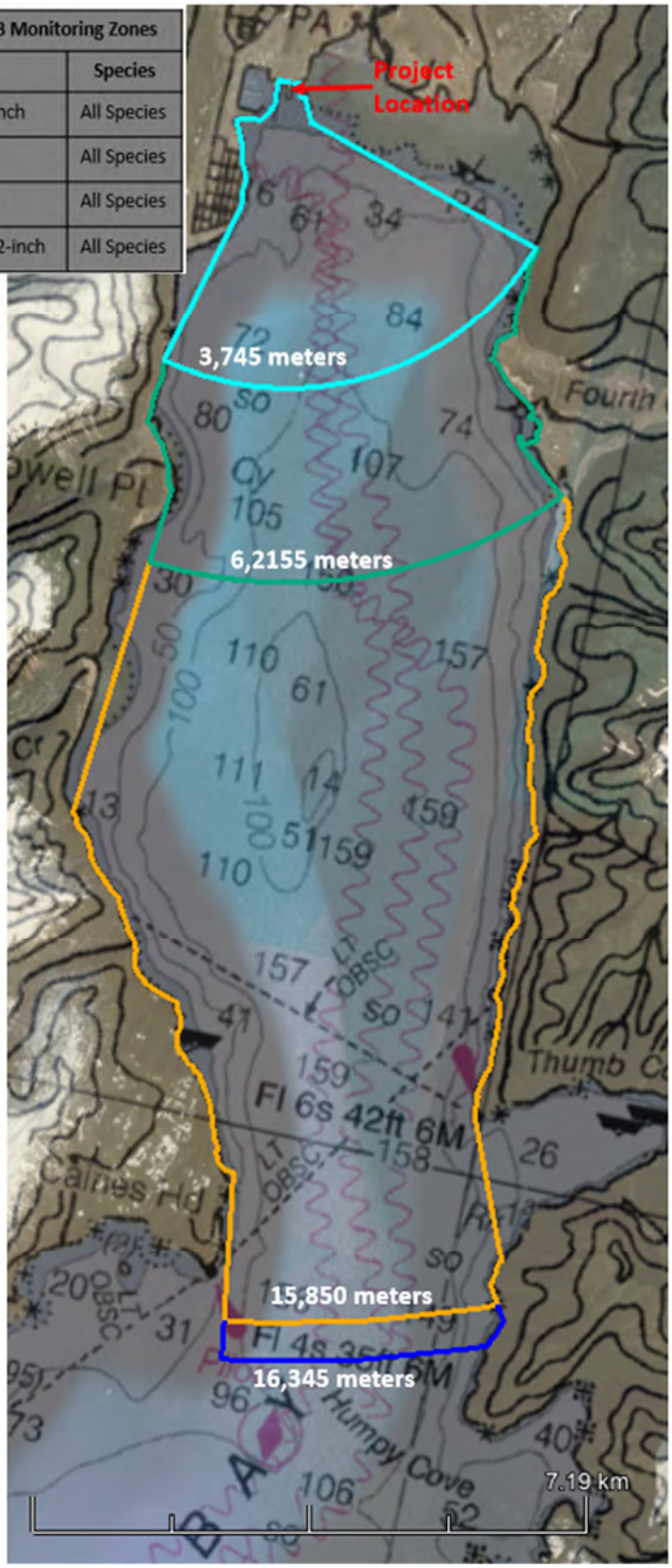
Level B take of humpback whales, fin whales, and Steller sea lions incidental to completing the Seward Passenger Terminal Expansion Project is requested, and shutdowns associated with Level B harassment of these species are not proposed. The monitoring zones associated with Level B disturbance are outlined in **Table 7** and **Figure 10**.

Table 7. Seward Passenger Terminal Expansion Project Level B Monitoring Zones

Source	Monitoring Zones (meters) [a]
Vibratory Pile Driving/Removal	
14-inch existing H-pile removal (910 piles; ~150 mins per day on 30 days)	15,850
14-inch existing H-pile installation (300 piles; ~150 mins per day on 10 days)	15,850
20-inch existing steel removal (10 piles; ~30 mins per day on 4 days)	6,215
36-inch steel permanent installation (220 piles; ~50 mins per day on 44 days)	16,345
42-inch steel permanent installation (2 piles; ~20 mins per day on 1 day)	16,345
Impact Pile Driving	
36-inch steel permanent installation (220 piles; ~5 mins per day on 44 days)	3,745
42-inch steel permanent installation (2 piles; ~2 mins per day on 1 day)	3,745
[a] *These monitoring zones apply to all marine mammal species with authorized level B take.*	

Figure 10. Seward Passenger Terminal Expansion Project Level B Monitoring Zones

Seward Passenger Terminal Expansion Level B Monitoring Zones		
Distance	Activity	Species
3,745 meters	Impact: 36-inch and 42-inch	All Species
6,215 meters	Vibratory: 20-inch	All Species
15,850 meters	Vibratory: 14-inch H-pile	All Species
16,345 meters	Vibratory: 36-inch and 42-inch	All Species



1.6.7 Strike Avoidance and Vessel Transit Mitigation Measures

1. Vessel operators will take reasonable precautions to avoid interaction with listed whales by taking the following actions:
    a. Vessel operators will maintain a watch for listed marine mammals at all times while underway.
    b. Vessels will stay at least 91 meters (100 yards) away from listed marine mammals, or 460 meters (500 yards) from endangered North Pacific right whales (50 CFR § 224.103(d)).
    c. Operators will reduce vessel speed to less than 5 knots (9 kilometers/hour) when within 274 meters (300 yards) of a whale.
    d. Unless necessary to reduce the risk of collision, vessel operators will avoid changes in direction and speed when within 274 meters (300 yards) of whales.
    e. Vessel operators will not position vessel(s) in the path of whales, and will not cut in front of whales in a way or at a distance that causes the cetaceans to change their direction of travel or behavior (including breathing/surfacing pattern).
    f. Operating the vessel(s) to avoid causing a whale to make changes in direction.
    g. Checking the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the propellers are engaged.
    h. Reducing vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 kilometers (1 miles) or less.
2. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 meters (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel. Vessels will remain 460 meters (500 yards) from North Pacific right whales (50 CFR § 224.103(d)).
3. If the vessel is taken out of gear, vessel crew will ensure that no whales are within 50 meters of the vessel when propellers are re-engaged, minimizing risk of marine mammal injury.
4. Vessels will take reasonable steps to alert other vessels in the area to the presence of whales in the vicinity.
5. Vessels will not allow lines to remain in the water, and no trash or other debris will be thrown overboard, thereby reducing the potential for marine mammal entanglement.
6. The transit route for the vessels will avoid designated critical habitat to the extent practicable.
7. For North Pacific right whales vessels will:
    a. remain 460 meters (500 yards) from North Pacific right whales (50 CFR § 224.103(d); or
    b. avoid traveling within or through North Pacific right whale critical habitat (73 FR 19000). If travel within or through North Pacific right whale critical habitat cannot be avoided:
        i. vessels will travel through North Pacific right whale critical habitat at 5 knots or less; or
        ii. vessels will travel through North Pacific right whale critical habitat at 10 knots or less while PSOs maintain a constant watch for marine mammals

from the bridge;

iii. vessel speed while within North Pacific right whale critical habitat will not exceed 10 knots; and

iv. operators will maintain a ship log indicating the time and geographic coordinates at which vessels enter and exit North Pacific right whale critical habitat.

8. For Western DPS Steller Sea Lions:
    a. vessels will not approach within 5.5 kilometers (3 nautical miles) of rookery sites listed in (50 CFR § 224.103(d)); and
    b. vessels will avoid approaching within 914 meters (3,000 feet) of any Steller sea lion haulout or rookery.

2 DESCRIPTION OF THE SPECIES AND THEIR HABITAT

Five species of marine mammal listed under the ESA under NMFS's jurisdiction may occur in the action area: WNP and Mexico DPS humpback whale, fin whale, North Pacific right whale, sperm whale, and the WDPS Steller sea lion. There is no critical habitat for WNP and Mexico DPS humpback whales, fin whales, North Pacific right whales, sperm whales, and the WDPS Steller sea lions within the action area.

2.1 SPECIES THE PROJECT IS LIKELY TO ADVERSELY AFFECT

We have reviewed information about the WNP and Mexico DPS humpback whale, fin whale, North Pacific right whale, sperm whale, and the WDPS Steller sea lion and conclude that they are likely to be adversely affected by the proposed action. Analyses are provided below. Some of the following sections contain direct excerpts from species information on the NMFS website and relevant scientific studies.

2.1.1 Mexico and Western North Pacific DPS Humpback Whale

2.1.1.1 Description

Humpback whales are classified in the cetacean suborder Mysticeti, whales characterized by having baleen plates for filtering food from water. The humpback whale is one of the larger baleen whales, weighing up to 25-40 tons (50,000-80,000 pounds) and measuring up to 60 feet long, with females growing larger than males. Newborns are about 15 feet long and weigh about 1 ton (2,000 pounds). Humpback whales reach sexual maturity at 4 to 7 years, and their lifespan is around 50 years or more. The species is known for long pectoral fins, which can be up to 15 feet long. The body coloration is primarily dark grey, but individuals have varying amounts of white on their pectoral fins and belly. This variation is so distinctive that tail fluke pigmentation patterns are used to identify individual whales, analogous to human fingerprints (NOAA 2011).

Humpback whales filter feed on tiny crustaceans (mostly krill), plankton, and small fish; they can consume up to 3,000 pounds of food per day (NMFS 2017). Well-documented North Pacific

humpback whale prey include: krill, Pacific herring, juvenile salmon, capelin, Pacific sandlance, juvenile walleye pollock, eulachon, Pacific sandfish, surf smelt and lanternfish (Straley et al. 2017). Hunting methods involve using air bubbles to herd, corral, or disorient fish (Wiley et al. 2011).

2.1.1.2 Status

In 1970, the humpback whale was listed as endangered worldwide under the Endangered Species Conservation Act (ESCA) of 1969 (35 FR 8491; June 2, 1970), primarily due to decimation from whaling. Congress replaced the ESCA with the ESA in 1973, and some stocks of humpback whales continued to be listed as threatened or endangered. Following the cessation of most legal whale harvesting, humpback whale numbers increased.

On September 8, 2016, NMFS published a final decision changing the status of humpback whales under the ESA (81 FR 62259), effective October 11, 2016. Previously, humpback whales were listed under the ESA as an endangered species worldwide. In the 2016 decision, NMFS recognized the existence of 14 DPSs, classified four of those as endangered and one as threatened, and determined that the remaining nine DPSs do not warrant protection under the ESA.

2.1.1.3 Range

The humpback whale is distributed worldwide in all ocean basins with 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 (Allen and Angliss 2015).

Humpback whales migrate seasonally between warmer, tropical or sub-tropical waters in winter months (where they reproduce and give birth to calves) and cooler, temperate or sub-Arctic waters in summer months (where they feed) (Bettridge et al. 2015; **Figure 11**). In their summer foraging areas and winter calving areas, humpback whales tend to occupy shallower, coastal waters. During their seasonal migrations, however, humpback whales disperse widely in deep, pelagic waters and tend to avoid shallower coastal waters (Winn and Reichley 1985).

Patterns of occurrence likely follow the spatial and temporal changes in prey abundance and distribution with humpback whales adjusting their foraging locations to areas of high prey density (NMFS 2012). They are frequently sighted in the northern reaches of the Gulf of Alaska and off the Aleutian Islands following prey in the spring and then move south to Southeast Alaska in early fall to feed on krill, passing the Project area on the way (Krieger and Wing 1986). However, humpback whales may be seen year-round in Southcentral Alaska where food is abundant (ADF&G 2008).

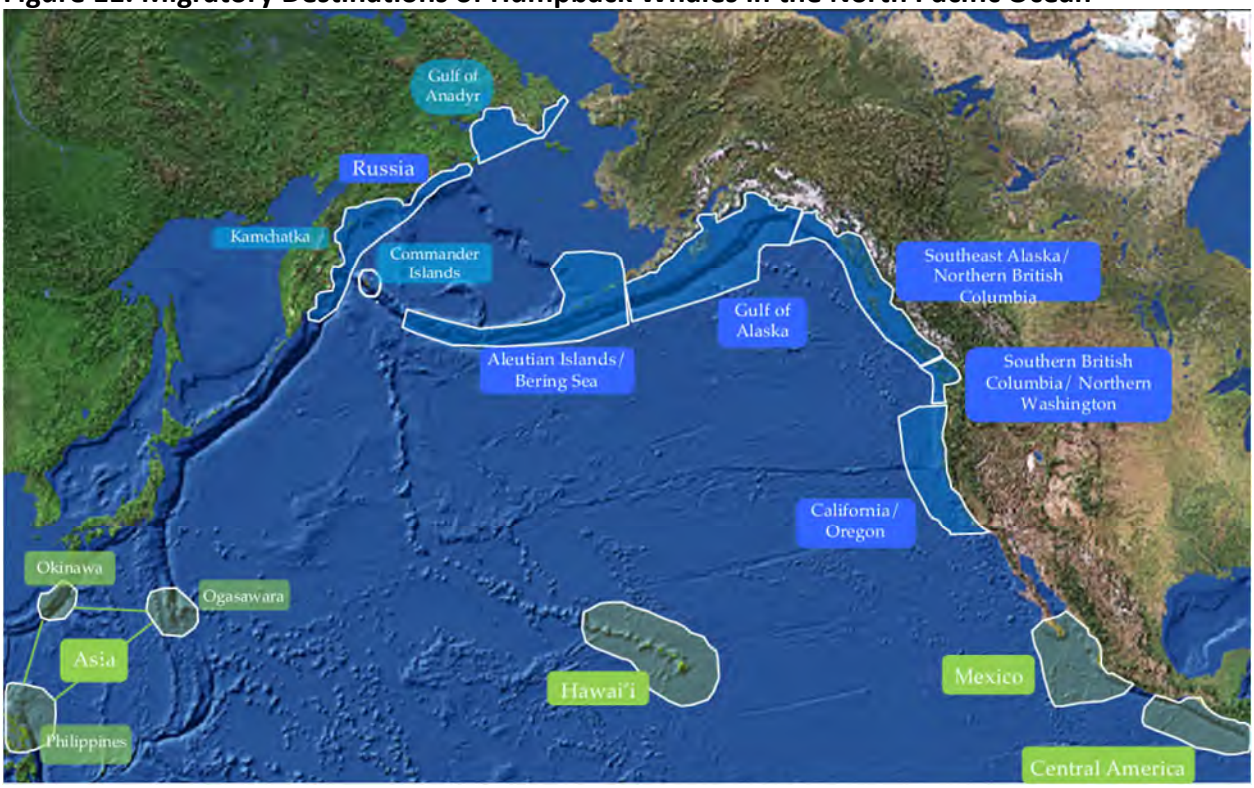
Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade et al. (2021) concluded that humpback whales feeding in Alaskan waters belong primarily to the Hawaii DPS (now recovered), with small contributions

of Mexico DPS (threatened) and WNP DPS (endangered) individuals. Three DPSs of humpback whales occur in waters off the coast of Alaska: the Western North Pacific DPS, which is an endangered species under the ESA, the Mexico DPS, which is a threatened species under the ESA, and Hawaii DPS, which is not protected under the ESA. Whales from these three DPSs overlap to some extent on feeding grounds off Alaska.

2.1.1.4 Abundance

Using fluke identification photographs from 2004 through 2006, Barlow et al. (2011) estimated that there are 21,063 humpback whales in the North Pacific. More recently, using a multi-strata analysis, Wade et al. (2016) estimated that the abundance of humpback whales in the North Pacific is 16,132 for the winter areas and 15,805 for the summer areas. The population in the North Pacific has increased substantially since the cessation of major commercial whaling operations, and the current abundance estimate exceeds some pre-whaling estimates. According to the SPLASH (Structure of Populations, Levels of Abundance, and Status of Humpbacks) report, the Gulf of Alaska abundance estimates range from approximately 3,000 to 5,000 animals, depending on the modeling approach employed (Hilborn model and Markovian Model) (Calambokidis et al. 2008).

Figure 11. Migratory Destinations of Humpback Whales in the North Pacific Ocean



(Source: Wade et al. 2021)

2.1.1.5 Humpback Whales in Resurrection Bay

Whales from the WNP, Mexico, and Hawaii DPSs overlap on feeding grounds off Alaska and are not visually distinguishable. In the action area, the majority of humpback whales (89%) are

likely to be from the recovered Hawaii DPS, about 11% are likely to be from the threatened Mexico DPS, and about 1% are likely to be from the endangered WNP DPS. The Mexico DPS is comprised of approximately 3,264 (CV=0.06) animals with an unknown population trend, though likely to be in decline (81 FR 62260) (Wade et al. 2021; NMFS 2021b). An estimated 367 individuals from the endangered WNP stock have been recorded between Prince William Sound and the Kenai Peninsula (Waite et al. 1999 and Von Ziegesar et al. 2000).

Correspondence with the Alaska SeaLife Center in Seward, Alaska indicates that humpback whales are frequent visitors of upper and outer Resurrection Bay with peak numbers during the summer months (Alaska SeaLife Center 2020). The National Parks Service, who manage Kenai Fjords National Park and monitor marine mammals from sightseeing cruises, confirm that humpback whales are observed throughout Resurrection Bay and the waters surrounding Kenai Fjords National Park. NPS states that several spots near the Chiswell Islands (approximately 53 kilometers from the Project) also attract feeding humpbacks (NPS 2018). Given their widespread range and their opportunistic foraging strategies, humpback whales may be in the Project vicinity year-round.

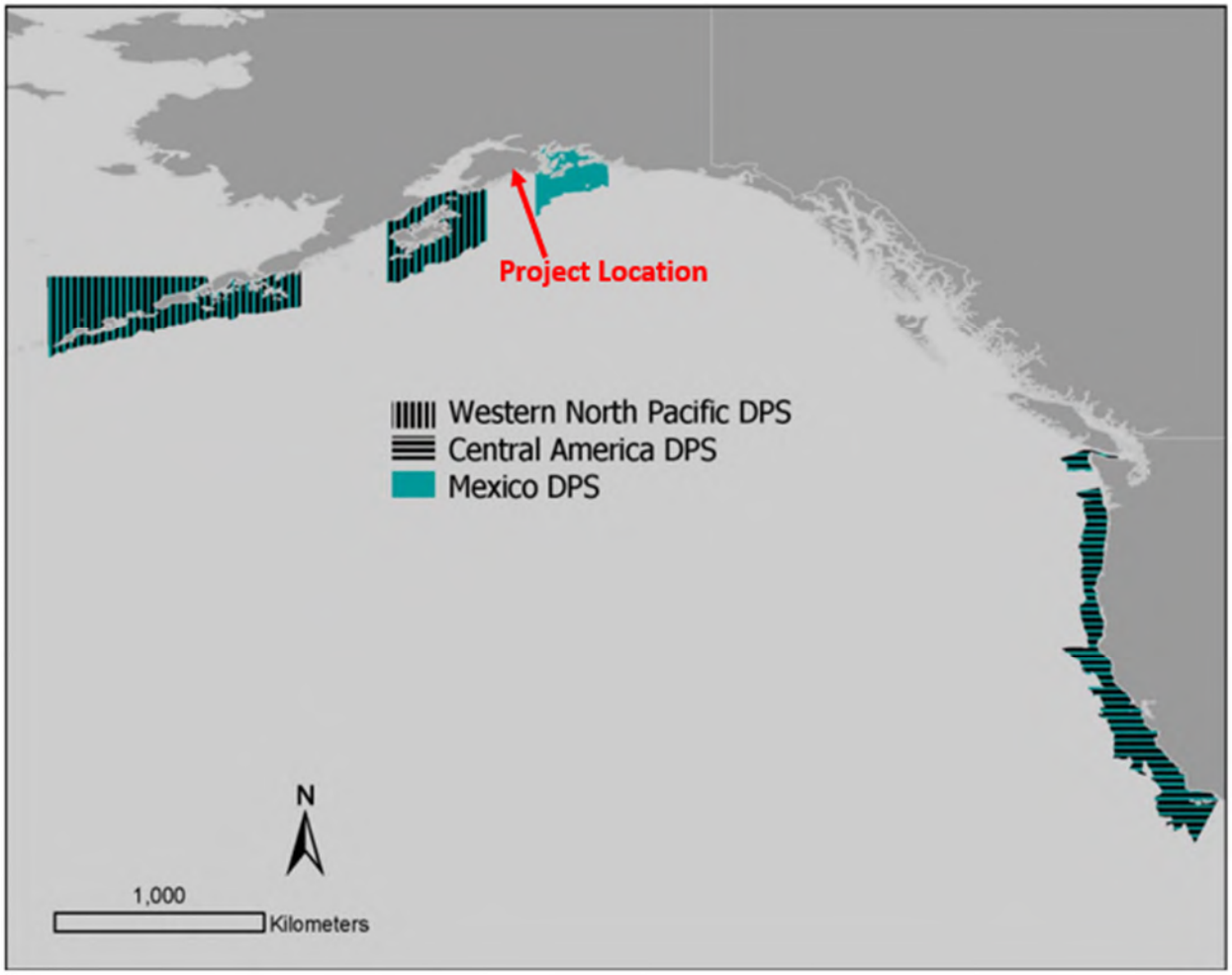
2.1.1.6 Hearing Ability

Humpback whales are classified by NMFS as low-frequency cetaceans with a generalized hearing range of 7 hertz (Hz) to 35 kilohertz (kHz) (NMFS 2018). No direct measurement of whale hearing is available due the lack of captive subjects and logistical challenges of bringing experimental subjects into a laboratory. Consequently, hearing in mysticetes is estimated based on other means such as vocalizations (Wartzok and Ketten, 1999), anatomy (Houser et al. 2001; Ketten 1997), behavioral responses to sound (Edds-Walton 1997), and nominal natural background noise conditions in their likely frequency ranges of hearing (Clark and Ellison 2004). The combined information from these and other sources strongly suggests that mysticetes are likely most sensitive to sound from perhaps tens of hertz to ~10 kHz, and 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).

2.1.1.7 Critical Habitat

Critical habitat for humpback whales was finalized on April 21, 2021 and became effective on May 21, 2021 (86 FR 21082). This Project's action area is not within designated WNP and Mexico DPS humpback whales' critical habitat (**Figure 12**).

Figure 12. Humpback Whale Designated Critical Habitat in Alaska



(Source: NMFS 2021)

2.1.2 Fin Whale

2.1.2.1 Description

Fin whales are classified in the same suborder as Humpback whales, Mysticeti, with the indicative baleen plates in place of teeth. Fin whales are the second largest cetacean species with measured lengths of 24 meters (78 feet). Females are typically larger than males. Individuals range in weight from 50 to 70 tons. At birth calves measure 5.5 to 6.5 meters (14 to 20 feet) and weigh approximately two tons. Male fin whales reach sexual maturity at about 6 to 10 years while females reach sexual maturity at 7 to 12 years. Fin whales have a maximum lifespan of 90 years (NMFS 2021c; ACS 2018).

The anatomy of a fin whale is streamlined and lends to their reputation as “greyhounds of the sea” with measured speeds of 37 kilometers per hour (23 miles per hour). Fin whales have a distinguishable, V-shaped head that is flat on top and an atypically colored jaw that is white or creamy yellow on the right side and mottled black on the left side. The topside of the body is

light gray to brownish black and the underside of the body, fluke, and flippers are white. A prominent, curved dorsal fin is located far back on the body and is the most identifiable feature.

Fin whales fast during their winter migration and feed on up to two tons per day of krill, small schooling fish, and squid at their summer feeding grounds. They have been documented lunge feeding and circling prey at high speeds before turning on their side to engulf the ball of fish.

2.1.2.2 Status

The fin whale was listed as endangered under the ESA on December 2, 1970 (35 FR 18319). NMFS completed a recovery plan for the fin whale in 2010 (75 FR 47538). The species was listed after the population was depleted by whaling from 1935 to 1965. Fin whales were divided into four stocks: California/Oregon/Washington, Hawaii, Alaska (Northeast Pacific), and Western North Atlantic.

2.1.2.3 Range

Fin whales are present in all oceans of the world with highest concentration in temperate to polar latitudes. They are found seasonally off the coast of Alaska, mainly during the summer months when they migrate north following prey movements to feeding grounds. Stock assessments for fin whales vary widely because they are a pelagic species, preferring deep off-shore waters, and are difficult to track.

2.1.2.4 Abundance

Currently, the estimate for the North Pacific population is between 14,000 and 18,000 individuals (Muto et al. 2020).

2.1.2.5 Fin Whales in Resurrection Bay

NOAA's National Marine Mammal Laboratory (NMML) and Pacific Marine Environmental Laboratory (PMEL) began developing and deploying hydrophones to increase their understanding of the presence and habits of cetaceans following the dual use of the United States Navy's Sound Surveillance System (SOSUS) underwater hydrophones to detect cetaceans in the North Pacific Ocean. The first six hydrophones were deployed in the Gulf of Alaska in 1999 and recorded until August 2003. Fin whales' pulses were detected year-round in the Gulf of Alaska with peak presence from August to February (Moore et al. 2006; Stafford et al. 2007).

Aerial Surveys conducted by the NMML from June to July in 1998 and 2000 recorded 95 fin whale sightings in the northern Gulf of Alaska (AFSC 2021). Additionally, consultation with a biologist at the Alaska SeaLife Center indicates that fin whales are frequently sighted in outer Resurrection Bay (peak sightings in summer) and are rare in upper Resurrection Bay (Alaska SeaLife Center 2020). The NPS states that fjords, like those near Seward, provide the right environment for spotting fin whales. In Kenai Fjords, NPS tends to see fin whales two or three times a season, usually in May and again in August. The area between the end of the

Resurrection Peninsula and Cheval Island and Agnes Cove (38 kilometers from the Project) is the best place in the park to spot a fin whale (NPS 2018).

Taking into account their range, habitat preferences, and known presence in the area; fin whales may be present within the proposed project action area during in-water construction.

2.1.2.6 Hearing Ability

Like humpback whales, fin whales are classified as low-frequency cetaceans with a generalized hearing range of 7 Hzto 35 kHz (NMFS 2018). There is a lack of studies on the hearing capabilities of fin whales. The only current study was based on anatomical laboratory findings from a young whale and suggests that fin whales may have the best sensitivity at 1.2 kHz, with thresholds within 3-dB of best sensitivity from ~1 to 1.5 kHz (Cranford et al. 2015).

2.1.2.7 Critical Habitat

Currently, there is no designated or proposed critical habitat for fin whales.

2.1.3 North Pacific Right Whale

2.1.3.1 Description

North Pacific right whales are baleen whales with large, callosities-covered (raised rough patches of skin) black bodies without a dorsal fin. Their head accounts for one-third of their body and females are typically larger with males. Using ear bone aging techniques, right whales are estimated to live at least 70 years. Females and Males typically reach sexual maturity around eight years of age (NMFS 2021d).

Like other toothless whales they filter zooplankton, krill, and small fish through baleen plates using a skimming method in which they move through the water with their mouth open (NMFS 2021d). Net trawls in areas where right whales have been recorded indicated that there are large densities of euphausiids and copepods (Wade et al. 2011).

2.1.3.2 Status

After exploitation of the species during whaling, the northern right whale was first listed under the ESCA in June 1970 and then in the ESA in 1973. In 2008, NMFS reclassified the species as two separate, endangered stocks; the North Pacific right whale and the North Atlantic right whale (73 FR 12024). A final recovery plan for North Pacific right whales was adopted by NMFS in 2013 (78 FR 34347).

2.1.3.3 Range

Historically, North Pacific Right Whale were found throughout the world's oceans. However, after over-whaling very few North Pacific right whales have been sighted in the central North Pacific, Bering Sea, and are extremely rare in the Gulf of Alaska with sightings occurring mostly during summer feeding months. Visual sightings and acoustic detections have been in shelf waters with depths of 100 meters or less (Wade et al. 2011; NMFS 2021d).

2.1.3.4 Abundance

Based on visual and photo-identification surveys, the population of the eastern North Pacific stock right whales is estimated to be 26 individuals (minimum estimate; Wade et al. 2011 and Muto et al. 2020).

2.1.3.5 North Pacific Right Whales in Resurrection Bay

Between 1960 and 2006, there were six right whale sightings in the Gulf of Alaska. Visual sightings were recorded in Yakutat Bay (one sighting) and near Kodiak Island in Albatross Bank and Barnabus Trough (five sightings) (Waite et al. 2003; Mellinger et al. 2004).

There have been no confirmed visual sightings or acoustic detections within Resurrection Bay by NPS (NPS 2018). Consultation with the Alaska SeaLife Center indicated that they are not a species that would be present in the area (Alaska SeaLife Center 2020).

2.1.3.6 Hearing Ability

North Pacific right whales are classified as low-frequency cetaceans under the NMFS *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammals* (NMFS 2018). They are estimated to have a hearing frequency range of 10 Hz to 22 kHz (Parks et al. 2007).

2.1.3.7 Critical Habitat

On May 8, 2008, two areas of critical habitat were designated for the North Pacific right whale (50 CFR 226). One area is in the southeastern Bering Sea and the second is along the Barnabus Trough immediately south of Kodiak Island (approximately 337 kilometers southwest of the proposed project).

2.1.4 Sperm Whale

2.1.4.1 Description

Sperm whales are in the order Cetacea and suborder Odontoceti, meaning “toothed whales” in Latin. The scientific name, *Physeter macrocephalus,* is further indicative of the whales’ “blow pipe” structure and “large head.” Sperm whales are the largest toothed whales. Males typically reach lengths of more than 68 feet and weigh up to 70 tons and the smaller females reach lengths of about 39 feet and weigh up to 20 tons. They have distinct head structures that account for one-third of their body composition and a single blow hole that is located on the left side of the head (CAC 2021).

Sperm whales can dive to depths of around 2,000 feet for approximately 45 minutes and prefer deep waters that support copepods, squid, sharks, skates, and bottom feeding fish (NMFS 2021e). They are frequently sighted foraging and following longline fishing vessels through deep water in the Gulf of Alaska (Straley et al. 2017; Rone et al. 2017).

2.1.4.2 Status

From the 1800s to early 1900s, sperm whale populations were decimated by commercial whaling. When the ESCA passed in 1970, sperm whales were listed as endangered. When the ESA replaced the ESCA in 1973, sperm whales' status was transferred (NMFS 2021e).

2.1.4.3 Range

Age, sex, and breeding stage drive sperm whale distribution. While they are present in all oceans, males tend to have wider ranges and spend more time in polar latitudes; females tend to remain in equatorial waters, but have been documented in the Gulf of Alaska (Wild et al. 2020; Rone et al. 2017). Their diet is determined by their immediate habitat and prey availability.

2.1.4.4 Abundance

Abundance estimates for this species are limited and considered unreliable. Surveys conducted in 2009 and 2015 in the Gulf of Alaska estimated 129 (CV = 0.44) and 345 (CV = 0.43) whales, respectively (Rone et al. 2017). Using the estimates from Rone et al. 2017, NMFS calculated a minimum population estimate of 244 (CV = 0.43) sperm whales; however, this is a underestimate and does not account for the nomadic tendencies of the species (Muto et al. 2020).

2.1.4.5 Sperm Whales in Resurrection Bay

Sperm whales are well documented in all parts of the Gulf of Alaska. Based upon a review of current literature, including NPS marine mammal sightings and consultation with the Alaska Sealife Center, they are rare in Resurrection Bay. The only documented occurrence of sperm whales in the area is a 2006 stranding in Resurrection Bay that presented a unique opportunity for NOAA to complete a partial necropsy (NMFS 2019). Lower Resurrection Bay provides suitable habitat and prey availability for sperm whales, but the shallow depths at the head of the bay are not ideal.

2.1.4.6 Hearing Ability

Sperm whales produce sounds greater than 180 dB re 1 µPa and have an estimated best hearing sensitivity from 0.1 to 30 kHz with frequencies of 2–4 and 10–16 kHz (Madsen et al. 2006). NMFS considers sperm whales to be in the mid-frequency hearing group with a generalized hearing range of 150 Hz to 160 kHz (NMFS 2018).

2.1.4.7 Critical Habitat

Critical habitat has not been designated or proposed for sperm whales.

2.1.5 WDPS Steller Sea Lion

2.1.5.1 Description

Steller sea lions are pinnipeds and members of the Otariidae or "eared seals" family. They are the largest of the eared seals, with males measuring up to 2,500 pounds and 11 feet long. Females of the species are slightly smaller, weighing up to 800 pounds. They are characterized by light blonde to reddish brown coats and long white whiskers on their muzzles used to sense prey and navigate within the water. They have long front flippers that are used to propel themselves in water and shorter back flippers that can be turned for walking on land (NMFS 2021f). As social animals, they gather in large groups on land at rookeries for resting, breeding, and raising young pups. They are known to haul out on land, docks, buoys, and navigational markers. Different from rookeries, haulouts are more informal gathering locations used for resting and molting. In their aquatic habitat they are generally more solitary hunters and are excellent divers but often gather in large rafts, or clusters, at the surface.

Steller sea lions are opportunistic foraging feeders with diets consisting of a variety of fish and cephalopod species, depending on prey availability. Feeding habits vary with season. During spring energetic demands are high for pregnant females and for males preparing for extended fasting. Beginning in May and throughout the breeding season, males may fast for up to two months while occupying and defending their rookery territory and breeding females forage closer to rookeries and return often to their nursing pups (NMFS 2021f).

2.1.5.2 Status

The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 due to significant population decline (55 FR 49204). Speculated causes of the decline included competition with commercial fisheries, environmental change, disease, predation, incidental take, and shooting (NMFS 2016). In 1997, NMFS reclassified Steller sea lions with 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 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.

2.1.5.3 Range

Steller sea lions' range runs along the North Pacific Ocean from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Loughlin et al. 1984). They are distributed mainly on the coastlines and coastal waters but can be found in pelagic waters (NMFS 2021f). Steller sea lions are not known to migrate annually, but individuals may disperse widely outside of the breeding season (Jemison et al. 2013; Allen and Angliss 2015).

2.1.5.4 Abundance

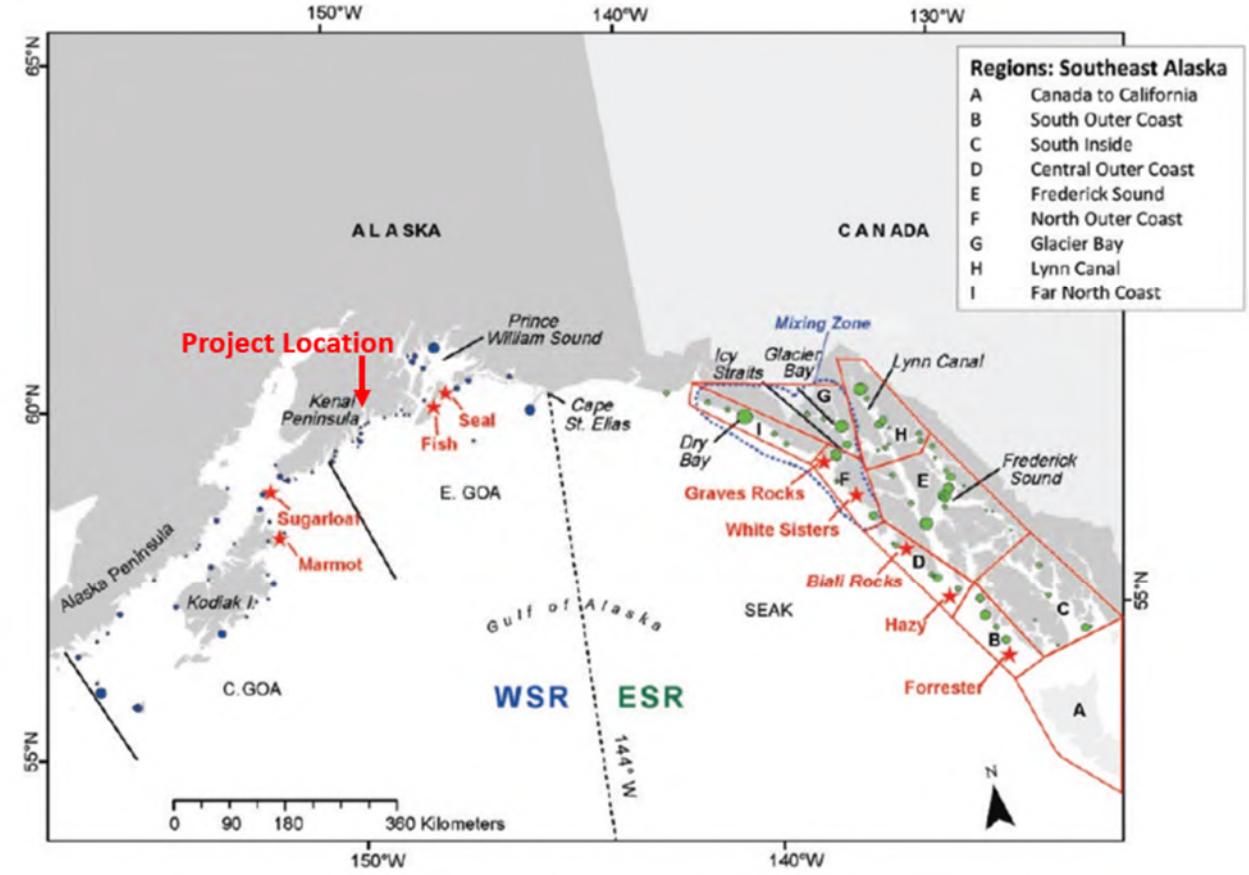
The most recent population assessment for the U.S. portion of the WDPS and EDPS Steller sea lion stocks is 53,624 and 43,201 animals, respectively, based on aerial photographic and land-based survey data (Muto et al. 2020).

2.1.5.5 Steller Sea Lions in Resurrection Bay

Steller sea lions are distributed throughout Southcentral Alaska, with patterns loosely correlated to aggregations of spawning and migrating prey species, particularly fish and cephalopod species (Womble et al. 2005; Sinclair and Zeppelin 2002; Sinclair et al. 2013). Haulout sites in Southcentral Alaska (at and west of Cape Suckling) were documents through aerial surveys by Fritz et al. (2016) and are shown in **Figure 13**.

Of the two Steller sealion populations in Alaska, the WDPS includes sea lions born on rookeries at or west of Cape Suckling, and the EDPS includes sea lions born on rookeries from California north through Southeast Alaska. A dividing line, based on genetic studies, was established at 144°W as shown in **Figure 13** (NMFS 2021f). Seward, Alaska, at 149°W, is west of the dividing line and firmly within the range of the ESA-list WDPS. However, westward movement of EDPS animals, specifically males, have been observed since the 1990s. The gap between the breeding ranges has narrowed and new mixed-DPS rookeries have been established near the DPS boundary (Jemison et al. 2013). Hastings et al. (2019) recently updated estimates of the number of EDPS animals within the range of Western DPS (Hastings et al. 2019; Fritz et al. 2016).

Figure 13. Separation of WDPS and EDPS Steller Sea Lion Rookeries at 144°W



(Source: Hastings et al. 2019)

Steller sea lions may be found in and around Resurrection Bay year-round. Steller sea lions have been observed frequently along the eastern shoreline of Resurrection Bay, transiting between the small boat harbor and Lowell Point, within the small boat harbor, and around fish cleaning stations (NPS 2018). Communication with the Alaska SeaLife Center also indicated that the WDPS of Steller sea lions are common year-round throughout the bay. Sealife Center staff contend that EDPS Steller sea lions occasionally visit the area (Alaska SeaLife Center 2020).

2.1.5.6 Hearing Ability

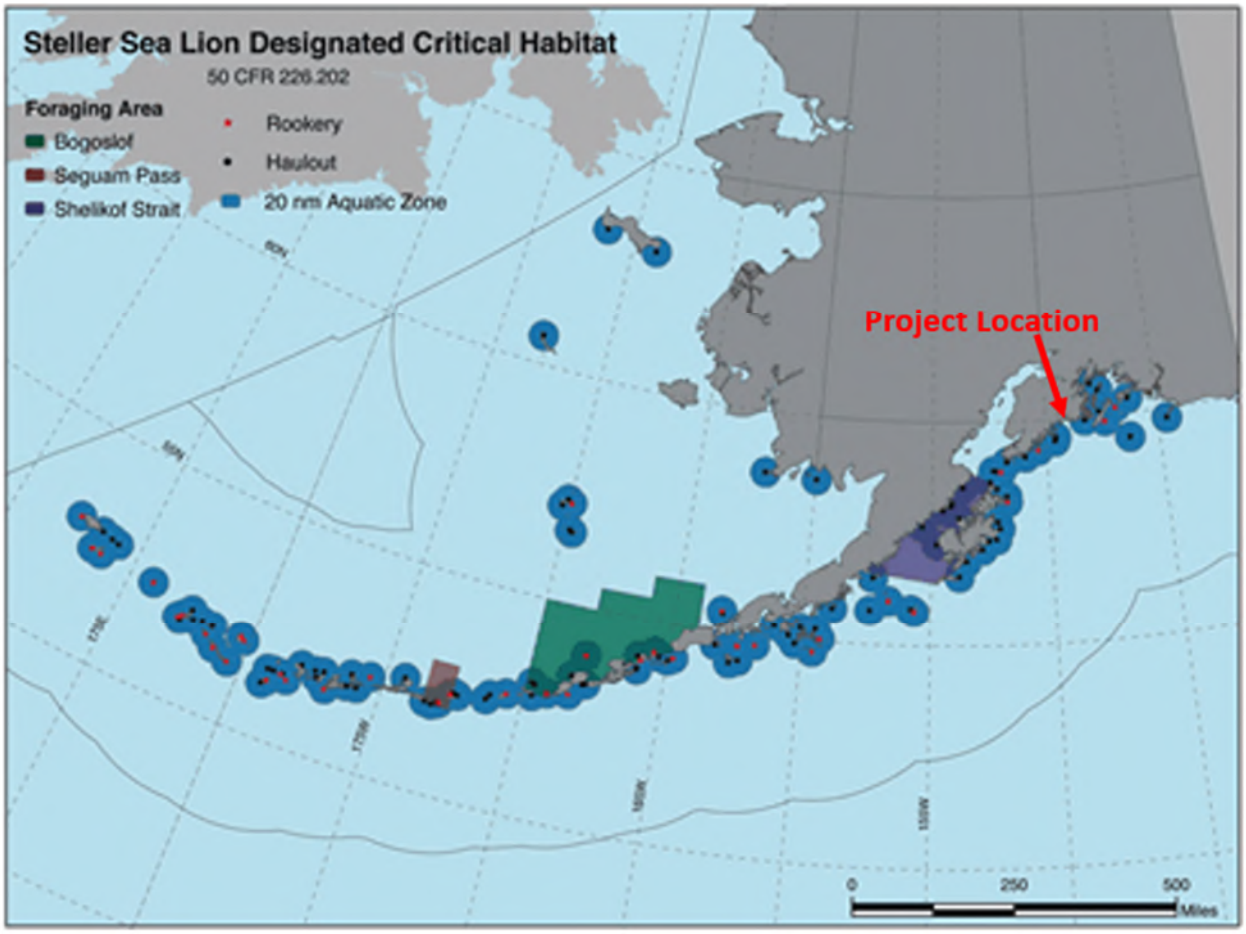
Steller sea lions have a generalized in-water hearing range of 60 Hz to 39 kHz (NMFS 2018). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 to 25 kHz (Kastelein et al. 2005) and in air between 30 Hz and 250 kHz (Muslow and Reichmuth 2010).

2.1.5.7 Critical Habitat

Critical habitat for Steller sea lions was designated by NMFS in 1993 based on location of terrestrial haulout and rookery sites, general extent of foraging trips, and prey availability (58

FR 45269; **Figure 14**). It consists of a terrestrial buffer zone that extends 914 meters (3,000 feet) landward from each major sea lion rookery and haulout. The aquatic buffer zone extends 914 meters (3,000 feet) from major rookeries and haulouts east of 144° W longitude (the dividing line for EDPS and WDPS Steller sea lions) and 37 kilometers (20 nautical miles) from major rookeries and haulouts west of 144° W longitude.

Figure 14. Steller Sea Critical Habitat in Western Alaska



(Source: NPS 2015)

The nearest rookery to the proposed Project is on the Chiswell Islands and the nearest major haulouts are at Rugged Island, Cape Resurrection, No Name, and Aialik Cape (**Figure 13**; NPS 2015). The Chiswell Island rookery is located in the Gulf of Alaska within the Kenai Peninsula Burough, approximately 58 kilometers (36 miles) southwest of the Project area. Cape Resurrection and Rugged Island are about 30 kilometers (19 miles) south of Seward. No Name and Aialik Cape are both about 46 kilometers (29 miles) southwest of Seward. No designated critical habitat occurs within the Project area; therefore, no effects to critical habitat from the proposed action are anticipated.

3 ENVIRONMENTAL BASELINE

The "environmental baseline" includes the past and present impacts of all federal, state, or private actions and other human activities in the action area. It also includes the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early Section 7 consultation. Finally, it includes the impact of state or private actions that are existing or occurring at the same time as the consultation process (50 CFR § 402.02).

The Project vicinity is an area of moderate human use and habitat alteration. Ongoing human activity in the action area that impacts marine mammals includes marine vessel activity, fisheries, pollution, climate change, noise (e.g., aircraft, vessel, etc.), and coastal zone development.

3.1 MARINE VESSEL ACTIVITY

The action area experiences moderate levels of marine vessel traffic year-round with the highest volumes occurring April through October. Marine vessels that use the action area include cruise ships, passenger ferries, whale watching tour boats, charter and commercial fishing vessels, barges, freight vessels, and kayaks (ARRC 2017a; ARRC 2017).

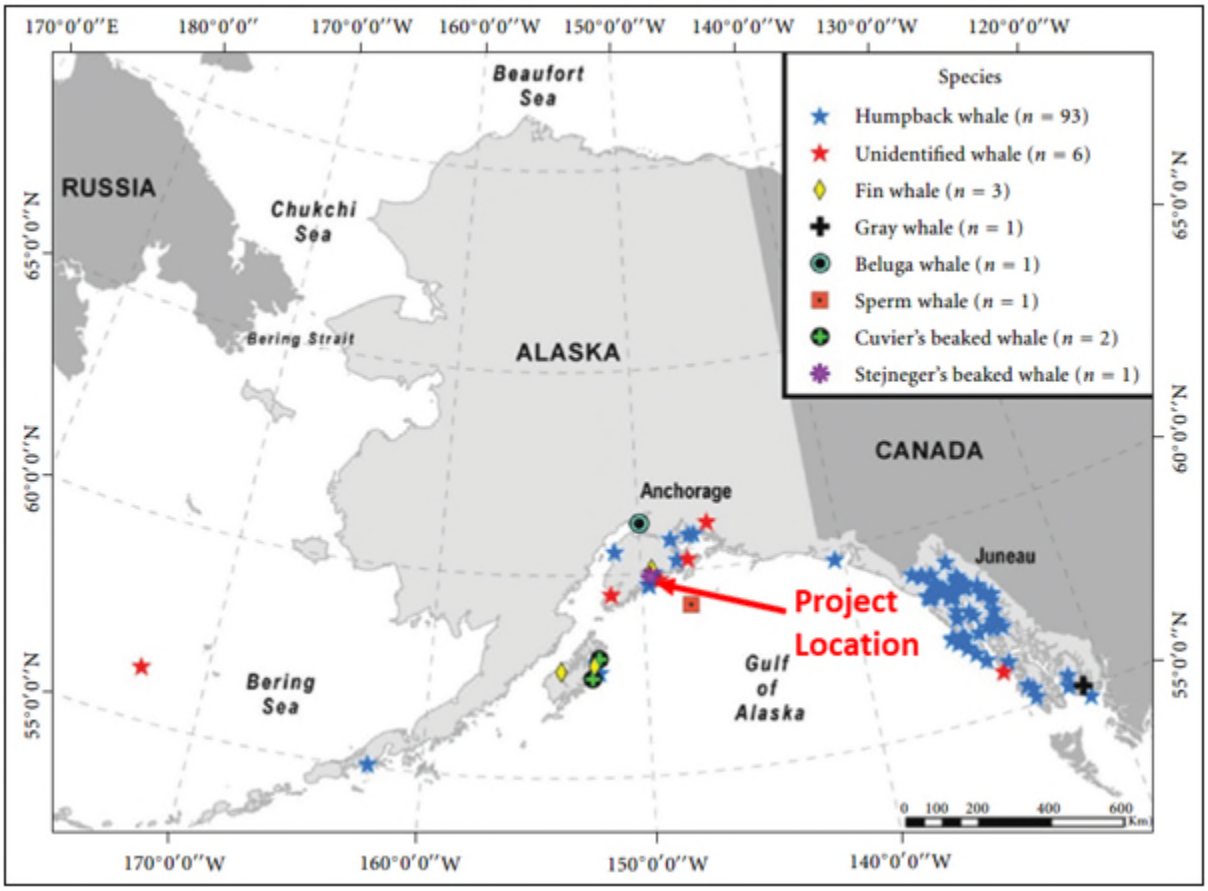
Cruise ships, barges, and freight vessels are the largest vessels that routinely transit the action area. The Seward Passenger Terminal has served as a passenger facility since it was constructed after the 1964 earthquake. In 2019, 12 ships docked 87 times; an increase from the 11 ships that docked 64 times in 2015 (ARRC 2017a; Crew Center 2019). Currently, there are 60 freight clients utilizing the ARRC facilities (ARRC 2017b).

Cetaceans are especially susceptible to injury by vessel strike. Neilson et al. (2012) studied a history of whale strikes by vessels in Alaska reported between 1978 and 2011 (**Figure 15**). Of the 108 vessel-whale collisions reported, 86% involved humpback whales, 2.8% involved fin whales, and 0.9% involved sperm whales. Of the two reported vessel collisions in Resurrection Bay, one involved a humpback whale[7]and the other involved a fin whale[8]. This study found that all types and sizes of vessels collided with whales, but small (less than 15 meter) recreational vessels were the most often involved in these incidents (Neilson et al. 2012).

[7] On September 7, 2008, a 27-meter commercial recreational vessel was travelling at a speed just above an idle when it struck and severely injured a humpback whale in Resurrection Bay (Neilson et al. 2012).

[8] On August 19, 2006, a 294-meter cruise ship travelling at an unknown speed carried the carcass of a fin whale into the Port of Seward. The crew members did not recall feeling any "bumps" and it was determined that the collision occurred somewhere between Yakutat and Seward (Neilson et al. 2012).

Figure 15. Location of Reported Whale-Vessel Collisions from 1978-2011 by Species



(Source: Neilson et al. 2012)

Marine vessel activity may deter marine mammals from their habitat and raise the likelihood of accidental ship strikes, which may cause injury or death of marine mammals. Steller sea lions may be disturbed by anthropogenic noise caused by ship traffic, with reactions ranging from increased alertness to vocalizations and flushing into the water from a haulout. These reactions can have amplified impacts, including induced stress, separations of pups from their mother, energy deficit, and loss of habitat (Wilson no date). Although vessel strikes do not appear to be a major cause of species decline for Steller sea lions, NMFS cautions that vessel strikes are more common in areas where Steller sea lions are congregated, such as rookeries, haulouts, and rafts (**Figure 14**).

3.2 FISHERIES

Commercial fisheries pose a threat to recovering marine mammal stocks in Southcentral Alaska. Reductions in seasonal availability and distribution of fish can cause cumulative effects on many species that depend on reliable sources of prey for survival.

Bettridge et al. (2015) report that fishing gear entanglements may moderately reduce the population size or the growth rate of ESA-listed whales. Whales are reported entangled in fishing gear (particularly crab and shrimp pot gear and gill net fishing gear) in Alaska every year

(NMFS 2017). Other gear interactions with whales in Alaska have occurred with purse seine fisheries, anchoring systems and breasting lines, and marine debris. The minimum *average* annual mortality and serious injury rate due to all fisheries between 2013 and 2017 is 1.3 WNP humpback whales due to commercial fisheries (0.7), recreational fisheries (+0.4), and unknown fisheries (+0.2) (Muto et al. 2020). From 2013 to 2017, three serious injuries to sperm whales were reported, resulting in a minimum estimated mean mortality and serious injury rate of 4.7 sperm whales (Muto et al. 2020; Briewick 2013). No incidental mortality or serious injury of North Pacific right whales and Northeast Pacific fin whales due to interactions with fisheries in Alaska were reported between 2013 to 2017 (Muto et al. 2020; Delean et al. 2020).

NMFS considers competition with fisheries to be a threat to Steller sea lions that may have a potentially high impact on recovery of the species (Muto et al. 2020). Additionally, entanglement in fishing gear is a documented source of injury and mortality to pinnipeds and cetaceans. Entanglement may result in minor injury or may potentially significantly affect individual health, reproduction, or survival (NMFS 2017; NMFS 2021f).

Helker et al. (2017) found that Steller sea lions were the most common species reported in human-caused mortality and serious injury events due to commercial fishing between 2011 and 2015, and the WDPS Steller sea lions were primarily subject to injuries caused by federal groundfish trawl fisheries (n=66). Constricting entanglements by marine debris and fishery gear were a major contributing factor. The average annual mortality and serious injury rate caused by U.S. commercial fisheries in 2013 to 2017 is 36 WDPS Steller sea lions. As this is less than 10% of the potential biological removal for the species calculated by Muto et al. (2020), this number can be considered insignificant. However, this number is likely an underestimation since no observers have been assigned to several fisheries that are known to interact with this stock.

3.3 POLLUTION

Intentional and accidental discharges of contaminants pollute the marine waters of Alaska. Intentional sources of pollution including domestic, municipal, and industrial wastewater discharges are managed and permitted by the Alaska Department of Environmental Conservation (ADEC). Pollution may also occur from unintentional discharges and spills.

Resurrection Bay is listed as a Category 2 waterbody, and water quality is not sufficient enough to determine appropriate decision recommendations (ADEC 2018). Marine water quality in the action area may also be affected by discharges from the shipyard and other industrial activity, seafood processing plants, treated sewer system outflows, vessels operating in marine waters, and sediment runoff from paved surfaces and disturbed areas. Table 8 provides a detailed list of permitted discharges in Resurrection Bay.

Table 8. Permitted Discharges into Resurrection Bay

Site/Facility Name	Permit Number	Distance from Proposed Project
Alaska SeaLife Center	AK0052566	2,300 meters
Fox Island Wastewater Treatment Facility	AKG572103	21.4 kilometers
Seward Wastewater Treatment Facility	AK0021890	4.25 kilometers
Spring Creek Wastewater Treatment Facility	AK0053724	4.9 kilometers
OBI Seafoods, LLC Railroad Dock Outfall	AKG520488	125 meters
OBI Seafoods, LLC Outfall 001	AKG520488	700 meters
Resurrection Bay Seafoods Outfall 001	AKG520355	2,700 meters
Polar Seafoods North Outfall *(emergency use only)*	AKG520474	5.4 kilometers
Polar Seafoods South Outfall	AKG520474	5.6 kilometers

(Source: ADEC 2021)

Through skin biopsy tissue sampling, researchers have detected levels of toxicity in the blubber of humpback whales such as persistent organic pollutants and mercury (Das et al. 2015). Elfes et al. (2010) reported detectable concentrations of several contaminants within Alaska; however, the effect on the species has been difficult to quantify. NMFS does not identify pollution as a significant threat to the ESA-listed cetaceans with ranges extending into the Project area (Muto et al. 2020).

Toxic substances in ocean waters accumulate in top predators such as Steller sea lions, as they may be exposed to pollutants through direct contact and through ingestion of contaminated prey. Although the sensitivity of pinnipeds to anthropogenic contaminants is largely unknown, in their *Steller Sea Lion Recovery Plan*, NMFS (2008) identifies toxic substances as a medium level threat to recovery of the species.

3.4 CLIMATE AND OCEAN REGIME CHANGE

There is widespread consensus within the scientific community that atmospheric temperatures on earth are increasing and that this will continue for at least the next several decades (Watson and Albritton 2001, Oreskes 2004). The Intergovernmental Panel on Climate Change estimated in their 2013 report that average global land and sea surface temperature has increased by 0.6°C (±0.2) since the mid-1800s, with most of the change occurring since 1976. This temperature increase is greater than what would be expected given the range of natural climatic variability recorded over the past 1,000 years (Crowley 2000). The time period between 1983 and 2012 was likely the warmest 30-year period in the Northern Hemisphere in the last 1,400 years. This warming is thought to lead to increased decadal and inter-annual variability

and increases in extreme weather events (IPCC 2013). The likelihood of further global-scale changes in weather and climate events is virtually certain (Overland and Wang 2007; IPCC 2013; Salinger et al. 2013).

Effects to marine ecosystems from climate change include ocean acidification, expanded oligotrophic gyres, temperature shifts, circulation, stratification, and nutrient input (Doney et al. 2012). Altered oceanic circulation and warming cause reduced subsurface oxygen concentrations (Keeling et al. 2010). These large-scale shifts have the potential to disrupt existing trophic pathways as change cascades from primary producers to top level predators (Doney et al. 2012; Salinger et al. 2013).

The strongest warming is expected in the north, exceeding the estimate for mean global warming by a factor of 3, due in part to the "ice-albedo feedback," whereby as the reflective areas of Arctic ice and snow retreat, the earth absorbs more heat, accentuating the warming. Climate change is projected to have substantial direct and indirect effects on individuals, populations, species, and the structure and function of marine, coastal, and terrestrial ecosystems in the foreseeable future (National Research Council 2013).

For ESA-listed species that undergo long migrations, if either prey availability or habitat suitability is disrupted by changing ocean temperature regimes and acidification, the timing of migration can change or negatively impact population sustainability (Simmonds and Eliott 2009). Specifically, krill distribution has been linked to ocean temperature (Klein et al. 2018, Atkinson et al. 2004). As a major food source for baleen whales, impacts to krill distribution could have effects on whale migration patterns and reproduction rates. The indirect effects of climate change on baleen whales would likely include changes in the distribution of temperatures suitable for many stages of their life history, the distribution and abundance of prey, and the distribution and abundance of competitors or predators.

Alterations in ocean temperature have led to changes in the quantity, quality, distribution, and accessibility of prey species of fish for sperm whales and Steller sea lions. Trites et al. (2007) hypothesize that a major contributing factor to Steller sea lion population decline in the 1970s through the 1990s was a shift in abundance of prey species from high-energy fish to low-energy fish. This led to a state of prolonged nutritional stress in some Steller sea lion groups. They further hypothesize that nutritional stress would have compromised survival and reproduction if sea lions could not maintain normal growth and body condition. Changes in prey abundance and availability may have also led to increased foraging times and increased exposure of Steller sea lions to predators.

3.5 NOISE

The Project area is subject to noise from many anthropogenic sources, including marine vessels, aircraft, shoreline construction, trains, and land-based vehicles. Beyond Seward's immediate surroundings, the Project action area extends into Resurrection Bay which is relatively undeveloped.

Regular use by commercial and recreation vessels, the ARRC railyard, and overhead flights to or from the adjacent Seward Airport contribute noise to both the underwater and in-air acoustic baselines in the action area. The Seward Passenger Terminal is located within the town of Seward, Alaska, approximately 2 kilometers (1.24 miles) from the proposed project location. The entrance to the Seward Small Boat Harbor is located 0.38 kilometers (0.24 miles) to the west of the proposed project, equidistant between the Freight Dock and Coal Dock. Resurrection Bay beyond the action area is regularly transited by cruise ships and container vessels.

3.6 PAST AND PRESENT DISTURBANCES IN THE ACTION AREA

Coastal zone development results in the loss and alteration of nearshore marine mammal habitat and changes in habitat quality. Increased development may prevent marine mammals from reaching or using important feeding, breeding, and resting areas. The shoreline at the Project site has been previously disturbed and heavily developed, with man-made industrial structures such as the neighboring Freight Dock and Coal Dock.

Within the action area, past and on-going development in Seward has resulted in some modifications to shoreline and nearshore habitat, which may affect prey species for ESA-listed species to a small extent in the action area. The shoreline near the proposed Seward Passenger Terminal Expansion Project hosts several waterfront businesses, Seward Sealife Center, city-owned parks, a small boat harbor, a freight dock, and a coal dock; however, this development has been limited, with a large portion of the action area remaining untouched.

4 EFFECTS OF THE ACTION

"Effects of the action" refers to the direct and indirect effects of an action on the present species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02).

Direct effects defined under the ESA are immediate effects caused by the proposed action and occurring concurrently with the proposed action. Indirect effects defined under the ESA are effects from the proposed action that occur at a later time, but are still reasonably certain to occur. Direct and indirect effects that may arise from the proposed action include noise associated with pile driving, construction of new structures, operation of support vessels, increased marine vessel traffic, pollution, and habitat loss.

4.1 ACOUSTIC DISTURBANCE/NOISE FROM PILE INSTALLATION

As explained in **Section 1.4**, the above-ambient underwater and in-air noise from pile driving and removal is anticipated to arise and radiate into Resurrection Bay from the construction and expansion of the Seward Passenger Terminal. All pile driving and removal, filling, and dredging associated with the Project is estimated to occur for a total of approximately 3,068 hours over 299 days (not necessarily consecutively). Most of the in-water work time would be spent placing fill (116 days) and vibrating piles (124 days) (**Tables 3** and **4**).

If a sound is loud enough, it may cause discomfort or tissue damage to auditory or other systems of all animals, including humans (Le et al. 2017). Marine mammals exposed repeatedly or for prolonged periods to high intensity sound can experience a hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges. A TS can be permanent (PTS), in which case hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold can recover over time (Southall et al. 2007).

Marine mammals depend on acoustic cues for vital biological functions (e.g., orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs (Kastak et al. 2005). A TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Although repeated TTS sound exposure could cause PTS, which constitutes injury, NMFS classifies TTS as a disturbance (Level B) harassment (Southall et al. 2007; NMFS 2018).

Direct impacts of noise to marine mammals depend not only on sound magnitude but also on the species receiving the sound, exposure type (e.g., continuous vs. pulse), duration, site characteristics, and individual animal characteristics such as habituation, season, or motivation (Ellison et al. 2012). Some of the in-water sound source levels from pile installation and removal from the proposed action will generate noise loud enough to harm or harass ESA-listed species at certain distances. Possible impacts include injury and disturbance ranging from mild (e.g., startle response or masking of species relevant sounds) to severe (e.g., abandonment of habitat).

Auditory interference, or masking, occurs when an interfering noise is similar in frequency and volume to (or is louder than) the auditory signal received by an animal while it is processing echolocation signals or listening for acoustic information from other animals. Masking can interfere with an animal's ability to gather acoustic information about its environment, such as predators, prey, conspecifics, and other environmental cues (Francis and Barber 2013). The impacts of masking may be greater for cetaceans, which produce complex vocalizations for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Exposure to anthropogenic noise may result in changes to cetacean vocalization behavior. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Fristrup et al. 2003; Foote et al. 2004), while right whales have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks et al. 2007).

Construction activities for the proposed project could mask vocalizations or other important acoustic information for marine mammals present in the action area. This could affect communication among individuals or affect their ability to receive information from their

environment. However, the primary effects of project activities will occur in an active waterway, where masking from vessel sounds and dock activity is likely (Erbe et al. 2019)

Fish populations in the Project area that serve as ESA-listed species' prey could be affected by noise from in-water pile-driving. High underwater SPLs 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 from this project to marine mammal prey species are expected to be minor and temporary. The area likely impacted by the proposed project is relatively small compared to the available habitat around Seward. The most likely impact to fish from the proposed project will be temporary behavioral avoidance of the immediate area. Any behavioral avoidance by fish of the immediate area will still leave large areas of fish and foraging habitat in the action area. Further, mitigation measures will be implemented to reduce impacts of noise on habitat. Therefore, effects on ESA-listed species prey during the proposed project are not expected to be substantial.

Indirect effects from acoustic disturbance may arise from ongoing activities within the action area, stemming from a growing tourism industry and related vessel traffic, and may contribute to elevated ambient levels of underwater and in-air noise in the action area. Tugs and barges can emit significant noise levels, around 171-176 dB (Richardson et al. 1995; Kipple and Gabriele 2004); large cruise ships have been reported to have noise levels of 175-195 dB, depending on speed (Kipple 2002); ARRC passenger trains emit noise levels of 93 dB at 50-feet (HMMH 2003); noise levels from small airports range from 59 dB to 67dB (HMMH 2013). Marine mammals in the area are currently exposed to these sounds. An increase in noise in the action area is not anticipated after completion of the proposed project and impacts to marine mammals, including ESA-listed species, are not anticipated.

4.2 TURBIDITY/SEDIMENTATION

A temporary and localized increase in turbidity near the seafloor will occur in the immediate area surrounding dock during the estimated 3,038 hours (approximate) of in-water project construction. A portion of the in-water work will involve dredging (72 hours) which has been shown to increase turbidity to a maximum of 300 mg 1^{-1} at 24 meters from the source (Reine et al. 2007). Jetting the concrete panels into place (55 hours) will result in a temporary increase in turbidity within an approximately 6-meter radius from the jetting site (Gabr et al. 2004). Minimal turbidity and sedimentation impacts are expected during the placement of fill since fill will be placed within the concrete paneled enclosed dock space.

Temporary and localized turbidity associated with the proposed project may cause displacement of small schooling fish from the construction area; however, such distribution shifts are likely to be temporary and it is expected that fish will return after of pile driving is complete. Additionally, Resurrection River already contributes high levels of sediment into Resurrection Bay throughout the year. Construction-induced turbidity is unlikely to measurably

affect ESA-listed species or prey species in the action area. No indirect effects are anticipated that would cause an increase in turbidity in the action area.

4.3 MARINE VESSEL ACTIVITY

Tugs and barges will be used to deliver materials to the Project site and will remain onsite during project construction. Additionally, a small skiff will be used for day-to-day project operations. Vessels associated with the Project will follow well-established, frequently utilized navigation lanes. No direct effects from the minor amount of increased marine vessel activity are anticipated during project construction, particularly since this is an area that currently experiences vessel traffic.

Once construction is completed, an increase in vessel traffic is not anticipated in Southcentral Alaska waters or barges travelling to Seward. The purpose of the project is to replace a degrading dock that is past its usable life to continue to service vessels that currently travel Alaskan waters. We do not anticipate that ESA-listed species in the area will be exposed to more frequent vessel traffic. As mentioned in **Section 3.1**, the action area has only been cited in three whale-vessel collisions between 1978 to 2011, and the probability of a strike event depends largely on vessel speed (Neilson et al. 2012 and Laist et al. 2001).

Injury to whales from vessel strikes is a general concern for their populations. An examination of all known ship strikes for large (baleen and toothed) whales from all shipping sources indicates vessel speed is a principal factor in whether a vessel strike results in death (Laist et al. 2001; Vanderlaan and Taggart 2007). In assessing records with known vessel speeds, Laist et al. (2001) found a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. The authors concluded that most deaths occurred when a vessel was traveling in excess of 13 knots (24.1 kilometers per hour; 14.9 miles per hour). A 2015 study by Webb and Gende that characterized speeds and traffic of large cruise ships in found that the average ship speed was greater than 16 knots (29.6 kilometers per hour; 18.4 miles per hour). Speeds are likely to be lower within Resurrection Bay because it is a crowded vessel area and near land and port, reducing the risk of collision.

Steller sea lions exhibit a range of reactions to anthropogenic noise caused by ship traffic, including increased alertness, vocalizations, or flushing into the water from a haulout (**Section 3.1**). Disturbance from vessel traffic has been identified as a factor with a low impact on recovery of the species (Muto et al. 2020). Reports of human-caused mortality and injury from 2011-2015 did not list vessel strikes as a significant source of harm for Steller sea lions (Helker et al. 2017). Logically, vessel strikes happen more often in areas where sea lions are congregated, such as rookeries, haulouts, and rafts. As there are no known sea lion rookeries or haulouts near the action area, it is unlikely that vessel strikes with sea lions would increase significantly as a result of the proposed action.

ESA-listed species in the action area have been previously exposed to barge, small vessel, and cruise ship traffic, and are unlikely to change their behavior significantly in response to the

increase in traffic associated with this project. Although the overall risk of whale/vessel interaction is low, an increase in ship strikes may occur in the area. NMFS recently implemented regulations to reduce the likelihood of injurious whale/vessel interactions (50 CFR §§ 216.18, 223.214, and 224.103(b)) which would be followed by commercially operated vessels. See **Section 1.6.7** for more detailed regulations.

4.4 POLLUTION

As stated in **Section 3.3**, permitted and un-permitted sources have the potential to produce pollutants in the action area. Additionally, there is potential for an oil or pollutant spill from activities associated with the Project; however, the risk of spills and pollutants related to the Project will be mitigated by implementing best management practices and policies to prevent accidental spills. Plans will be in place and materials will be available for cleanup activities if a spill were to occur. The probability of project effects to ESA-listed species from accidental spills or other pollution sources is very small. It is anticipated that pollution will cause direct or indirect adverse effects to marine mammals in Resurrection Bay.

During dredging and jetting, sediment will be displaced or removed. Concerns of contamination from the 1964 earthquake have resulted in extensive sediment surveys at the ARRC Passenger and Freight Dock during previous dredging efforts. All samples collected between 1994 and 2009, did not contain traces of contaminates above Lower Columbia River Management Area (LCRA) Tier IIB testing parameters (Golder Associates 2015). It is very unlikely that the dredging or jetting associated with the proposed project will pollution that will affect ESA-listed species in Resurrection Bay.

4.5 HABITAT LOSS OR MODIFICATION

There is no designated critical habitat within the area. Any direct impacts such as physical destruction or alteration of habitat as a result of the proposed project would be minimal since the area is already developed and the Project footprint is relatively small as compared with available marine habitat in Resurrection Bay.

ESA-listed species could experience a temporary loss of suitable habitat in the action area if elevated noise levels associated with in-water construction results in their displacement from the area. The area is already somewhat loud and busy, and displacement of ESA-listed species by noise will not be permanent and will not result long-term effects to the local population.

4.6 CUMMULATIVE EFFECTS

“Cumulative effects” are those effects of future state, local, tribal, or private activities, not involving federal activities, that are reasonably certain to occur within the action area (50 CFR § 402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

Reasonably foreseeable future activities within and immediately adjacent to the passenger dock could involve the placement of fill, dredging, or new construction in the area, requiring

authorization from the USACE and consultation pursuant to Section 7 of the ESA. Therefore, such activities do not meet the ESA definition of cumulative effects and are not addressed here.

It is expected that threats to ESA-listed species listed in **Section 3** including marine vessel interactions, fisheries, pollution, climate change, and anthropogenic noise will continue in the action area. The action area will continue to be a moderately-active port with regular marine vessel traffic adjacent to railroad activities and an active airport.

5 DETERMINATION OF EFFECTS

The proposed ARRC Seward Dock Expansion Project is likely to adversely affect ESA-listed species due to the noise associated with pile-driving. Noise associated with the Project may reach levels exposing ESA-listed species to Level A and B harassment under the MMPA, and therefore cannot be considered to have insignificant or discountable effects on the species. However, mitigation measures described in **Section 1.6** will be implemented throughout the duration of the Project to reduce ESA-listed species exposure to noise associated with the pile-driving. These mitigation measures include minimization of construction noise, marine mammal monitoring, safety radii, clearing the safety radii, soft-start procedures, vessel transit regulations, and shutdown procedures.

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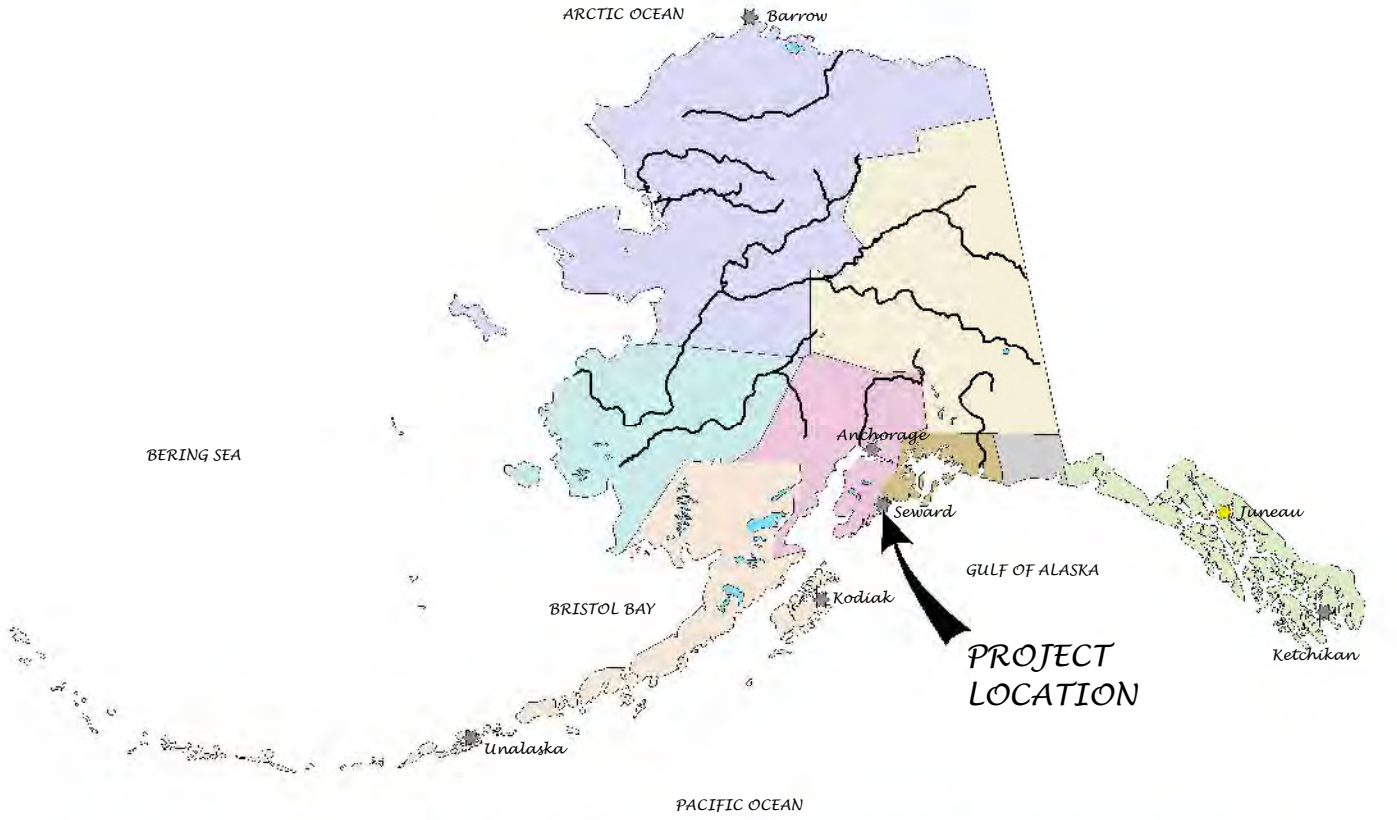
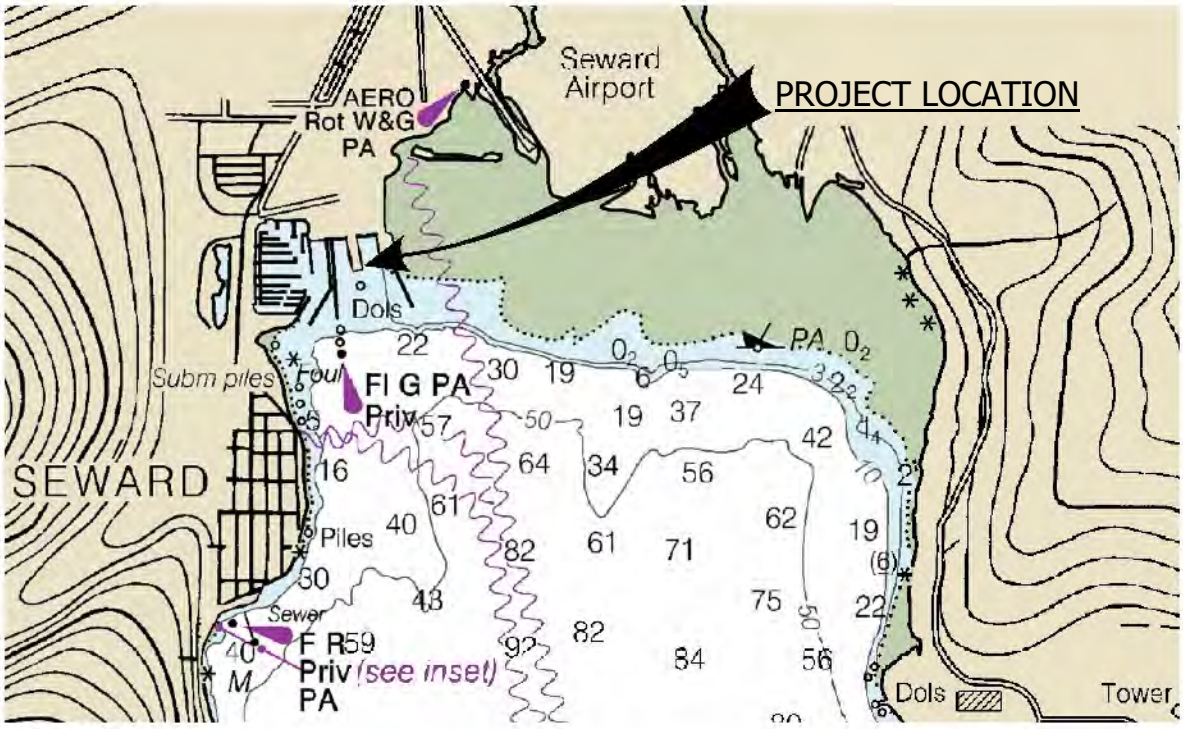
APPENDIX A:

Project Drawings





PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

VICINITY MAP AND LOCATION MAP

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

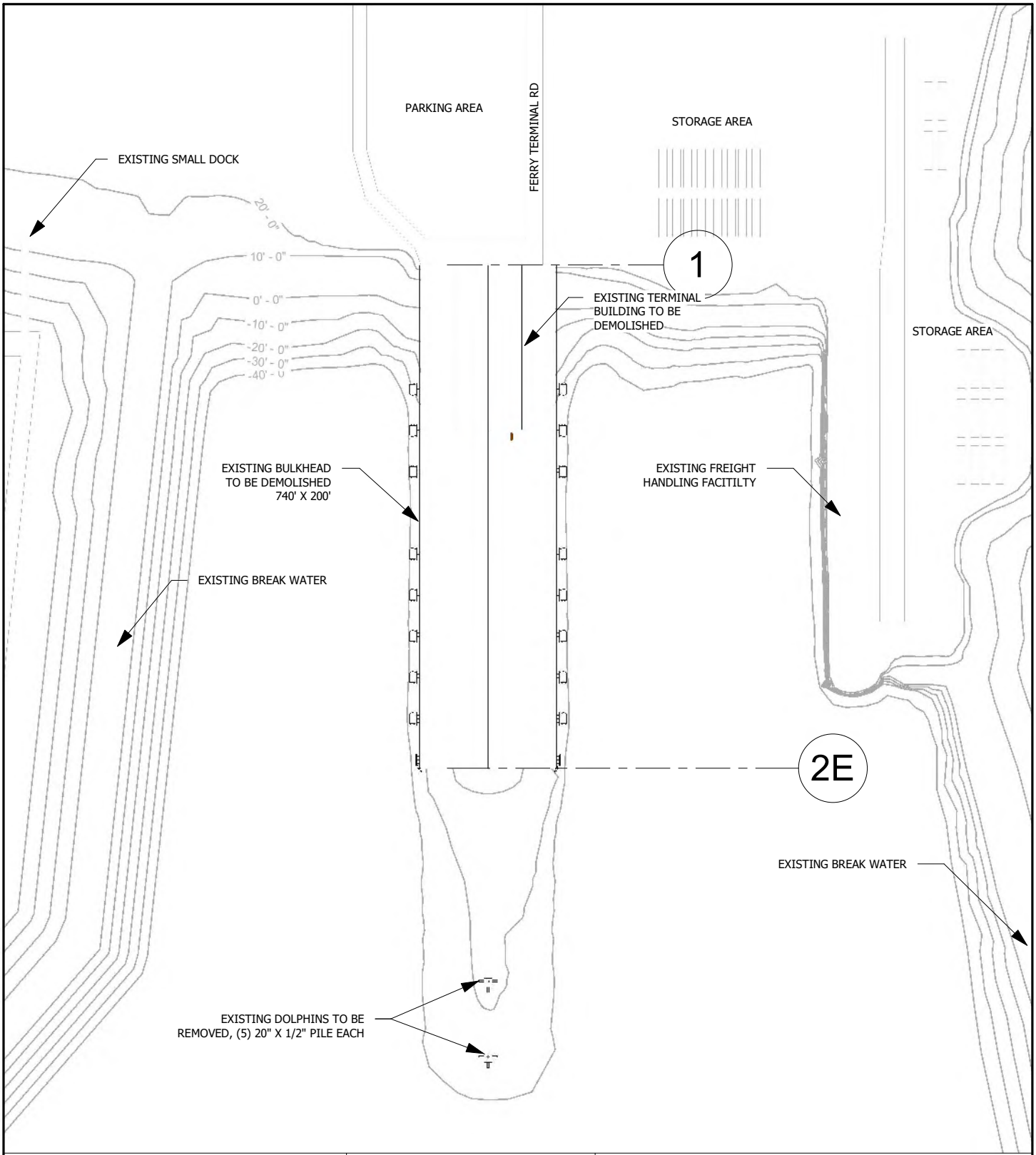
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 1



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

EXISTING CONDITION SITE PLAN

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

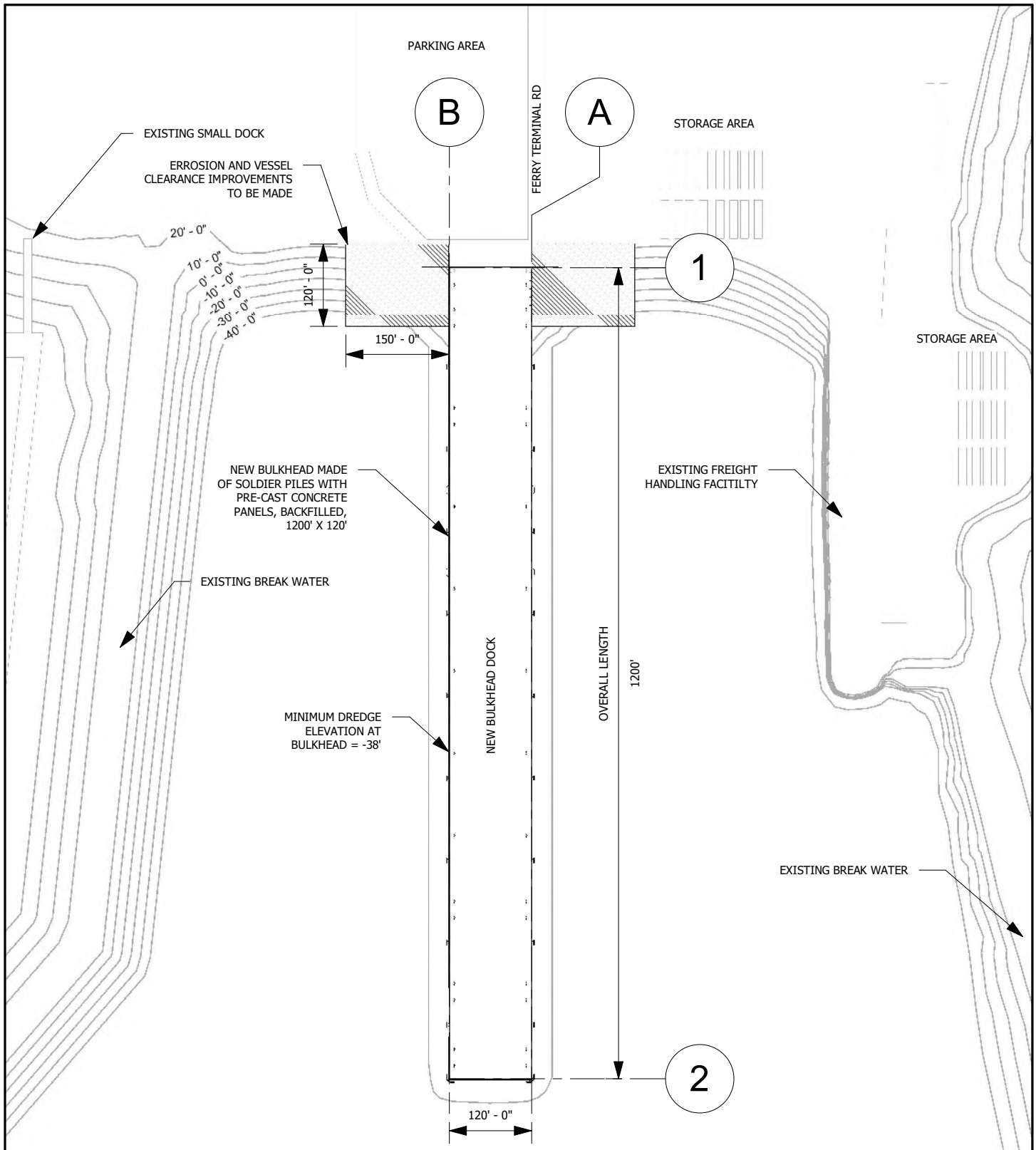
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 2



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

PROPOSED SITE PLAN

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

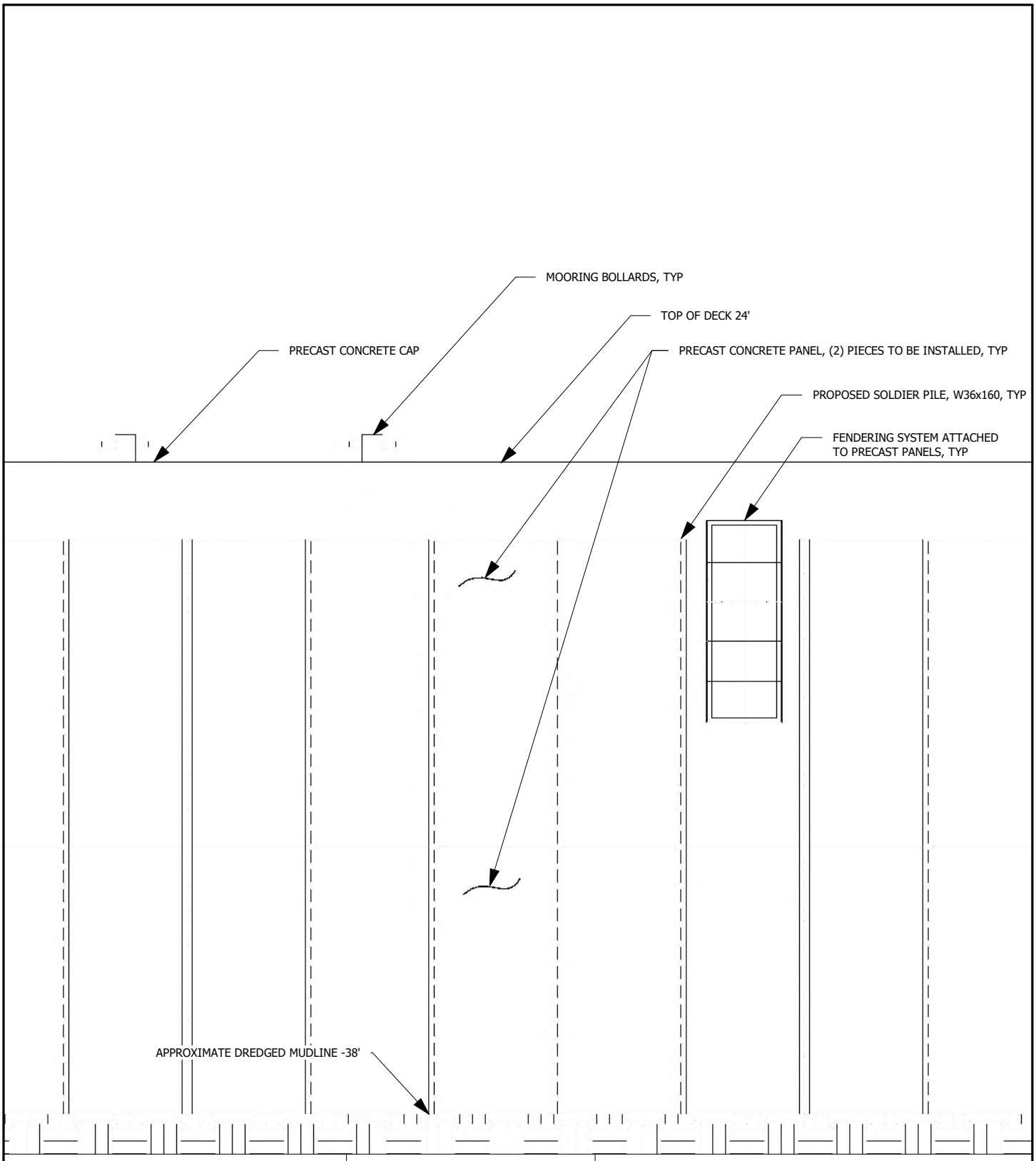
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 3



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

PROPOSED ELEVATION

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

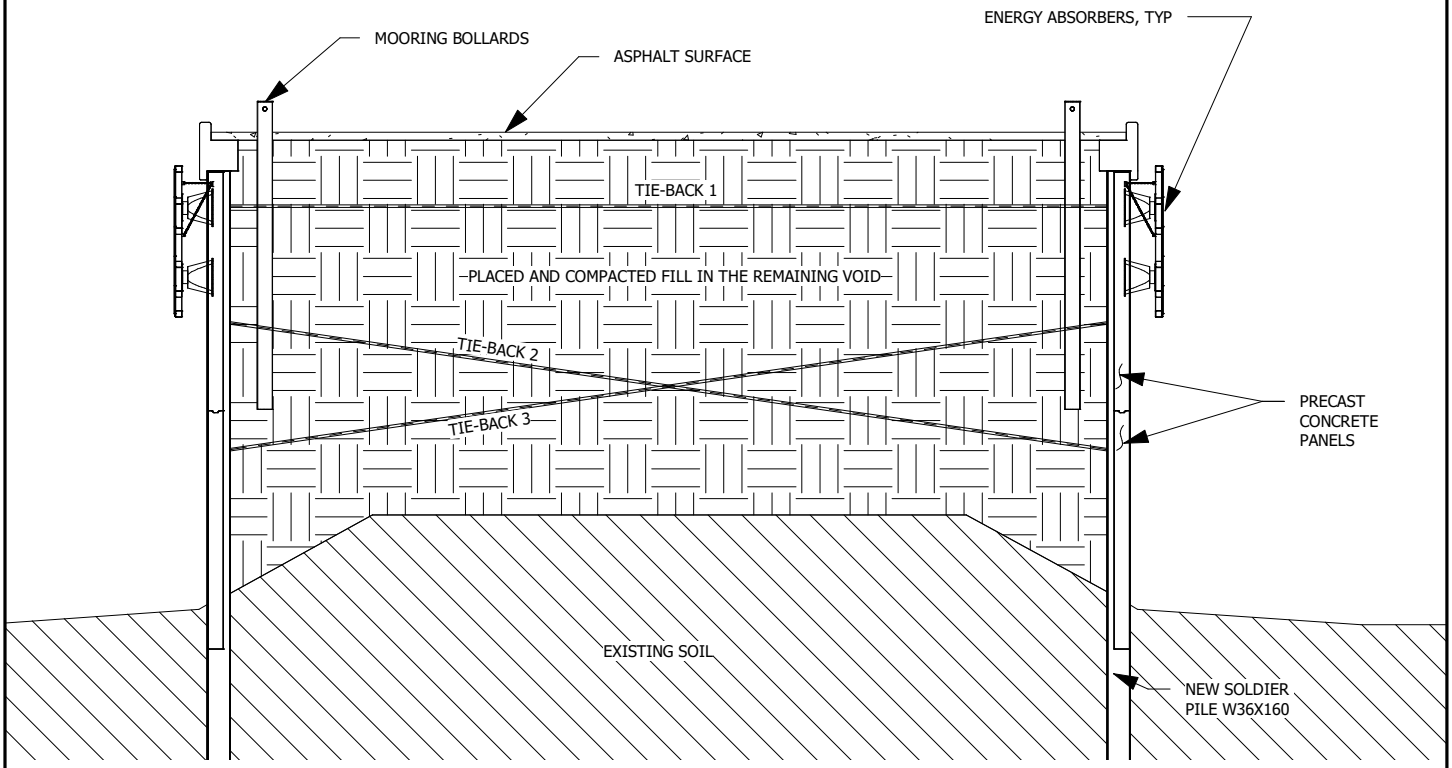
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 4



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

BULKHEAD PAST EXISTING STRUCTURE

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

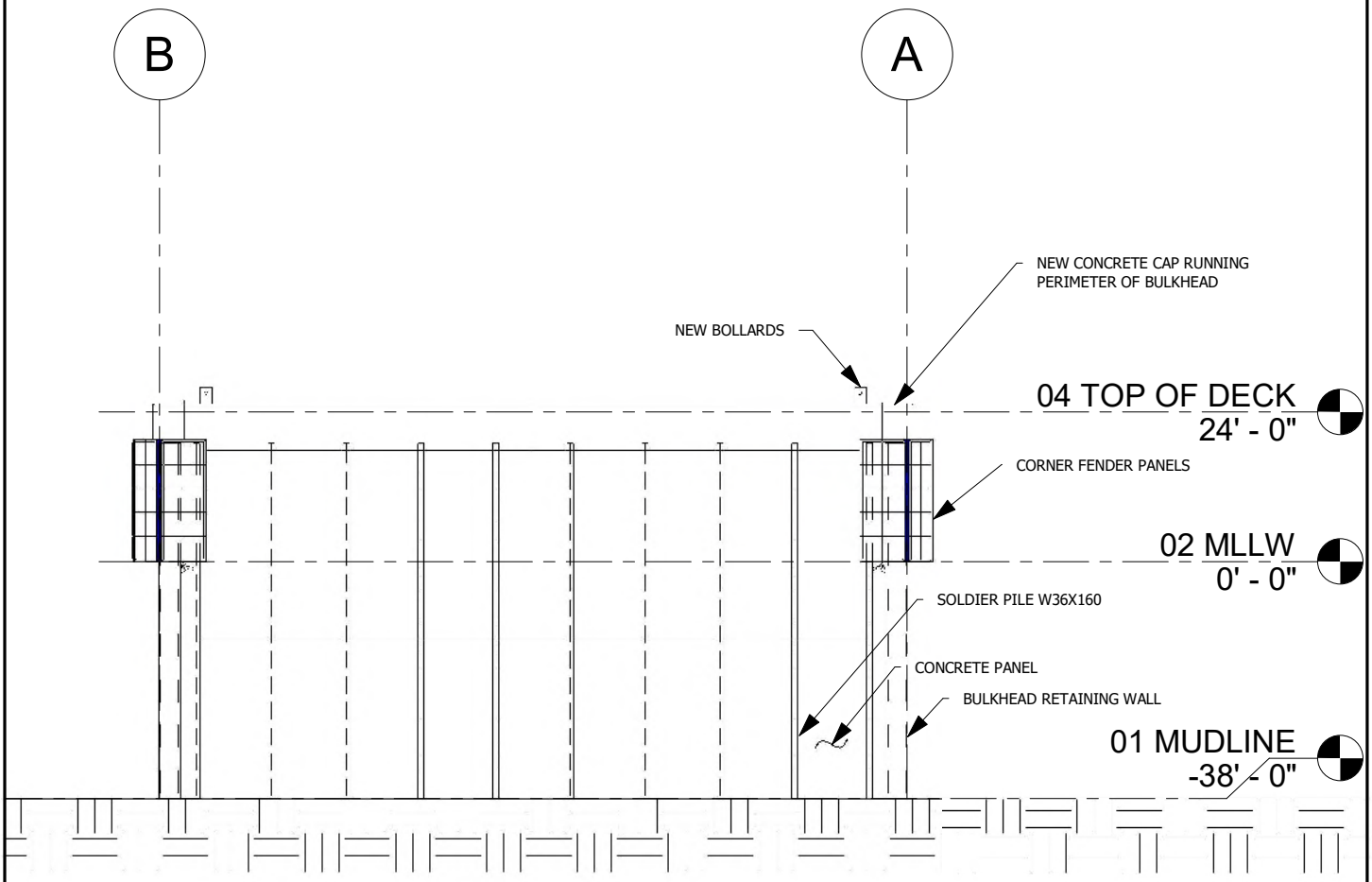
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 5



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

BULKHEAD ELEVATION

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

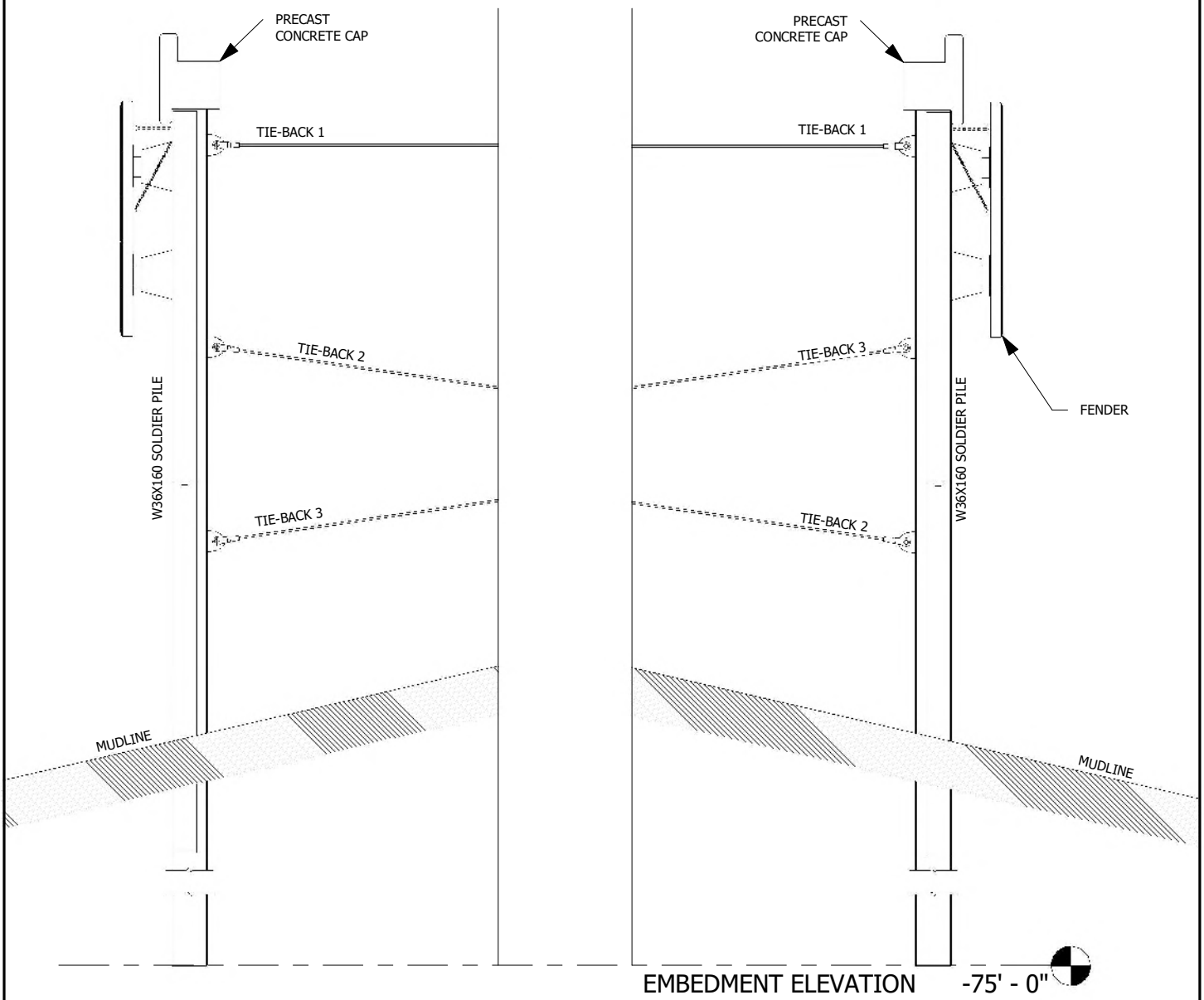
IN: RESURRECTION BAY

AT: SEWARD, AK

APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 6



PURPOSE:

SEWARD PASSENGER TERMINAL DEVELOPMENT PROJECT

DATUM: 0.0'

HTL = +15.70'

MHW = +9.7'

MLLW = 0.00'

LAT = -3.50'

TYPICAL SOLDIER PILE

JOB NO. 20-004

PROPOSED: TURNAGAIN MARINE

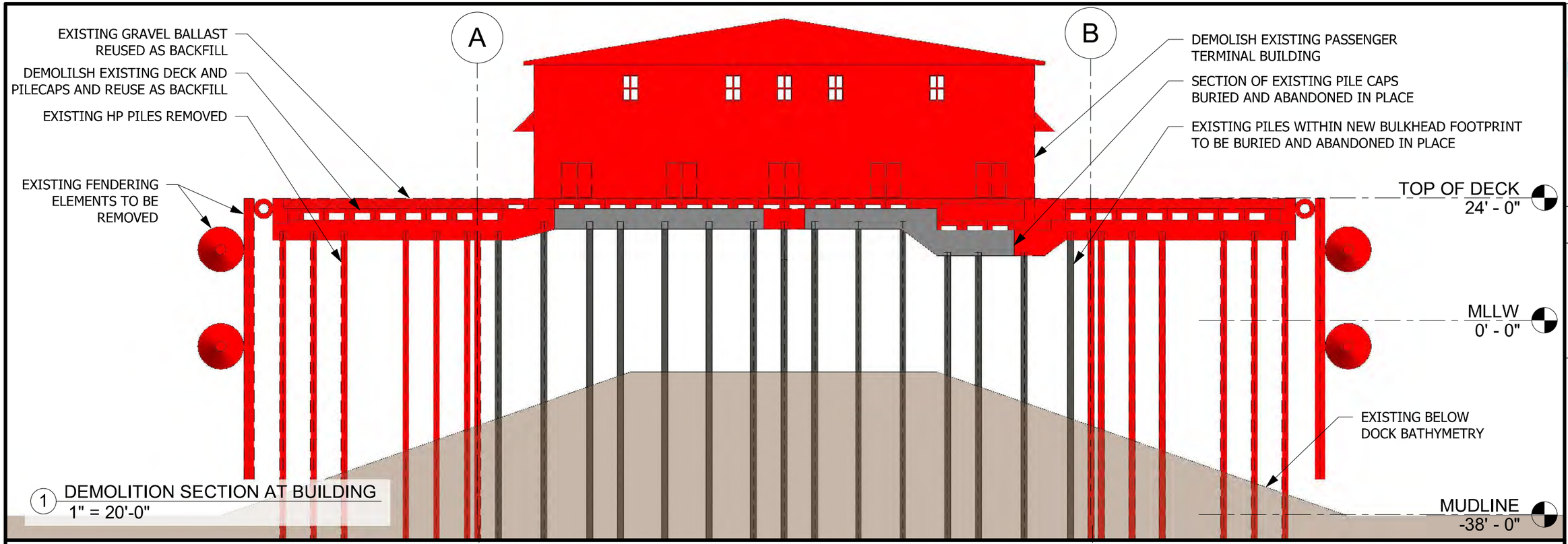
IN: RESURRECTION BAY

AT: SEWARD, AK

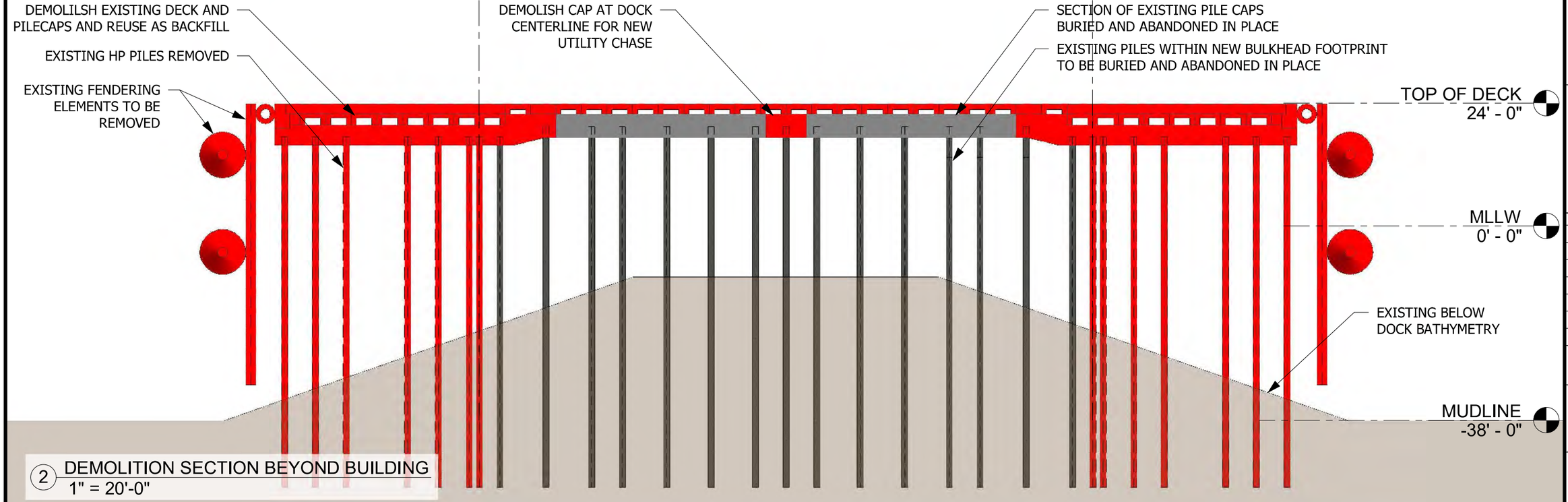
APPLICATION BY: TURNAGAIN MARINE

DATE: MARCH 29, 2021

SHEET: 7



1 DEMOLITION SECTION AT BUILDING
1" = 20'-0"



2 DEMOLITION SECTION BEYOND BUILDING
1" = 20'-0"

Turnagain
Marine Construction
8241 DIMOND HOOK DR, UNIT A
ANCHORAGE, AK 99507
PHONE: (907) 261-8960

PROJECT NUMBER:
20-004

DRAFT
BASELINE
DESIGN

PASSENGER TERMINAL
DEVELOPMENT PROJECT
SEWARD, ALASKA

REV#	DESCRIPTION	DATE

ISSUE DATE:
AUGUST 31, 2020

SHEET TITLE:
DEMOLITION SECTIONS

SHEET NUMBER:
C201

APPENDIX B:

Expected Project Equipment and Vessel Specifications

WORKSKIFF

W Series

The Workskiff W Series is a rugged no-nonsense work platform for the water. The W Series is available in three hull dead rise designs: Flat Bottom, Semi V - 8°, and Medium V - 13°. The Semi V hull design is also available with a tunnel option for jet outboard engines. The W Series can be outfitted with either a console or T-Top and incorporates a square bow design, heavy duty 4" D-rubber fendering, closed cell foam for floatation and internal hull structure that is designed for heavy loads, pushing and towing and can be outfitted with a variety of accessories. All models are custom configured to meet your specific application.

STANDARD FEATURES

HULL FEATURES	19' X 8.0'	21' X 8.5'	23' X 8.5'
Dead Rise – Jon Boat Hull	0°	0°	0°
Dead Rise – Semi-V Hull	8°	8°	8°
Dead Rise – V Hull	13°	13°	13°
Wheelhouse	Console	Console or T-Top	Console or T-Top
Wheelhouse Width	36"	40"	40"
Number of Engines	Single	Single	Single
Recommended Horsepower	90 – 135 HP	115 – 200 HP	200-225 HP
Internal Aluminum Baffled Fuel – 0.190" 5052	40 Gallons	60 Gallons	75 Gallons

HULL:

✓ All Aluminum Welded Construction	✓ Hull Bottom & Transom – 0.250" 5086 Aluminum	✓ Hull Sides – 0.190" 5086 Aluminum	✓ Hull Deck & Internal Structure – 0.190" 5052 Aluminum
✓ Beaching Plate – 0.250" 5086 Aluminum	✓ Closed Cell Floatation Foam	✓ D Rubber Fender 4" – Black	✓ Bull Nose Bow with pushing surface
✓ Cleats – HD 10" Cast Aluminum	✓ Nonskid on Deck Surface	✓ Bow Storage Locker	✓ Rubbing Strake – Aluminum
✓ Self-Bailing Deck with Scuppers	✓ HD Trailer Tie -Down & Bow Eye	✓ Fuel Tank Deck Hatch Access for Servicing and Removal	

WHEELHOUSE:

✓ Wheelhouse - 0.190" 5052 Aluminum	✓ Footrest	✓ Built-In Handrails	✓ Leaning Cushioned Bolster Seat
✓ Side Doors for Console Access	✓ Maintenance Access		

WORKSKIFF

W Series

HARDWARE:

✓ Hardware Fasteners – 316 SS	✓ Door & Hatch Hardware - 316 SS	✓ Operations Labels

STANDARD FEATURES

12V DC ELECTRICAL:

✓ Optima Blue Top Marine Batteries - 1 EA. Engine(s) & 1 EA. House	✓ Battery Switch(es)	✓ Resettable Thermal Circuit Breaker Protection
✓ Switch Panel(s) on Dash	✓ 12VDC Power Outlet – 2 EA	✓ LED 12VDC Volt Meter
✓ Automatic Charge Relay	✓ Wire & Cable – Tin Coated Marine Grade	✓ Electrical Drawing(s) & Circuit Labeling
✓ Battery Tender		

COMMAND & CONTROL:

✓ Navigation Lights USCG Certified	✓ All-Round Mast Light USCG Certified	✓ Horn

AUXILIARY SYSTEMS:

✓ EPA Compliant Fuel System – Aluminum Under deck Fuel Tank, Fuel Filter, Hoses and 316 Stainless Ball Valve & Fittings	✓ Hydraulic Steering	✓ Bilge Pump & Float Switch

PROPULSION:

✓ Honda	✓ Yamaha	✓ Evinrude (Govt. Only)	✓ Mercury (Govt. Only)

TRAILERS – ALUMINUM I-BEAM AND GALVANIZED CHANNEL:

✓ Boat Master	✓ Tuff Trailer	✓ EZ Loader

WORKSKIFF

W Series

UPGRADE FEATURES

ALUMINUM SEATS & STORAGE

✓ Deck Locker – Lock/Non-Lock	✓ Bolster Seat	✓ Swing Down Seat
✓ Bench Seating		

HULL PROTECTION

✓ D Rubber Fendering	✓ Laminated Tire Fendering	✓ UHMW Fendering
✓ Polyform Lace-on Fendering	✓ Hybrid RIB Collar	✓ Push Knees

TOW & TIE-DOWN FIXTURES

✓ Cleats	✓ Tie-Pockets	✓ Transport Tie-Down – Ship/Rail/Air
✓ Tow Bit	✓ Bollards	

LIFT FITTINGS

✓ Welded Aluminum Lift Eye – 4 Point	✓ Welded Aluminum Lift Eye – Single Point

WELDED SPECIAL PURPOSE ACCESSORIES

✓ Light Bar	✓ Radar Mast	✓ Transducer Well
✓ Safety Screen - Towing	✓ Gun Cabinets	✓ Engine Guard
✓ Dive Door	✓ Ring Buoy Mount	✓ Thru Hull Water Pick-up
✓ Davit – Fixed and Articulating	✓ Sunscreen/Awning	✓ Deck Cradle
✓ Net Trawls	✓ A-Frame	✓ Custom Handrails
✓ Multi-Beam Transducer Systems	✓ Research Workstation / Desk	✓ Custom Design and Fabrication

ELECTRICAL

✓ 12vDC SYSTEMS	✓ 120vAC Systems – Generator / Shore Power / Invertor / Chargers	✓ Deck/Work Lights
✓ Spotlights	✓ Under-water Lighting	✓ Custom Electrical Design

COMMAND & CONTROL

✓ VHF/UHF Radio(s)	✓ Hailer / PA	✓ Integrated Navigation – GPS / Chart Plotter / Depth Finder / AIS / Heading / Auto Pilot
✓ Police Light Bar	✓ Siren / PA	✓ Strobe Lights
✓ Flags – Ensign / Dive / Signal	✓ Tow Lighting	

UPGRADES FEATURES

AUXILLIARLY SYSTEMS

✓ Davit Winches – Manual / Electric / Hydraulic	✓ Hydraulic Systems	✓ HVAC Systems
✓ Fire Extinguishers	✓ Trim Tabs	✓ Custom Systems

OUTFIT ITEMS

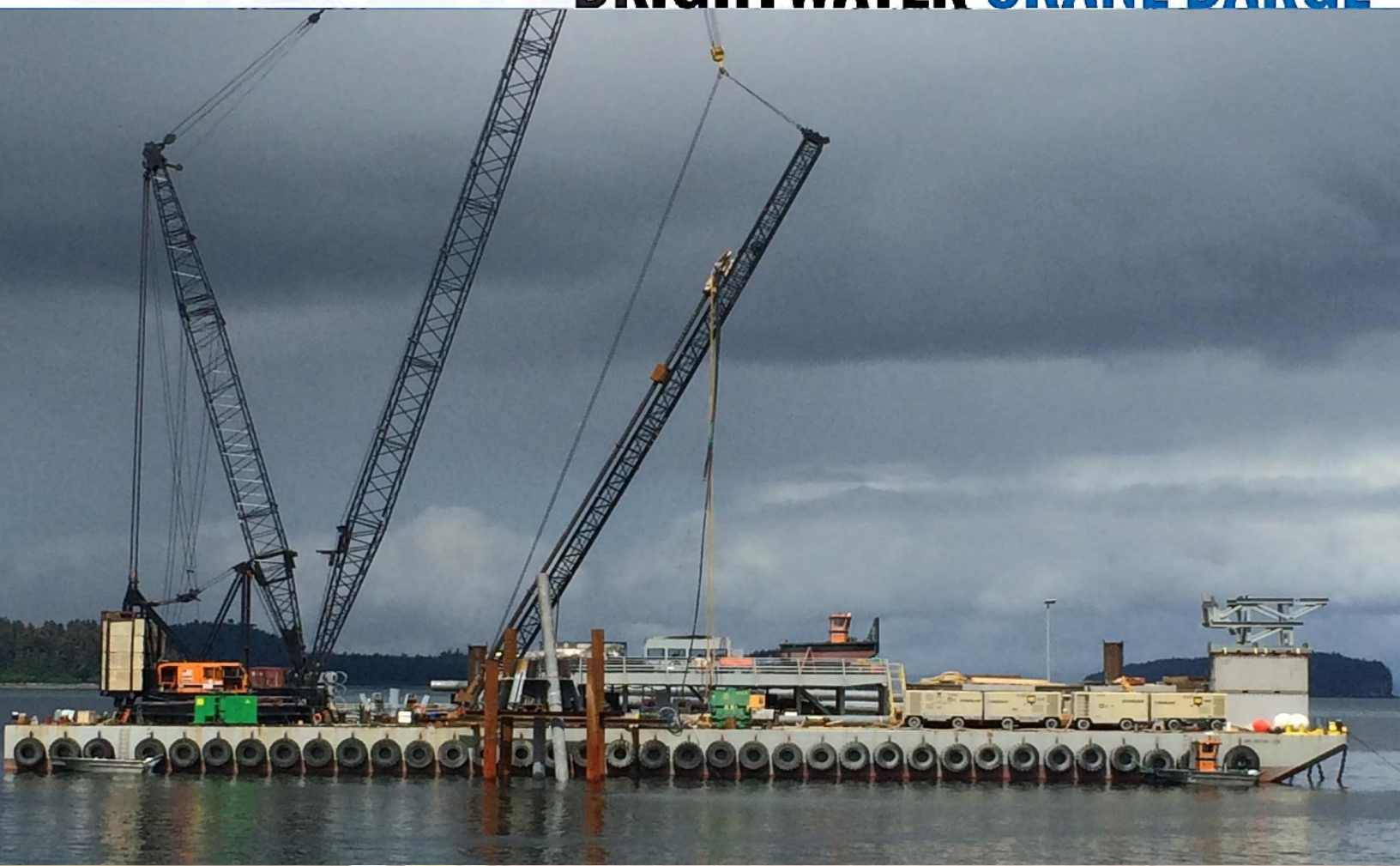
✓ Seating – Shock Absorbing	✓ Anti-Fatigue Matting	✓ Canvas Enclosures
✓ Canvas Awnings	✓ Canvas Boat Covers	✓ Custom Upholstery
✓ Sand Blast Matte Finish	✓ Anti-Foul Paint	✓ Above Waterline Hull Paint
✓ Dive Tank Storage	✓ Cargo Tie-Down - Adjustable	✓ Personal Floatation Devices
✓ EPIRB	✓ Ring Buoy & Line	✓ Man-Overboard Light
✓ Boat Hook	✓ Paddle	✓ Tow Line & Spool
✓ First Aid Kits	✓ Flair Kit	✓ Dock Lines
✓ Dock Fenders	✓ Anchor Line & Chain	✓ Lifting Straps and Hardware

ENGINEERING – DESIGN – NAVAL ARCHITECTURE

Workskiff partners with Boksa Marine Design for naval architecture and professional engineering, and employees and in-house design team proficient in 3D design using SolidWorks and Rhino software.

Turnagain
Marine Construction

BRIGHTWATER CRANE BARGE

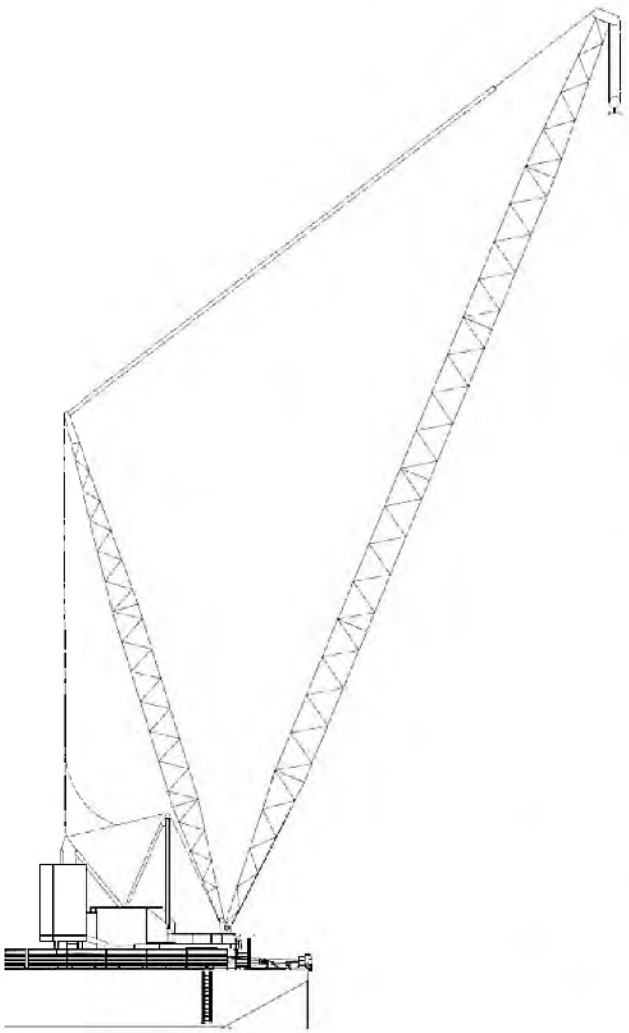


American 9310 Ringhorse, 300 ton capacity @ 50 foot radius, Boom lengths 240 feet, 6-point mooring system

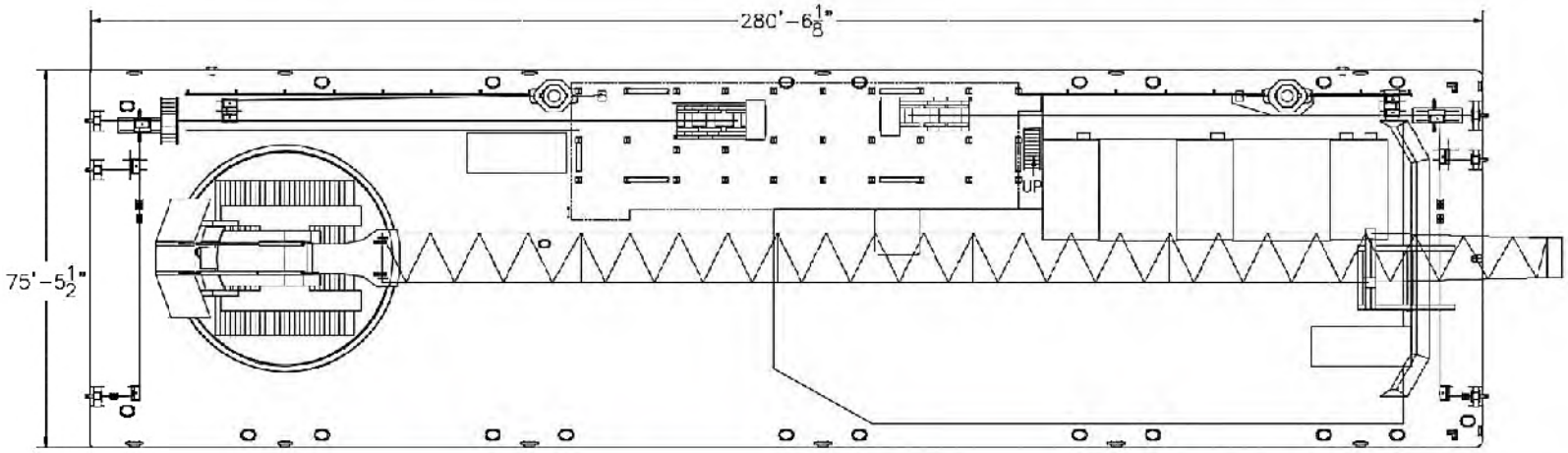
9330 VANGUARD DR. SUITE 100 , ANCHORAGE, ALASKA 99507 WEBSITE: HTTP://TURNAGAIN.BUILD

CRANE BARGE SPECIFICATIONS

The Brightwater crane barge is owned and operated by Turnagain Marine Construction Corporation of Anchorage, Alaska. With the 6-point mooring system and American 9310 Ringhorse, the Brightwater offers the versatility and capacity to safely meet the demands of projects anywhere requested.

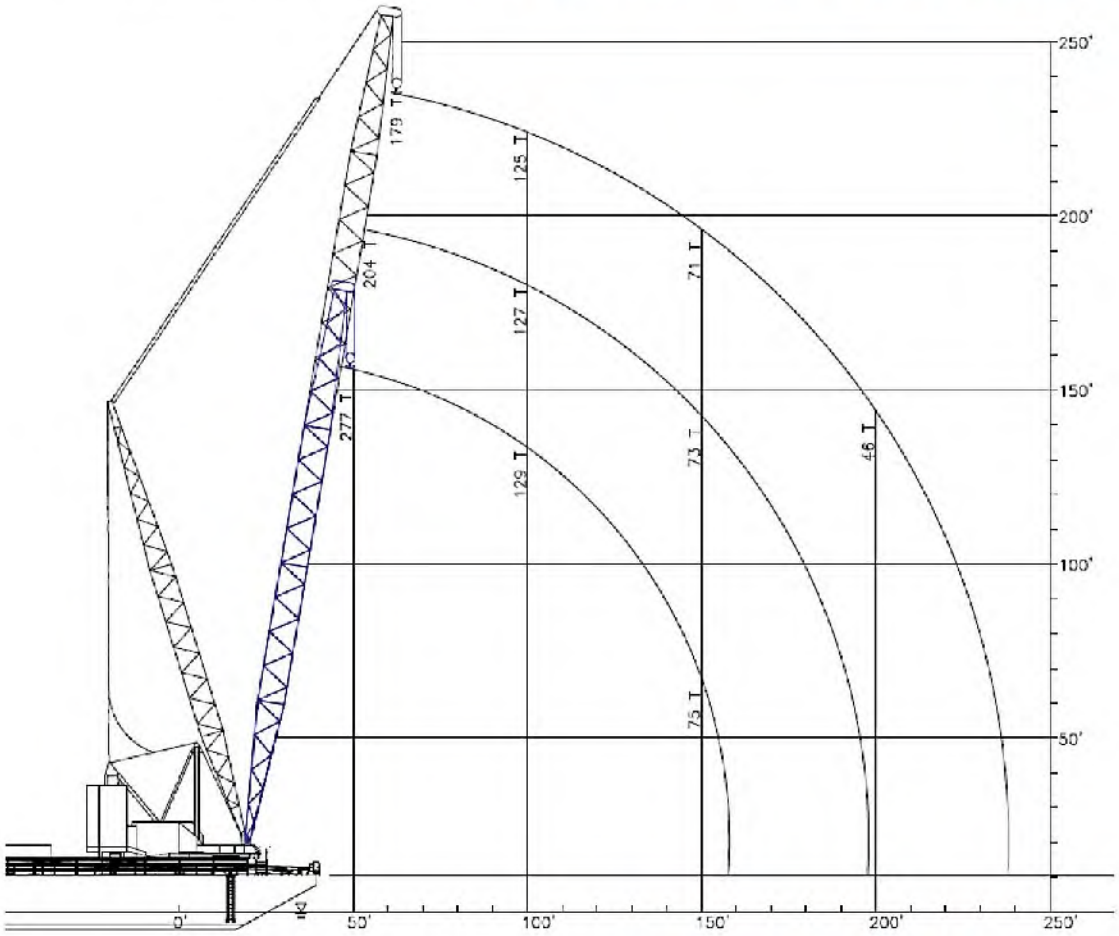


Barge	Length- 280 ft. Width- 76 ft. Height- 16 ft. Draft- 5 ft. ABS Load line Built in 2007 86,000 gallon fresh water tank 10,000 gallon fuel tank Tire Fendering
MOORING SYSTEMS	6 point mooring system -*Option to Increase to 8-point Mooring System* 2 each 100' long octagonal spuds 2 each Manitowoc 390 three drum winches
CRANE	Type- American 9310 Ringhorse Boom- 240 FT of 118S main crane boom Drums- 4 total hoist drums 44 FT diameter ring attachment Capacities -300 ton capacity at 50 FT radius -125 ton capacity at 100 FT radius -35 ton capacity at 250 FT radius -160 ton capacity at 240 FT vertical
SPECIAL CHARACTERISTICS	Boom cradle for ocean transit without crane tear down Crane Smart Load Monitoring System List and Trim Monitoring System 2,200 SF below deck tool room 2,000 SF covered winch, storage, and fabrication room 1,200 SF heated office, galley, and rest rooms Option to add living quarters

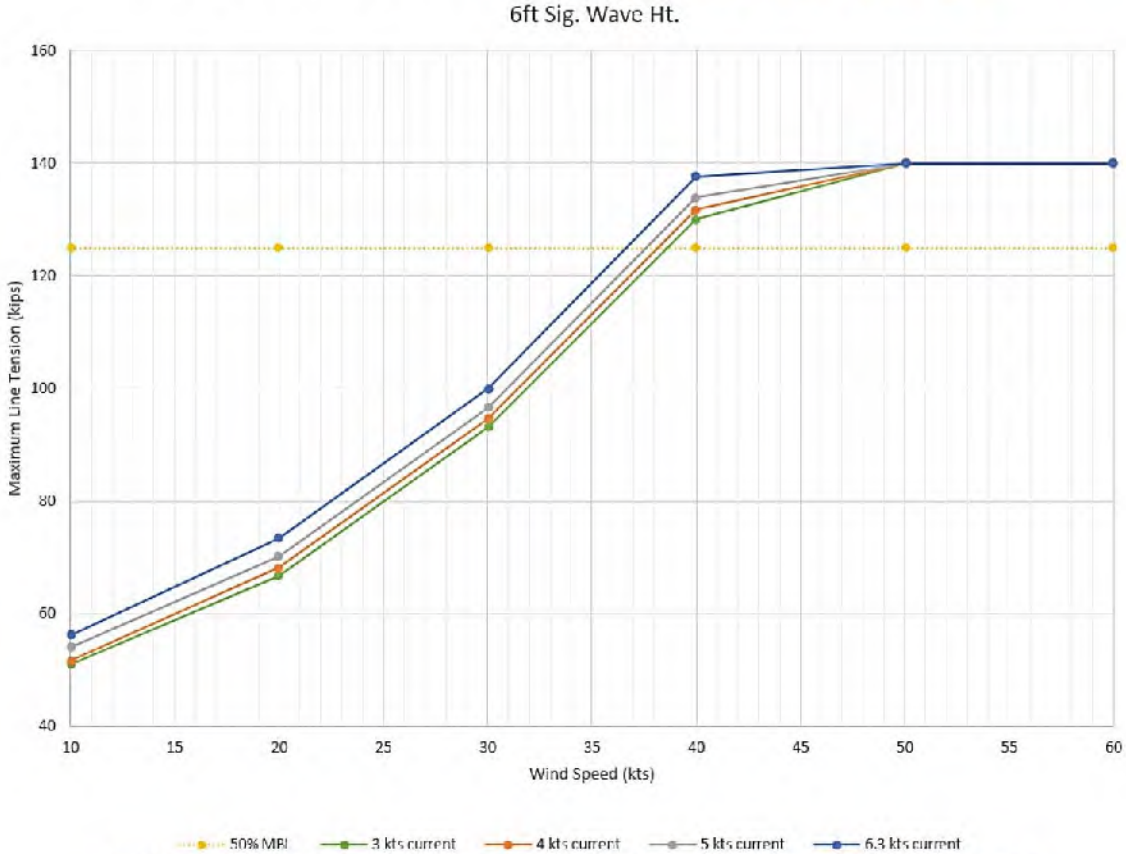


9330 VANGUARD DR. SUITE 100 , ANCHORAGE, ALASKA 99507 WEBSITE: HTTP://TURNAGAIN.BUILD

AMERICAN 9310 RINGHORSE CAPACITY

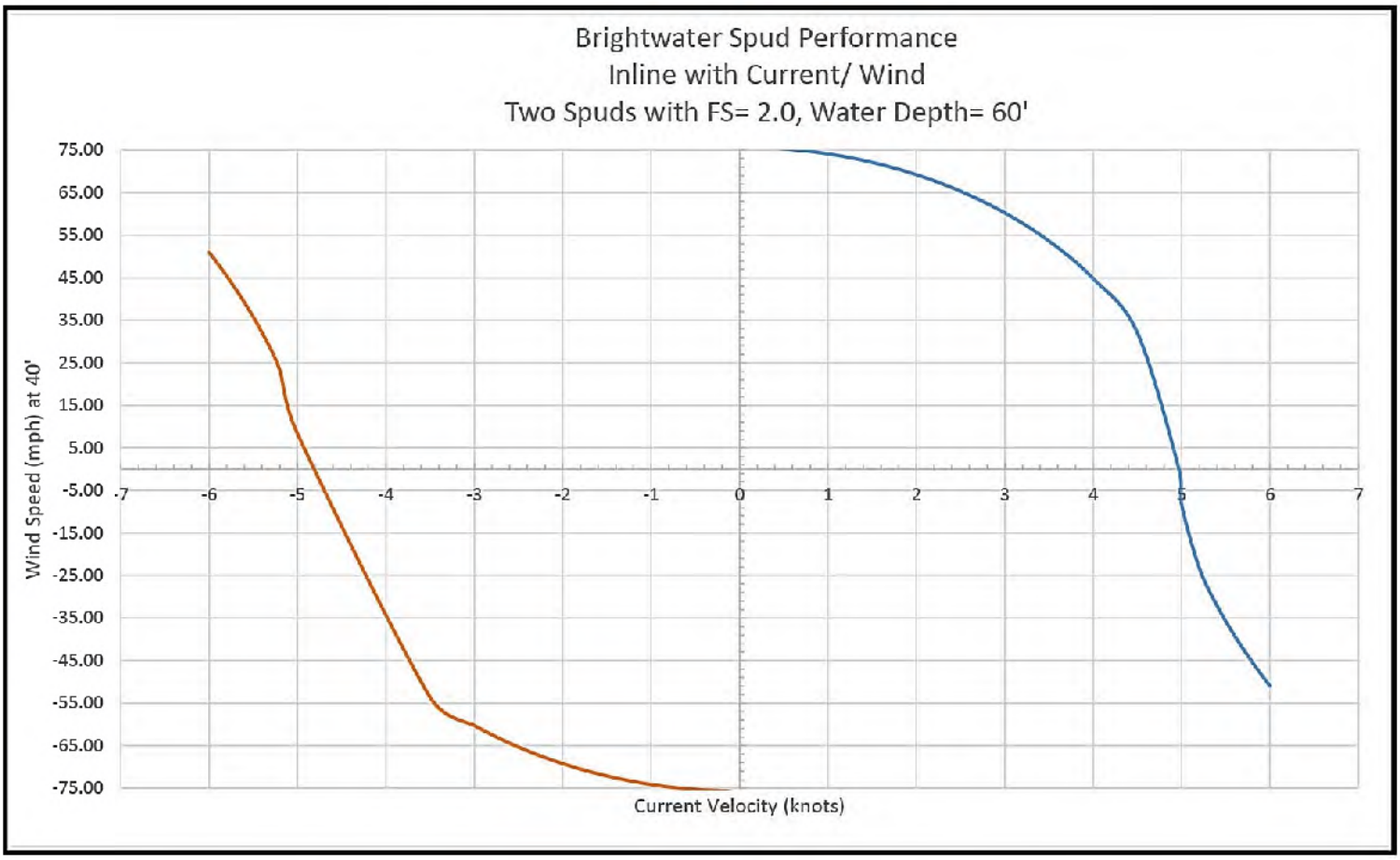


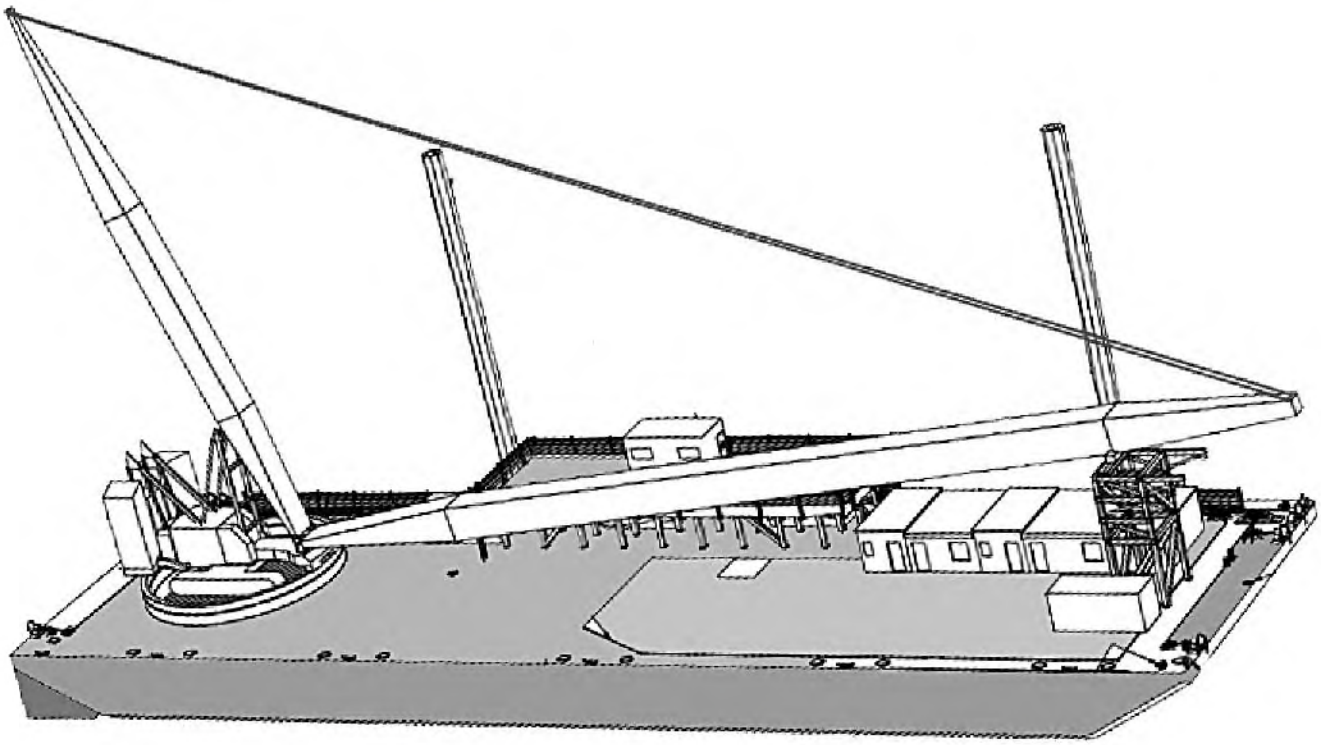
MOORING SYSTEM PERFORMANCE



9330 VANGUARD DR. SUITE 100 , ANCHORAGE, ALASKA 99507 WEBSITE: HTTP://TURNAGAIN.BUILD

SPUD PERFORMANCE





Swiftwater
230’ x 60’ x 15.5’ barge
250 ton Link-Belt LS-718 crane on deck

Diesel Pile Hammers

Technical Data

		D36-32	D46-32	D62-22	D80-23
Impact weight (piston)	kg lbs	3600 7,940	4600 10,140	6200 13,640	8000 17,600
Energy per blow max. - min.	kNm ft-lbs	123-56 90,720-41,300	166-71 122,435-52,370	224-107 165,215-78,920	288-171 212,420-126,125
Number of blows	min-1	36-53	35-53	35-50	35-45
Suitable for driving piles (depending on soil and pile)	t US tons	2,5-12 2.2-13.2	3-16 3.3-17.6	4-30 4.4-33.1	6-60 6.6-66.1
Consumption					
Diesel oil	l/h gal/h	11,5 2.53	16 3.52	20 4.4	25 5.5
Lubricant	l/h gal/h	1,5 0.33	1,5 0.33	2 0.44	2,6 0.57
Tank capacity					
Diesel oil tank	l gal	89 23.5	89 23.5	98 25.9	155 40.9
Lube tank	l gal	17 4.5	17 4.5	31,5 8.3	32 8.5
Max. rope diameter for deflector sheave of tripping device (* reeved twice)	mm in	38 1.5	38 1.5	38 1.5	30* 1.2*
Max. inclined pile driving without / with extension		1:5 / 1:1	1:5 / 1:1	1:2 / 1:1	1:5 / 1:2
Weight					
Diesel pile hammer	kg lbs	8200 18,060	9300 20,485	12250 26,950	16905 37,190
Tripping device	kg lbs	450 992	450 992	450 992	750 1,650

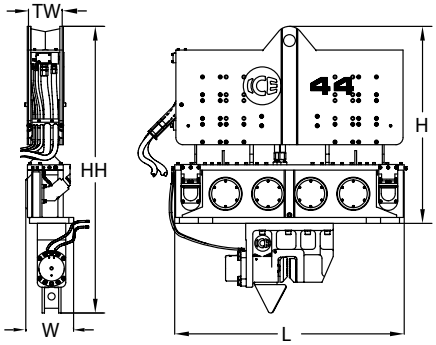
Technical Data

		D100-13	D150-42	D200-42
Impact weight (piston)	kg lbs	10000 22,000	15000 33,000	20000 44,000
Energy per blow max. - min.	kNm ft-lbs	360-214 265,520-157,840	512-329 377,630-242,660	682-436 503,036-321,580
Number of blows	min-1	35-45	36-45	36-45
Suitable for driving piles (depending on soil and pile)	t US tons	7-100 7.7-110.2	12-160 13.2-176.4	14-250 15.4-275.6
Consumption				
Diesel oil	l/h gal/h	30 6.6	50 11	60 13.2
Lubricant	l/h gal/h	2,6 0.57	4,8 1	5,8 1.3
Tank capacity				
Diesel oil tank	l gal	155 40.9	310 81.9	430 113.6
Lube tank	l gal	32 8.5	45 11.9	80 21.1
Max. rope diameter for deflector sheave of tripping device (* reeved twice)	mm in	30* 1.2*	36* 1.4*	36* 1.4*
Max. inclined pile driving without / with extension		1:5 / 1:2	1:5 / 1:2	1:5 / 1:3
Weight				
Diesel pile hammer	kg lbs	20720 45,585	28450 62,590	51800 113,960
Tripping device	kg lbs	750 1,650	1850 4,070	1850 4,070

ICE® Model 44B Hydraulic Vibratory Driver/ Extractor with Model 595G Power Unit

WWW.ICEUSA.COM
888-ICE-USA1

Highest frequency (1800 vpm) and driving force (207 tons, 1844 kN) in its class.
595HP (444 kW) CAT C15 Tier 3 (Stage IIIA) engine meets all EPA & EU emission regulations.
Up to 100 tons (900 kN) line pull for extraction.



ICE Model 44B Vibratory Pile Hammer				
Eccentric moment	4400	in-lbs	51	kg-m
Maximum frequency	1800	vpm		
Driving Force	207	tons	1845	kN
Centrifugal force	202	tons	1790	kN
Amplitude (free w/o clamp)	1.1	in	28	mm
Standard line pull for extracting	65	tons	600	kN
Maximum line pull for extracting	100	tons	900	kN
Weight (no clamp or hoses)	12450	lbs	5650	kg
Non-vibrating Weight	4560	lbs	2070	kg
Height without clamp (H)	84	in	2135	mm
Length (L)	98	in	2485	mm
Width (W)	21	in	530	mm
Throat width (TW)	14.25	in	362	mm
Hydraulic hose length	150	ft	45	m
Hydraulic hose weight	1555	lbs	705	kg
Height with sheeting clamp (HH)	122	in	3095	mm
Weight with sheeting clamp & 1/2 hoses	15430	lbs	7000	kg
Height with beam & caisson clamps	115	in	2915	mm
Weight with beam, caisson clamps & 1/2 hoses	19345	lbs	8775	kg

ICE Model 595G Power Unit				
Engine	Caterpillar C15			
EPA/EU Emissions rating	EPA	Flex	EU	Flex
Power	595	HP	444	kW
Operating speed	1800	rpm	1800	rpm
Maximum motors pressure	5500	psi	380	bar
Motors flow (no load)	160	gpm	610	lpm
Clamp pressure	4500	psi	310	bar
Clamp flow	6	gpm	20	lpm
Weight (w/ full fluid & 1/2 fuel)	16350	lbs	7420	kg
Length	160	in	4040	mm
Width	73	in	1855	mm
Height	100	in	2540	mm
Hydraulic oil capacity	430	gal	1630	liters
Fuel Capacity	150	gal	570	liters

INTERNATIONAL CONSTRUCTION EQUIPMENT 40 1974 - 2014 YEARS OF EXCELLENCE

DESIGNED AND MANUFACTURED IN USA BY ICE®
WORLD LEADER IN COST-EFFECTIVE FOUNDATION EQUIPMENT SINCE 1974.

APE Model 200-6 Vibratory Driver Extractor

The Worlds Largest Provider of Foundation Construction Equipment

SPECIFICATIONS	DATA
Eccentric Moment	6,600 in-lbs (76.04 kgm)
Drive Force	255 tons (2,270 kN)
Frequency Maximum (VPM)	0 - 1,650 vpm
Max Line Pull	185 tons (1,646 kN)
Bare Hammer Weight w/o Clamp	18,900 lbs (8,573 kg)
Throat Width	14.75 in (37 cm)
Length	140.00 in (356 cm)
Height w/o Clamp	75.00 in (191 cm)

APE Model 765 Power Unit

SPECIFICATIONS	DATA
Engine Type	Caterpillar C18 Tier II
Horse Power	765 HP (563 kW)
Drive Pressure	0 - 4,500 psi (310 bar)
Drive Flow	220 gpm (833 lpm)
Clamp Pressure	4,800 psi (69,618 bar)
Clamp Flow	10 gpm (3 lpm)
Engine Speed	2,100 rpm
Weight	20,000 lbs (9,072 kg)
Length	152 in (385 cm)
Width	82 in (208 cm)
Height	94 in (239 cm)
Hydraulic Reservoir	450 gal (1,703 L)
Fuel Capacity	150 gal (568 L)

Specifications may vary due to site conditions, specific hammer conditions or product set up.
Specifications may change without notice.
Consult the factory for details on any specific product (800) 248-8498.

WWW.APEVIBRO.COM
(800) 248-8498
webmaster@apevibro.com

349
Hydraulic Excavator

Technical Specifications

Configurations and features may vary by region. Please consult your Cat® dealer for availability in your area.

Table of Contents

特定特殊自動車
軽油
排出ガス2014年基準
適合車
環境省・経済産業省・国土交通省

オフロード法２０１４年
基準適合

349 Hydraulic Excavator Specifications

Engine

Engine Model	Cat® C13	
Net Power – ISO 9249	316 kW	424 hp
Engine Power – ISO 14396	317 kW	425 hp
Bore	130 mm	5 in
Stroke	157 mm	6 in
Displacement	12.5 L	763 in³

- Meets Japan 2014 (Tier 4 Final) emission standards.
- Recommended for use up to 4500 m (14,764 ft) altitude with engine power derate above 2600 m (8,530 ft).
- Net power is tested per ISO 9249. Standards in effect at the time of manufacture.
- Net power advertised is the power available at the flywheel when the engine is equipped with fan, air intake system, exhaust system and alternator.
- Rated speed at 1,800 rpm.

Engine rpm

Operation	1,650 rpm
Travel	1,800 rpm

Swing Mechanism

Swing Speed	8.44 rpm	
Maximum Swing Torque	187 kN·m	138,000 lbf-ft

Weights

Operating Weight	47 700 kg	105,300 lb

- Reach boom, R3.35TB (11'0") stick, HD 1.90 m³ (2.48 yd³) bucket, 600 mm (24") double grouser shoes, 9.0 t (19,842 lb) counterweight.

Track

Track Shoes Width	750 mm	30 in
Track Shoes Width	600 mm	24 in
Number of Shoes (each side)	52	
Number of Track Rollers (each side)	9	
Number of Carrier Rollers (each side)	2	

Drive

Gradeability	35°/70%	
Maximum Travel Speed	4.8 km/h	3.0 mph
Maximum Drawbar Pull	335 kN	75,311 lbf

Hydraulic System

Main System – Maximum Flow – Implement	779 L/min (389 × 2 pumps)	206 gal/min (103 × 2 pumps)
Maximum Pressure – Equipment – Implement	35 000 kPa	5,076 psi
Maximum Pressure – Travel	35 000 kPa	5,076 psi
Maximum Pressure – Swing	26 000 kPa	3,771 psi
Boom Cylinder – Bore	170 mm	7 in
Boom Cylinder – Stroke	1524 mm	60 in
Stick Cylinder – Bore	190 mm	7 in
Stick Cylinder – Stroke	1758 mm	69 in
TB Bucket Cylinder – Bore	160 mm	6 in
TB Bucket Cylinder – Stroke	1356 mm	53 in

Service Refill Capacities

Fuel Tank Capacity	715 L	188.9 gal
Cooling System	52 L	13.7 gal
Engine Oil (with filter)	40 L	10.6 gal
Swing Drive	10.5 L	2.8 gal
Final Drive (each)	15 L	4.0 gal
Hydraulic System (including tank)	550 L	145.3 gal
Hydraulic Tank (including suction pipe)	217 L	57.3 gal
DEF Tank	46 L	12.2 gal

Standards

Brakes	ISO 10265:2008
Cab/ROPS	ISO 12117-2:2008

Sound Performance

ISO 6395:2008 (external)	108 dB(A)
ISO 6396:2008 (inside cab)	72 dB(A)

- Hearing protection may be needed when operating with an open operator station and cab (when not properly maintained or doors/windows open) for extended periods or in a noisy environment.

Operating Weights and Ground Pressures

	600 mm (24") Double Grouser Shoes				750 mm (30") Triple Grouser Shoes			
	Weight		Ground Pressure		Weight		Ground Pressure	
	kg	lb	kPa	psi	kg	lb	kPa	psi
Base Frame with Track Rollers and Carrier Rollers								
9.0 t (19,842 lb) Counterweight + Long Undercarriage Base Machine								
Reach Boom + Reach 3.35 m (11'0") Stick + 1.90 m³ (2.48 yd³) HD Bucket	47 700	105 300	88.9	12.9	48 500	106,900	90.4	13.1

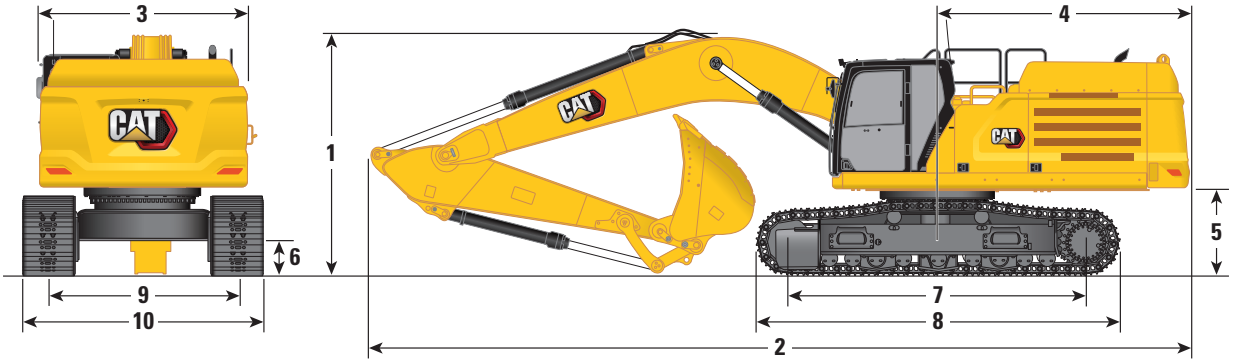
All operating weights include a 90% fuel tank with 75 kg (165 lb) operator.

Major Component Weights

	kg	lb
Base machine with 9.0 t (19,842 lb) counterweight, standard swing frame, base frame with single flange track rollers and carrier rollers	32 520	71,700
Track Shoes:		
600 mm (24") Width, 15.5 mm (0.6") Thick, Double Grouser Track Shoes	5410	11,920
750 mm (30") Width, 15.5 mm (0.6") Thick, Triple Grouser Track Shoes	6040	13,310
Two Boom Cylinders	1760	3,880
Weight of 90% Fuel Tank and 75 kg (165 lb) Operator	630	1,380
Counterweight:		
9.0 t Counterweight	9000	19,842
Swing Frame:		
Standard Swing Frame	4070	8,980
Long Undercarriages:		
Base Frame with Single Flange Track Rollers and Carrier Rollers	6890	15,190
Base Frame with Double Flange Track Rollers and Carrier Rollers	6940	15,300
Boom (including lines, pins, stick cylinder):		
Reach Boom 6.9 m (22'8")	4390	9,680
Stick (including lines, pins, bucket cylinder, bucket linkage):		
Reach Stick R3.35TB (11'0")	2510	5,540
Buckets (without linkage):		
1.90 m^3 (2.48 yd^3) HD	2280	5,020

Dimensions

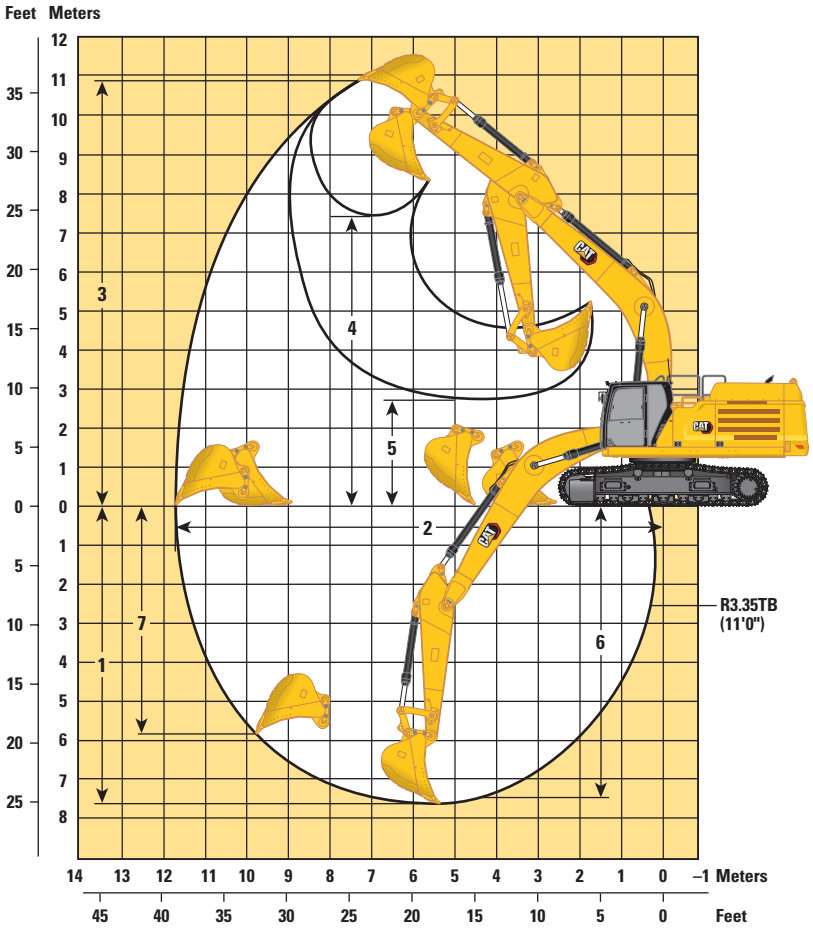
All dimensions are approximate and may vary depending on bucket selection.



Boom Option	Reach Boom 6.9 m (22'8")	
Stick Option	**Reach Stick R3.35TB (11'0")**	
1 Machine Height:		
Cab Height	3230 mm	10.6 ft
FOGS Height	3370 mm	11.1 ft
Handrails Height	3370 mm	11.1 ft
With Boom/Stick/Bucket Installed	3680 mm	12.1 ft
With Boom/Stick Installed	3550 mm	11.6 ft
With Boom Installed	3100 mm	10.2 ft
With Boom/Stick/Bucket Installed (with Auxiliary Lines)	3680 mm	12.1 ft
With Boom/Stick Installed (with Auxiliary Lines)	3550 mm	11.6 ft
With Boom Installed (with Auxiliary Lines)	3130 mm	10.3 ft
2 Machine Length:		
With Boom/Stick/Bucket Installed	11 920 mm	39.1 ft
With Boom/Stick Installed	11 880 mm	39.0 ft
With Boom Installed	10 650 mm	34.9 ft
With Boom/Stick/Bucket Installed (with Auxiliary Lines)	11 920 mm	39.1 ft
With Boom/Stick Installed (with Auxiliary Lines)	11 880 mm	39.0 ft
With Boom Installed (with Auxiliary Lines)	10 650 mm	34.9 ft
3 Upperframe Width without Walkways	3020 mm	9.9 ft
4 Tail Swing Radius	3760 mm	12.3 ft
5 Counterweight Clearance without Shoe Lug	1280 mm	4.2 ft
6 Ground Clearance without Shoe Lug	475 mm	1.6 ft
7 Length to Center of Rollers	4360 mm	14.3 ft
8 Track Length	5370 mm	17.6 ft
9 Track Gauge	2740 mm	9.0 ft
10 Undercarriage Width:		
600 mm (24") Shoes	3530 mm	11.6 ft
750 mm (30") Shoes	3530 mm	11.6 ft
Bucket Type	Heavy Duty	
Bucket Capacity	1.90 m^3	2.48 yd^3
Bucket Tip Radius	1891 mm	6.2 ft

Working Ranges and Forces

All dimensions are approximate and may vary depending on bucket selection.



Boom Option	Reach Boom 6.9 m (22'8")	
Stick Option	**Reach Stick R3.35TB (11'0")**	
1 Maximum Digging Depth	7660 mm	25.1 ft
2 Maximum Reach at Ground Line	11 730 mm	38.5 ft
3 Maximum Cutting Height	10 820 mm	35.5 ft
4 Maximum Loading Height	7430 mm	24.4 ft
5 Minimum Loading Height	2750 mm	9.0 ft
6 Maximum Depth Cut for 2440 mm (8 ft) Level Bottom	7520 mm	24.7 ft
7 Maximum Vertical Wall Digging Depth	5830 mm	19.1 ft
Bucket Digging Force (ISO)	268 kN	60,250 lbf
Stick Digging Force (ISO)	199 kN	44,740 lbf
Bucket Type	Heavy Duty	
Bucket Capacity	1.90 m^3	2.48 yd^3
Bucket Tip Radius	1891 mm	6.2 ft

Bucket Specifications and Compatibility

		Width		Capacity		Weight		Fill	Fixed Gauge Long Undercarriage 9.0 t (19,842 lb) Counterweight Reach Boom 6.9 m (22'8")
	Linkage	mm	in	m^3	yd^3	kg	lb	%	R3.35 (11'0")
Pin-On (No Quick Coupler)									
General Duty	TB	1500	59	1.90	2.48	1857	4,094	100	●
	TB	1600	63	2.00	2.62	1904	4,197	100	●
Heavy Duty	TB	1550	61	1.90	2.48	2275	5,015	100	●
	TB	1700	67	2.10	2.75	2415	5,324	100	●
Severe Duty	TB	1700	67	2.41	3.15	2496	5,502	90	◉
	TB	1850	74	2.69	3.52	2696	5,943	90	⊖
Maximum load with pin-on (payload + bucket)								kg	6690
								lb	14,749
With Cat Pin Grabber Coupler									
General Duty	TB	1500	59	1.90	2.48	1857	4,094	100	◉
	TB	1600	63	2.00	2.62	1904	4,197	100	◉
Heavy Duty	TB	1550	61	1.90	2.48	2275	5,015	100	◉
	TB	1700	67	2.10	2.75	2415	5,324	100	⊖
Severe Duty	TB	1700	67	2.41	3.15	2496	5,502	90	⊖
	TB	1850	74	2.69	3.52	2696	5,943	90	○
Maximum load with coupler (payload + bucket)								kg	5637
								lb	12,428

The above loads are in compliance with hydraulic excavator standard EN474-5:2006 + A3:2013, they do not exceed 87% of hydraulic lifting capacity or 75% of tipping capacity with front linkage fully extended at ground line with bucket curled.

Capacity based on ISO 7451:2007.

Bucket weight with Long tips.

Maximum Material Density:

- ● 2100 kg/m^3 (3,500 lb/yd^3)
- ◉ 1800 kg/m^3 (3,000 lb/yd^3)
- ⊖ 1500 kg/m^3 (2,500 lb/yd^3)
- ○ 1200 kg/m^3 (2,000 lb/yd^3)

Caterpillar recommends using appropriate work tools to maximize the value customers receive from our products. Use of work tools, including buckets, which are outside of Caterpillar's recommendations or specifications for weight, dimensions, flows, pressures, etc. may result in less-than-optimal performance, including but not limited to reductions in production, stability, reliability, and component durability. Improper use of a work tool resulting in sweeping, prying, twisting and/or catching of heavy loads will reduce the life of the boom and stick.

Attachments Offering Guide

Not all Attachments are available in all regions. Consult your Cat dealer for configurations available in your region.

✓ Match

† Allowed usage on machine less than 50%

PIN-ON ATTACHMENTS		
Undercarriage		**L**
Counterweight		**9.0 t (19,842 lb)**
Boom Type		**Reach HD**
Stick Length		**3.35 m HD (11'0")**
Hydraulic Hammers	H160 S	✓
	H180 S	✓
Mobile Scrap and Demolition Shears	S3050	✓
Pulverizers	P235	✓

CAT PIN GRABBER ATTACHMENTS		
Undercarriage		**L**
Counterweight		**9.0 t (19,842 lb)**
Boom Type		**Reach HD**
Stick Length		**3.35 m HD (11'0")**
Hydraulic Hammers	H160 S	✓
	H180 S	✓†
Pulverizers	P235	✓

BOOM-MOUNT ATTACHMENTS		
Undercarriage		**L**
Counterweight		**9.0 t (19,842 lb)**
Boom Type		**Reach HD**
Stick Length		**3.35 m HD (11'0")**
Mobile Scrap and Demolition Shears	S2090	✓
	S3070	✓
	S3090	✓

Standard and Optional Equipment

Standard and optional equipment may vary. Consult your Cat dealer for details.

	Standard	Optional
ENGINE		
Cold start block heaters		✓
Three selectable modes: Power, Smart, Eco	✓	
Automatic engine speed control	✓	
Up to 4500 m (14,764 ft) altitude capability	✓	
52° C (126° F) high-ambient cooling capacity	✓	
Hydraulic reverse fan		✓
–18° C (0° F) cold start capability	✓	
–32° C (–25° F) cold start capability		✓
Double element air filter with integrated precleaner	✓	
115 amp alternator	✓	
Single plane three horizontal cooling system	✓	
Dual stage 5.5 micron primary filter and 4.4 micron 2nd/3rd filters	✓	
Secure start with PIN code	✓	
HYDRAULIC SYSTEM		
Boom and stick regeneration circuit	✓	
Electronic main control valve	✓	
Automatic hydraulic oil warm up	✓	
Automatic swing parking brake	✓	
High performance hydraulic return filter	✓	
Two speed travel	✓	
Bio hydraulic oil capability	✓	
Combined two-way auxiliary circuit		✓
Medium-pressure auxiliary circuit		✓
Advanced Tool Control		✓

	Standard	Optional
UNDERCARRIAGE AND STRUCTURES		
Towing eye on base frame	✓	
Full-length track guiding guards		✓
Segmented track guiding guards		✓
Swivel guard	✓	
Grease lubricated track	✓	
9.0 t (19,842 lb) counterweight	✓	
600 mm (24") double grouser track shoes		✓
750 mm (30") triple grouser track shoes		✓
BOOM, STICK AND LINKAGE		
6.9 m (22'8") Reach boom	✓	
3.35 m (11'0") stick	✓	
Bucket Linkage, TB family without lifting eye, Cat GRADE	✓	
ELECTRICAL SYSTEM		
Maintenance-free 1,000 CCA batteries (×4)	✓	
Centralized electrical disconnect switch	✓	
LED chassis light, LH and RH boom lights, cab lights	✓	
Premium surround lighting package		✓

(continued on next page)

349 Standard and Optional Equipment

Standard and Optional Equipment *(continued)*

Standard and optional equipment may vary. Consult your Cat dealer for details.

	Standard	Optional
CAT TECHNOLOGY		
Cat Product Link™	✓	
Work tool recognition	✓	
Work tool tracking*	✓	
Cat GRADE with 2D	✓	
Cat GRADE with Advanced 2D		✓
Cat GRADE with 3D connectivity: – Virtual Reference Station** – Internet Base Service Station** – Trimble Connected Community**		✓
Cat Assist: – Boom Assist – Bucket Assist – Swing Assist – Grade Assist – Lift Assist	✓	
Cat Payload: – Static Weigh – Auto Calibration – Payload/Cycle Information – USB reporting capability	✓	
E-Fence: – E-ceiling – E-floor – E-swing – E-wall – E-cab avoidance	✓	
Auto hammer stop	✓	
Remote Services capability	✓	

*Paired with PL161 attachment locator.

**Subscription required.

	Standard	Optional
SERVICE AND MAINTENANCE		
Grouped location of engine oil and fuel filters	✓	
Scheduled Oil Sampling (S·O·S℠) ports	✓	
SAFETY AND SECURITY		
Caterpillar One Key security system	✓	
Lockable external tool/storage box	✓	
Lockable door, fuel, and hydraulic tank locks	✓	
Lockable fuel drain compartment	✓	
Service platform with anti-skid plate and recessed bolts	✓	
RH handrail and hand hold (ISO 2867:2011 compliant)	✓	
Standard visibility mirror package	✓	
Signaling/warning horn	✓	
Ground-level secondary engine shutoff switch	✓	
Rearview camera	✓	
360° visibility		✓

349 Attachments

Dealer Installed Kit and Attachments

Attachments may vary. Consult your Cat dealer for details.

CAB

- Radial lower wiper
- LH/RH electrical pedal for tool control

GUARDS

- Falling object guard system (not compatible with cab light cover, rain protector)
- Mesh guard full front (not compatible with cab light cover, rain protector)
- Mesh guard lower half front
- Rain protector for front windshield with cab light cover

SAFETY AND SECURITY

- Bluetooth® key fob

Cab Options

	Deluxe	Premium
ROPS, standard sound suppression	●	X
ROPS, advanced sound suppression	X	●
High-resolution 254 mm (10") LCD touchscreen monitor	●	●
High-resolution 254 mm (10") LCD touchscreen monitor + additional monitor (only for use with 360° visibility and Cat GRADE with Advanced 2D or Cat GRADE with 3D)	○	○
Automatic bi-level air conditioner	●	●
Jog dial and shortcut keys for monitor control	●	●
Keyless push-to-start engine control	●	●
Height-adjustable console, infinite with no tool	●	●
Heated seat with air-adjustable suspension	●	X
Heated and cooled seat with automatic adjustable suspension	X	●
51 mm (2") seat belt	●	●
Tilt-up left-side console	●	●
Bluetooth integrated radio with USB ports	●	●
12V DC outlets (×2)	●	●
Document storage	●	●
Cup and bottle holders	●	●
Openable two-piece front window	●	○
Radial wiper with washer	●	X
Parallel wiper with washer	X	●
Openable polycarbonate skylight hatch	●	○
LED dome and lower interior lights	●	●
Roller rear sunscreen	○	●

● Standard

○ Optional

X Not available

For more complete information on Cat products, dealer services, and industry solutions, visit us on the web at **www.cat.com**

Materials and specifications are subject to change without notice. Featured machines in photos may include additional equipment. See your Cat dealer for available options.

Based on the Labor, Safety and Health Laws in Japan, employer of small construction equipment are required to provide specific training for all operators on machines with ship weight less than 3 metric ton. For machines greater than 3 metric ton, operator needs to obtain operator license certification from a Government approved registered training school.

AEXQ2491-01 (09-2020)
Replaces AEXQ2491
Build Number: 07C
(Japan)

PRODUCT SPECIFICATIONS FOR CS64B

Save this as your preferred unit of measurement *clear*

WEIGHTS

Operating Weight - With Cab	26569 lb
Weight - Drum with Cab	15690 lb

OPERATING SPECIFICATIONS

Compaction Width	84 in
Turning Radius - Inside Drum Edge	12.08 ft
Ground Clearance	17.4 in
Static Linear Load - With Cab	186.8 lb/in
Travel Speed - Maximum	6.8 mile/h

ENGINE

Gross Power	131 HP
Engine Model	Cat C4.4 with ACERT

DIMENSIONS

Overall Width	7.58 ft
Drum Diameter	60.4 in
Overall Length	19.17 ft
Height - With ROPS/FOPS or Cab	10.25 ft
Drum Width	84 in
Wheel Base	9.58 ft

VIBRATORY SYSTEM

Centrifugal Force - Minimum	29900 lb
Nominal Amplitude - High	0.075 in
Nominal Amplitude - Low	0.037 in
Centrifugal Force - Maximum	52600 lb
Variable Frequency Option Range	23.3 - 30.5 Hz (1400-1830 vpm)

Vibratory Frequency - Standard 30.5 Hz (1830 vpm)

TIRES

Tires 23.1 x 26

SERVICE REFILL CAPACITIES

Fuel Tank Capacity 64 gal (US)

CS64B STANDARD EQUIPMENT

NOTE

- Standard and optional equipment may vary. Consult your Cat dealer for details.

OPERATOR ENVIRONMENT

- Open Platform with Handrails/Guardrails,
- Floor Mat
- Vinyl Adjustable Pivoting Seat with Integrated Console and LCD Display
- Adjustable Tilting Steering Column with Integrated Cup Holders
- Seat Belt
- 12-volt Power Outlet
- Horn, Backup Alarm
- Smooth Drum
- Dual Amplitude, Single Frequency
- Dual Pod-Style Eccentric Weight Housings
- Auto-vibe Function
- Front Adjustable Steel Scraper

POWERTRAIN

- Cat C4.4 Diesel Engine
- Air Cleaner, Dual Element

- Eco-mode
- Dual Propel Pumps; One for Drum Drive, One for Rear Axle
- Fuel Filter, Water Separator, Priming Pump, Water Indicator
- Tilting Radiator/Hydraulic Oil Cooler
- Dual Braking System
- Two-speed Hydrostatic Transmission

ELECTRICAL

- 24 volt Electrical System
- 75 ampere Alternator
- 750 Cold-cranking Amps Battery Capacity

OTHER

- Product LinkTM
- Sight Gauges for Hydraulic Oil Level and Radiator Coolant Level
- SOS Sampling Valves: Engine Oil, Hydraulic Oil and Coolant

CS64B OPTIONAL EQUIPMENT

NOTE

- Standard and optional equipment may vary. Consult your Cat dealer for details.

OPERATOR ENVIRONMENT

- Steel Sun Canopy
- ROPS/FOPS Canopy
- ROPS/FOPS Cab with Climate Control
- Internal Rear View Mirror
- External Rear View Mirrors
- Sun Visor
- Cab Internal Roll-down Sun Screen
- Padfoot Shell Kit (oval or square pads available)
- Variable Frequency

- Dual Adjustable Steel Scrapers
- Dual Adjustable Polyurethane Scrapers

POWERTRAIN

- Transmission Guard

TECHNOLOGY SOLUTIONS

- Measure - Machine Drive Power and/or CMV
- Map - SBAS GNSS Mapping
- Connect - Machine to Machine Communication

OTHER

- Upgraded Halogen Light Package
- Rotating Beacon
- Fuel Fill Access Door

HL150M Dri-Prime® Pump

The Godwin Dri-Prime HL150M pump offers flow rates to 1650 USGPM and has the capability of discharge pressures to 219 psi.

The HL150M is able to automatically prime to 28' of suction lift from dry. Automatic or manual starting/stopping available through integral mounted control panel or optional wireless-remote access.

High discharge pressure, dry-running, and portability make the HL150M the perfect choice for mining, industrial and emergency fire backup applications.

Features and Benefits

- Simple maintenance normally limited to checking fluid levels and filters.
- Dri-Prime (continuously operated Venturi air ejector priming device) requiring no periodic adjustment or control. Optional automatic on-off control available on the priming system.
- Dry-running high pressure liquid bath mechanical seal with high abrasion resistant solid silicon carbide faces.
- Close-coupled centrifugal pump with Dri-Prime system coupled to a diesel engine or electric motor.
- All cast iron construction (stainless steel construction option available) with cast steel impeller.
- Also available in a critically silenced unit which reduces noise levels to less than 70dBA at 30'.
- Standard engine Caterpillar C7 (T3 Flex). Also available with John Deere 6068HFC94 (IT4).

Specifications

Suction connection	6" 150# ANSI B16.5
Delivery connection	6" 150# ANSI B16.5
Max capacity	1650 USGPM †
Max solids handling	1.4"
Max Impeller diameter	15.2"
Max operating temp	176°F*
Max working pressure	219 psi
Max suction pressure	87 psi
Max casing pressure	329 psi
Max operating speed	2400 rpm

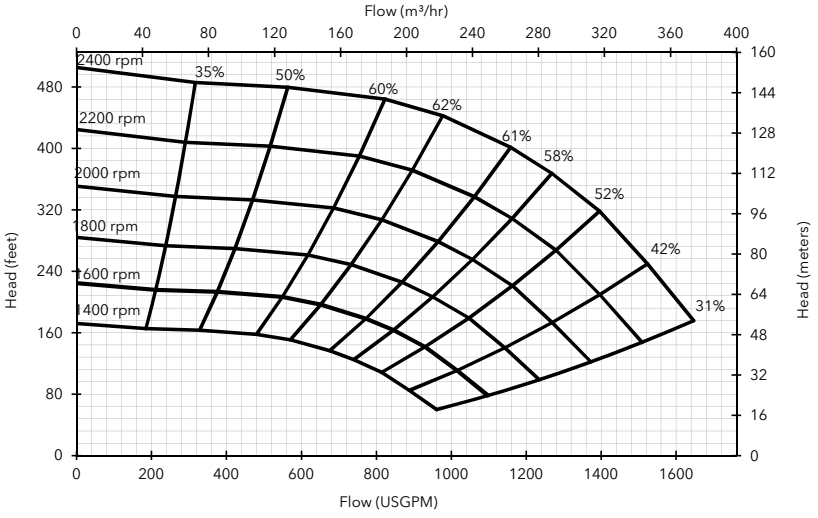
* Please contact our office for applications in excess of 176°F.

† Larger diameter pipes may be required for maximum flows.

Please contact the factory or office for further details. A typical picture of the pump is shown.
All information is approximate and for general guidance only.

godwin
a xylem brand

Performance Curve



Materials

Pump casing & suction cover	Cast iron BS EN 1561 - 1997
Wearplates	Cast iron BS EN 1561 - 1997
Pump Shaft	Carbon steel BS 970 - 1991 817M40T
Impeller	Cast Steel BS3100 A5 Hardness to 200 HB Brinell
Non-return valve body	Cast Iron
Mechanical seal	Silicon carbide face; Viton elastomers; Stainless steel body

Engine option 1

Caterpillar C7 (T3 Flex), 225 HP @ 2200 rpm

Impeller diameter 15.2"

Pump speed 2200 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	152	201	250	299	348
	Output (USGPM)				
10	1507	1399	1292	1157	969
15	1480	1372	1265	1130	942
20	1345	1345	1238	1076	861
25	1022	1006	996	969	807

Fuel capacity: 180 US Gal

Max Fuel consumption @ 2200 rpm: 12.2 US Gal/hr

Max Fuel consumption @ 2000 rpm: 12.2 US Gal/hr

Weight (Dry): 6,110 lbs

Weight (Wet): 7,410 lbs

Dimensions: (L) 147" x (W) 53" x (H) 84"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.

Engine option 2

John Deere 6068HFC94 (IT4), 225 HP @ 2400 rpm

Impeller diameter 15.2"

Pump speed 2400 rpm

Suction Lift Table

Total Suction Head (feet)	Total Delivery Head (feet)				
	183	241	299	358	416
	Output (USGPM)				
10	1644	1526	1409	1262	1057
15	1614	1497	1380	1233	1027
20	1468	1468	1350	1174	939
25	1115	1098	1086	1057	881

Fuel capacity: 180 US Gal

Max Fuel consumption @ 2400 rpm: 11.7 US Gal/hr

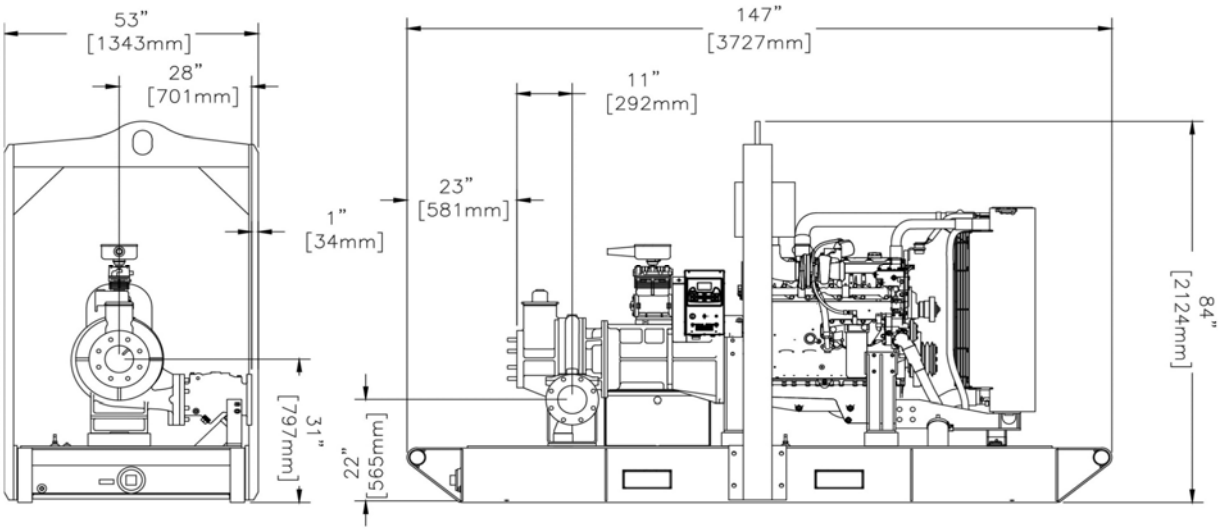
Max Fuel consumption @ 2000 rpm: 10.9 US Gal/hr

Weight (Dry): 6,150 lbs

Weight (Wet): 7,450 lbs

Dimensions: (L) 147" x (W) 53" x (H) 87"

Performance data provided in tables is based on water tests at sea level and 20°C ambient. All information is approximate and for general guidance only. Please contact the factory or office for further details.

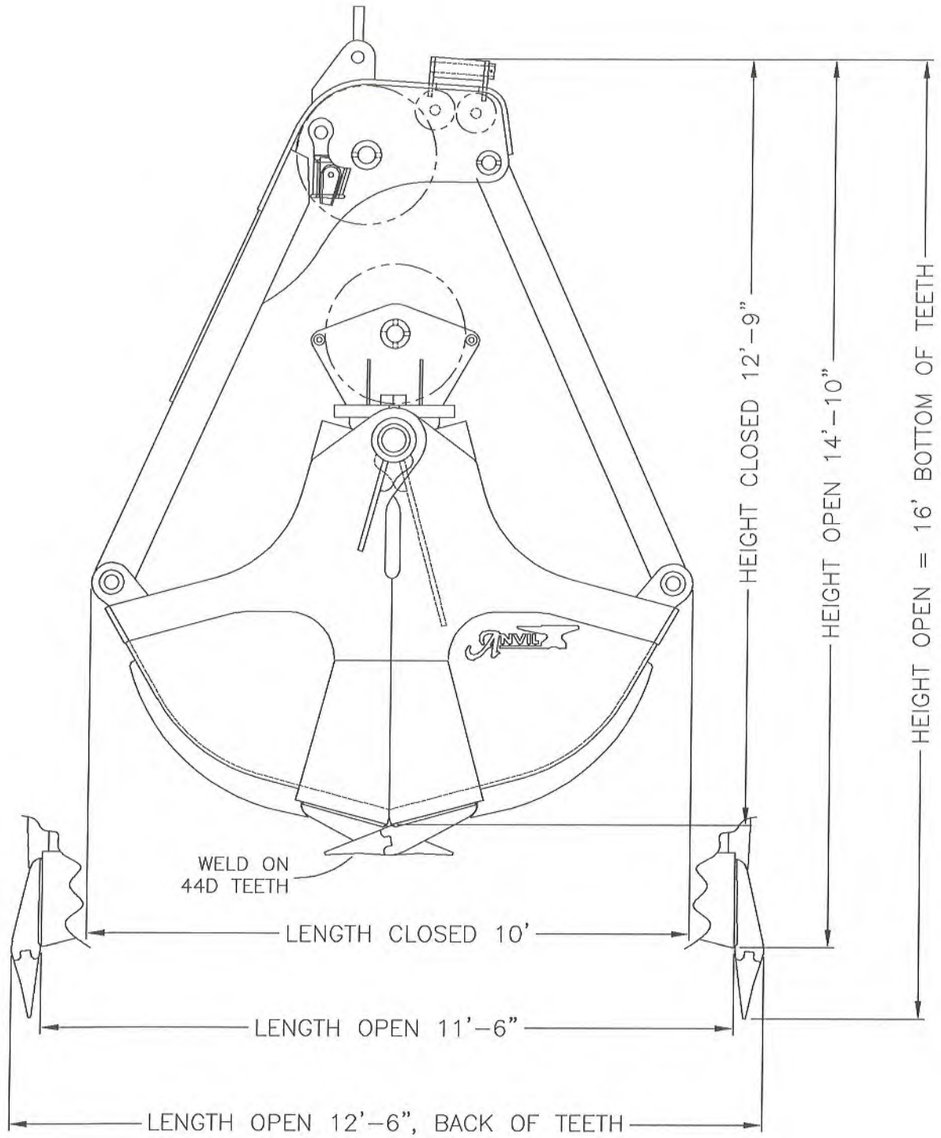


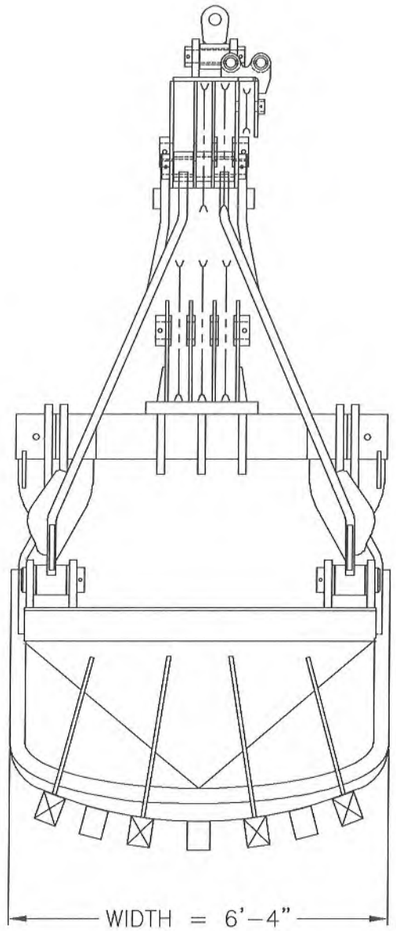
xylem
Let's Solve Water

84 Floodgate Road
Bridgeport, NJ 08014 USA
(856) 467-3636 . Fax (856) 467-4841
Email: sales@godwinpumps.com

Reference number : 95-1111-3000
Date of issue : February 26, 2014
Issue : 3

www.godwinpumps.com

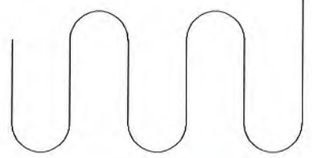




SPECIFICATIONS

	RATED CAPACITY	5	CU.YD.
	PLATE LINE	135	CU.FT.
1	WATER LEVEL	119.58	CU.FT.
	DECK AREA	83.63	SQ.FT.
	SHEAVE DIA. (QTY: 5)	28"	DIA.
	CABLE DIA.	1 1/8"	DIA.
	CABLE TO REEVE	84'	
1	CABLE TO CLOSE	40'	
	MAX. PARTS	6	
	WEIGHT ±3%	21,500	LBS.

REEVING LAYOUT



ANVIL ATTACHMENTS
Hawco • Pro-Line • Owen • Yaun • Williams • Drott

APPROVAL SIGNATURE: _____

APPROVAL DATE: _____

NO.	DATE	DESCRIPTION	INIT.
1	7/24/15	CORRECTED WL CAPACITY & CABLE TO CLOSE	NES

REVISION

TOLERANCES UNLESS SPECIFIED

FRACTIONAL	± 1/64
.00	± .01
.000	± .002
.0000	± .0005
ANGULAR	± 1/2°
FINISH	125

DWG. STD. – ASME Y14.5m–1994

MATERIAL

BY: LAM 7/21/15

CHK: 9/4/19

ANVIL ATTACHMENTS
Hawco • Pro-Line • Owen • Yaun • Williams • Drott

5 CY 2-ROPE HD ROUND NOSE

~ APPROVAL DRAWING ~

SCALE:	WEIGHT:			REV.	SHT. #
NTS		B	P15-097	1	1 OF 1

APPENDIX C:

Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

Turnagain Marine Construction

Alaska Railroad Corporation Seward Passenger Terminal Development Project
Resurrection Bay, Seward, Alaska

October 12, 2021

Prepared for:
Turnagain Marine Construction
8241 Dimond Hook Drive Unit A
Anchorage, Alaska 99507

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

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

CONTENTS

FIGURES

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

4MP	Marine Mammal Monitoring and Mitigation Plan
ARRC	Alaska Railroad Corporation
BA	Biological Assessment
DPS	distinct population segment
ESA	Endangered Species Act
HDPE	high-density polyethylene
IHA	Incidental Harassment Authorization
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
TMC	Turnagain Marine Construction
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

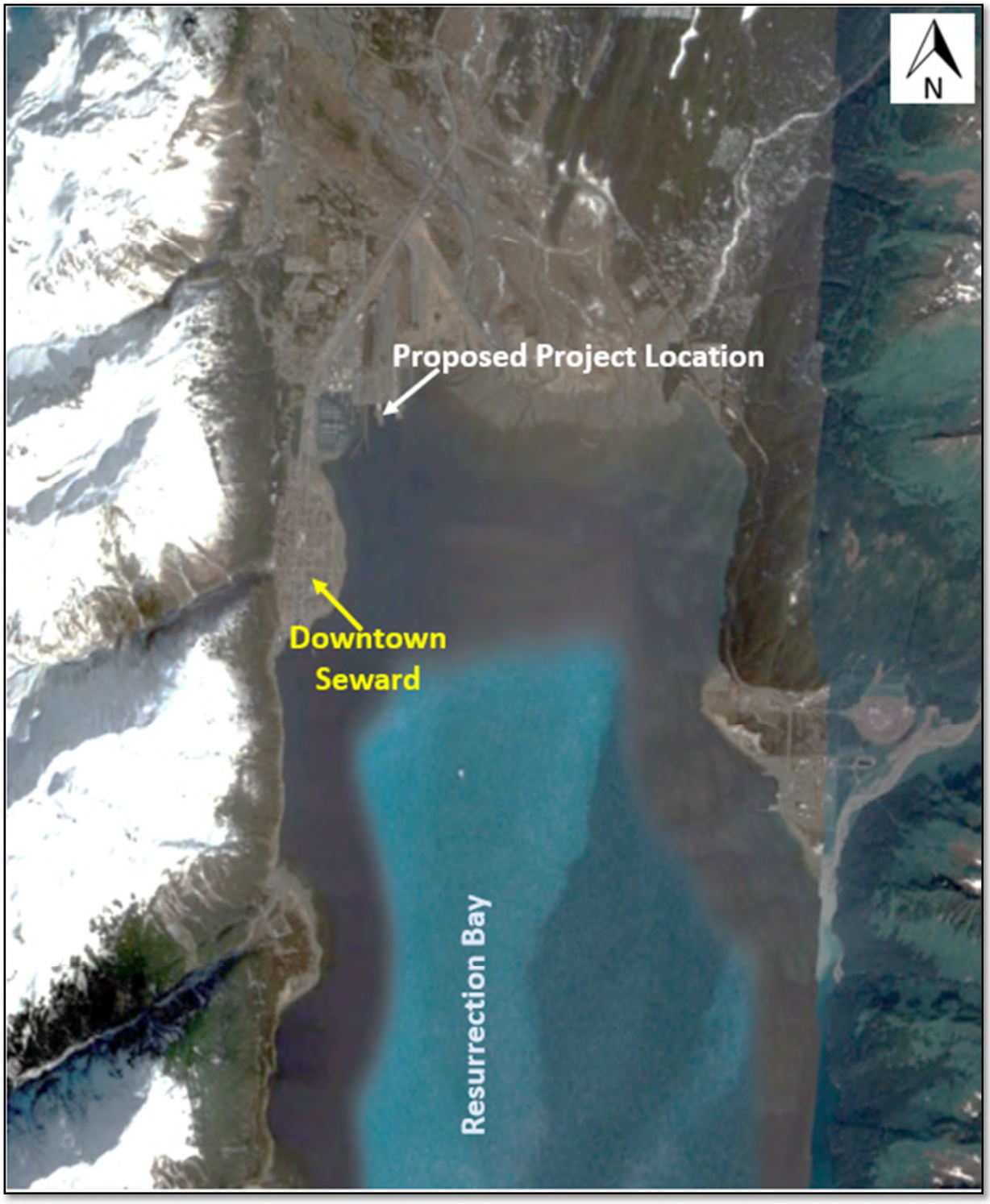
INTRODUCTION

Turnagain Marine Construction (TMC) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation/removal, dredging, and filling during construction at the Seward Passenger Terminal in Seward, Alaska (**Figure 1**). The project is in waters of the U.S., within the ranges of mammals listed in the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), and has the potential to generate noise that could exceed Level A and B harassment thresholds established by the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). This 4MP supports the Biological Assessment, in accordance with the ESA, and the Incidental Harassment Authorization (IHA) applications, in accordance with the MMPA (Section 101(a)(5)(D) permitting). Monitoring and shutdown zones will be implemented to minimize Level A and Level B harassment of marine mammals.

The goal of this 4MP is to ensure compliance with the ESA and the MMPA when implemented by the protected species observers (PSOs) at the project site. The project will comply with the terms and conditions outlined in the following requested permits and authorizations:

- U.S. Army Corp of Engineers (USACE) Permit POA-1965-00034, Resurrection Bay for activities in Waters of the U.S. (requested)
- NMFS Office of Protected Resources (OPR) Incidental Harassment Authorization (IHA) (requested)
- USFWS TBD

Figure 1. Seward Passenger Terminal Development Project Location



PROJECT DESCRIPTION

Under contract with The Alaska Railroad Corporation (ARRC), Turnagain Marine Construction proposes to replace and expand the Seward Passenger Terminal in Resurrection Bay in Seward, Alaska. Changes to the structure would include: the removal of some of the existing steel piles and the existing passenger terminal building; dredging; installation of new piles; and placement of fill to support the new 1,200-foot by 120-foot bulkhead dock. The proposed upgrades would provide safe harbor for cruise ships during visitor season and freight and non-cruise vessels in the off-season. Construction would begin in summer 2022 and continue into spring 2023. Pile installation activities, filling, and dredging are expected to occur for a total of approximately 3,038 hours over 299 days (not necessarily consecutive). The project would occur in and over waters of the United States. No blasting is proposed as part of this project. **Tables 1 and 2** provide a more detailed overview of the project components.

Table 1. Seward Passenger Terminal Development Project Dredging and Filling Summary

Project Component	Description				
	Soil Type	Area (acres)	Total Quantity (cubic yards)	Total Time (hours)	# of Days
Dredging (6 days)	Alluvial and Gravel	1.10	15,000	72	6
Fill (116 days)	Gravel	3.25	100,000	850	36
	Alluvial, Gravel, and recycled concrete		250,000	1900	80

Table 2. Seward Passenger Terminal Development Project Pile Size, Quantity, and Installation Method

Description	Project Component							
	Existing Pile Removal	Existing Pile Removal	Temp Pile Installation	Temp Pile Removal	Perm Pile Installation	Perm Pile Installation	Perm Pile Installation	Perm Pile Installation
Diameter of Steel Pile (inches)	14	20	30	30	14	36	42	Conc Panel
# of Piles	910	10	100	100	300	220	2	220
	Vibratory Pile Driving							
Total Quantity	910	10	100	100	300	220	2	
Max # Piles Vibrated per Day	30	3	6	6	30	5	2	
Vibratory Time per Pile	5 min	10 min	5 min	5 min	5 min	10 min	10 min	
Vibratory Time per Day	150 min	30 min	30 min	30 min	150 min	50 min	20 min	
Number of Days (124 days)	31	4	17	17	10	44	1	
Vibratory Time Total (157 hours)	76 hours	1.7 hours	8.5 hours	8.5 hours	25 hours	37 hours	20 min	
	Impact Pile Driving							
Total Quantity						220	2	
Max # Piles Impacted per Day						5	2	
# of Strikes per Pile						40	40	
Impact Time per Pile						1 min	1 min	
Impact Time per Day						5 min	2 min	
Number of Days (45 days)						44	1	
Impact Time Total (4 hours)						3.7 hours	2 min	
	Jetting							
Total Quantity								220
Max # of Panels Installed per Day								30
Time per Panel								15 min
Time per Day								7.5 hours
Number of Days (8 days)								8 days
Jetting Time Total (55 hours)								55 hours

SPECIES COVERED UNDER THE IHA

Fifteen marine mammal species are expected to occur within the project area. Take has been requested for the species known to frequent the area (**Table 3**).

The shutdown of work will occur if any other marine mammal enters the project area. Other species that may occur include Pacific white-sided dolphins (*Lagenorhynchus obliquidens)*, northern fur seals (*Callorhinus ursinus)*, and California sea lions (*Zalophus californianus)*.

Table 3. Species Known to Occur in Project Area and Requested Take Types and Numbers (may be updated following issuance of IHA)

Species	Level A	Level B
Gray Whale (*Eschrichtius robustus*)	0	54
Fin Whale (*Balaenoptera physalus*)	0	18
Humpback Whale (*Megaptera novaeangliae*)	0	124
Dall's Porpoise (*Phocoenoides dalli*)	0	270
Harbor Porpoise (*Phocoena phocoena*)	0	177
Killer Whale (*Orcinus orca*)	0	2,670
Steller Sea Lion (WDPS; *Eumatopia jubatus*)	0	354
Harbor Seal (*Phoca vitulina*)	540	2,124
Northern Sea Otter	TBD	TBD

MONITORING AND SHUTDOWN ZONES

The harassment zones will be monitored throughout the permitted in-water or over-water construction activity. The following mitigation measures will be taken based on species, in-water activity, and distance of the mammal from the project location:

- If a permitted marine mammal enters a monitoring zone, an exposure will be recorded and animal behaviors documented. Permitted construction activities would continue without cessation unless the animal approaches or enters the shutdown zone.
- If a marine mammal approaches or enters a Level A shutdown zone, all permitted construction activities will immediately halt until the marine mammal has left the shutdown zone or has not been sighted for 15 minutes (pinnipeds and small cetaceans) or 30 minutes (large cetaceans).
- If a non-permitted marine mammal approaches or enters a Level B harassment zone, all permitted construction activities will immediately halt until the marine mammal has left the shutdown zone or has not been sighted for 15 minutes (pinnipeds,small cetaceans, and otters) or 30 minutes (large cetaceans).
- If a harbor seal enters their Level A zone, but are not within the nominal 10-meter shutdown zone, a Level A exposure will be recorded and animal behaviors documented. However, permitted construction activities would continue without cessation unless the animal approaches or enters the 10-meter shutdown zone. See **Table 5** for an explanation of these zones.

- Takes, in the form of Level A or Level B harassment, of marine mammals other than permitted species are not authorized and will be avoided by shutting down construction activities before these species enter the Level B harassment zone.

Because species are impacted differently by noise, species-specific monitoring and shutdown zones have been calculated for this project. These monitoring and shutdown zones are shown in **Figures 2 and 3** and are summarized in **Tables 3 and 4**.

Monitoring Zones

Level B monitoring zones have been determined based on pile driving activity type. Level B monitoring zones represent areas where the sound pressure levels (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 instances of permitted marine mammal harassment will be documented. These Level B zones also allow PSOs to be aware of the presence of marine mammals as they near the shutdown zone and prepare for shutdowns if required.

Level B monitoring zones are presented in **Table 4** and **Figure 2** below.

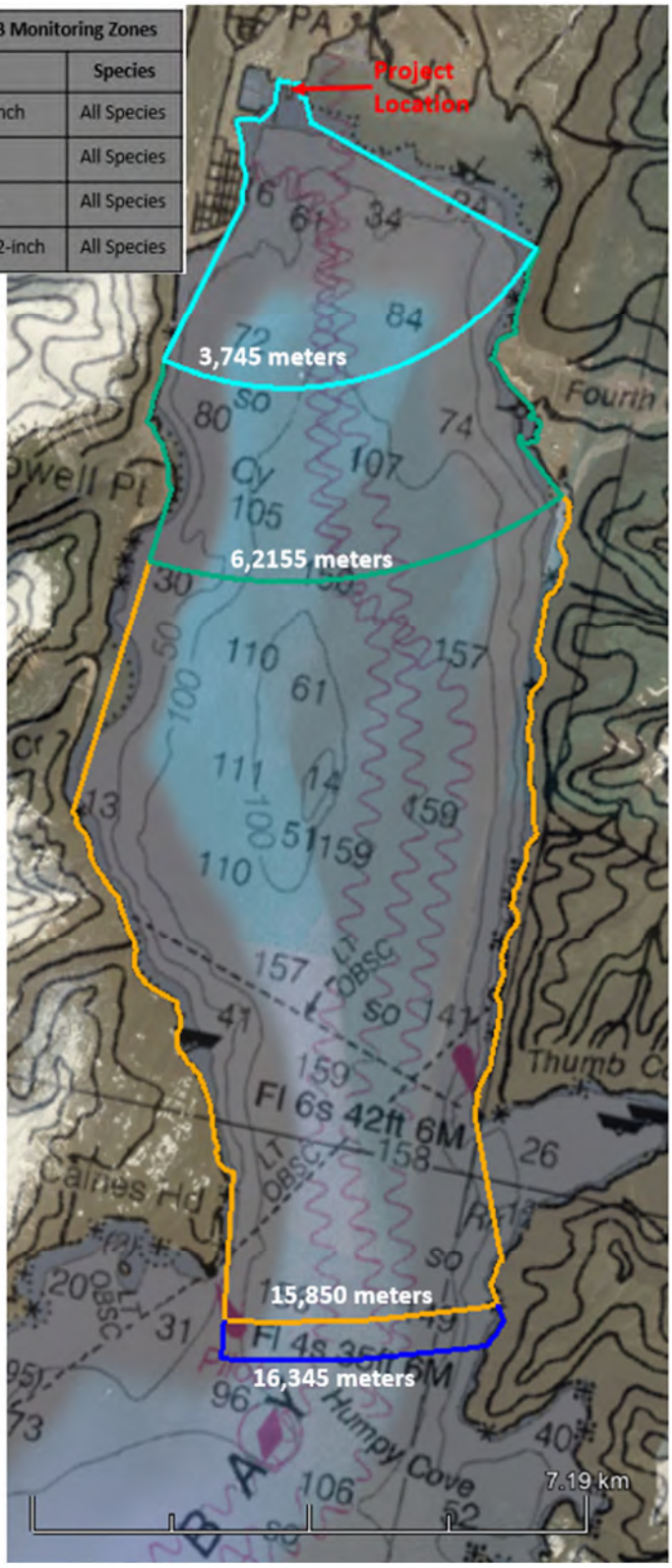
Table 4. Seward Passenger Terminal Development Project Level B Monitoring Zones

Source	NMFS-Jurisdiction Species Monitoring Zones (meters) [a]	Northern Sea Otter Monitoring Zones (meters)
Vibratory Pile Driving/Removal		
14-inch existing H-pile removal (910 piles; ~150 mins per day on 31 days)	15,850	TBD-May not be needed if no IHA and shutting down
14-inch existing H-pile installations (300 piles; ~150mins per day on 10 days)	15,850	TBD
20-inch existing steel removal (10 piles; ~30 mins per day on 4 days)	6,215	TBD
36-inch steel permanent installation (220 piles; ~50 mins per day on 44 days)	16,345	TBD
42-inch steel permanent installation (2 piles; ~20 mins per day on 1 day)	16,345	TBD
Impact Pile Driving		
36-inch steel permanent installation (220 piles; ~5 mins per day on 44 days)	3,745	TBD
42-inch steel permanent installation (2 piles; ~2 mins per day on 1 day)	3,745	TBD

[a] *These monitoring zones apply to all marine mammal species under NMFS jurisdiction with authorized level B take.*

Figure 2. Seward Passenger Terminal Development Project Monitoring Zones

Seward Passenger Terminal Expansion Level B Monitoring Zones		
Distance	**Activity**	**Species**
3,745 meters	Impact: 36-inch and 42-inch	All Species
6,215 meters	Vibratory: 20-inch	All Species
15,850 meters	Vibratory: 14-inch H-pile	All Species
16,345 meters	Vibratory: 36-inch and 42-inch	All Species



Shutdown Zones

Shutdown zones are defined as areas where SPLs meet or exceed the level that would cause auditory injury to marine mammals. Shutdown zones are intended to protect marine mammals from auditory injury. Pile driving activity would be halted upon the sighting of a marine mammal that is in (or anticipated to enter) the shutdown zone.

Harbor seals can be difficult to see at great distances due to their small size, and their Level A harassment zone during impact pile driving is large; therefore, it may be difficult to observe whether harbor seals are present in their Level A harassment zone. Level A take has been requested for harbor seals for those instances when they occur within the Level A harassment zone, but remain outside of the shutdown zone or when they occur within the shutdown zone and were not recorded in time for the project to be shut down.

Further, there will be a nominal 10-meter shutdown zone for construction activity where acoustic injury is not the primary concern. 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); and removal of the pile from the water column/substrate via a crane (i.e., deadpull). For these activities, monitoring would take place starting 15 minutes before initiation and ending when the action is complete. This can be monitored by the vessel operator when a PSO is not present. Radial distances to Level A shutdown zone boundaries are defined in **Table 5** and shown in **Figure 3**.

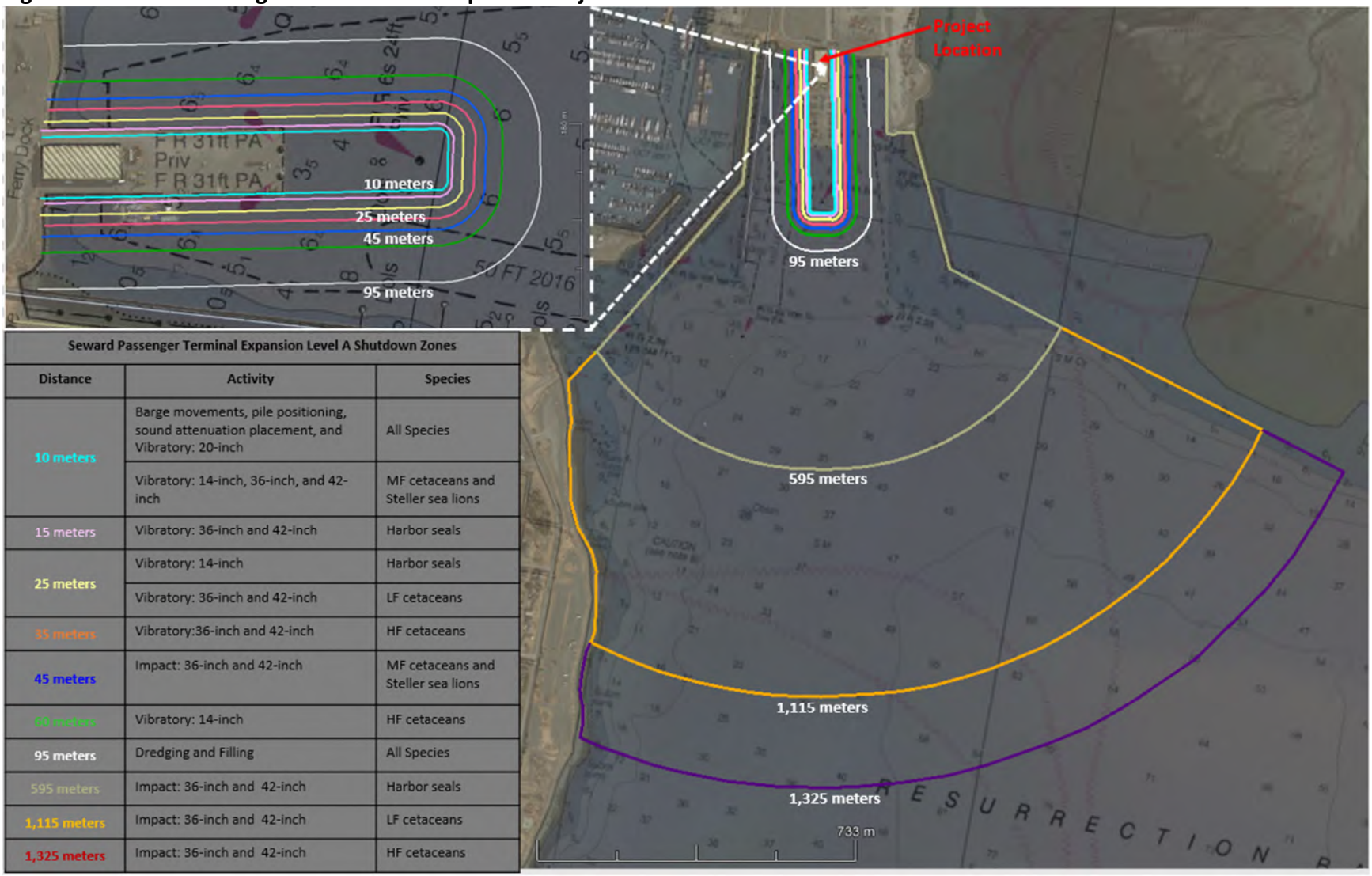
Table 5. Seward Passenger Terminal Development Project Distances to NMFS Level A Thresholds

Activity	Distance (in meters, m) to Level A					
	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid	Otariid	Northern Sea Otter
In-Water Construction Activities						
Barge movements, pile positioning, etc.* (throughout construction)	10	10	10	10	10	TBD
Dredging and Filling (~2,822 hours on 122 days)	95	95	95	95	95	TBD
Vibratory Pile Driving/Removal						
14-inch existing H-pile removal (910 piles; ~150 mins per day on 31 days)	45	10	60	25	10	TBD
14-inch existing H-pile installation (300 piles; ~150 mins per day on 10 days)	45	10	60	25	10	TBD
20-inch existing steel removal (10 piles; ~30 mins per day on 4 days)	10	10	10	10	10	TBD
36-inch steel permanent installation (220 piles; ~50 mins per day on 44 days)	25	10	35	15	10	TBD
42-inch steel permanent installation (2 piles; ~20 mins per day on 1 day)	25	10	35	15	10	TBD
Impact Pile Driving						
36-inch steel permanent installation (220 piles; ~5 mins per day on 44 days)	1,115	45	1,325	595	45	TBD
42-inch steel permanent installation (2 piles; ~2 mins per day on 1 day)	1,115	45	1,325	595	45	TBD

Shutdown zone distances refer to the maximum radius of the zone and are rounded.

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

Figure 3. Seward Passenger Terminal Development Project NMFS Distances to Level A Shutdown Zones



Seward Passenger Terminal Expansion Level A Shutdown Zones		
Distance	**Activity**	**Species**
10 meters	Barge movements, pile positioning, sound attenuation placement, and Vibratory: 20-inch	All Species
	Vibratory: 14-inch, 36-inch, and 42-inch	MF cetaceans and Steller sea lions
15 meters	Vibratory: 36-inch and 42-inch	Harbor seals
25 meters	Vibratory: 14-inch	Harbor seals
	Vibratory: 36-inch and 42-inch	LF cetaceans
35 meters	Vibratory:36-inch and 42-inch	HF cetaceans
45 meters	Impact: 36-inch and 42-inch	MF cetaceans and Steller sea lions
60 meters	Vibratory: 14-inch	HF cetaceans
95 meters	Dredging and Filling	All Species
595 meters	Impact: 36-inch and 42-inch	Harbor seals
1,115 meters	Impact: 36-inch and 42-inch	LF cetaceans
1,325 meters	Impact: 36-inch and 42-inch	HF cetaceans

*LF=Low-frequency Cetacean, MF=Mid-frequency Cetacean, and HF=High-Frequency Cetacean

MITIGATION MEASURES

The purpose of a marine mammal monitoring plan is to observe for marine mammals in the area where potential sound effects may occur. Work will be stopped or delayed if a marine mammal is sighted in the monitoring area. Work will not begin or resume until the marine mammal has moved out of the monitoring area on its own accord.

The following mitigation measures will be implemented during pile driving activities to limit impacts to marine mammals, including ESA-listed species.

General Conditions and Requirements

- Pile caps (pile softening material) will be used to minimize noise during impact pile driving. Much of the noise generated during pile installation comes from contact between the pile and the steel template used to stabilize the pile. 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.
- The contractor is required to conduct briefings for construction supervisors and crews and the monitoring team prior to the start of all pile driving activity, and upon hiring new personnel, to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.
- The contractor is required to employ PSOs during all in-water construction activities.
- Marine mammal monitoring must take place starting 30 minutes prior to initiation of pile driving and ending 30 minutes after completion of pile driving activity. Pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone (Table 5), their behavior must be monitored and documented until they leave of their own volition, at which point the activity may begin or resume.
- Pile driving must be halted or delayed If a marine mammal is observed entering or within an established shutdown zone (**Table 5**). Pile driving may not commence or resume until either: the animal has voluntarily left and has been visually confirmed beyond the shutdown zone; 15 minutes have passed without subsequent observations of small cetaceans and pinnipeds; or 30 minutes have passed without subsequent observations of large cetaceans.
- The contractor must use soft start techniques when impact pile driving.
- Pile installation and removal must be delayed or halted immediately if a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized takes are met, is observed approaching or within the monitoring zone (**Table 4**). Activities must not start or resume until the animal has been confirmed to have left the area or the observation time period, as indicated in the conditions above, has elapsed.

- Should light or environmental conditions deteriorate such that marine mammals within the entire largest Level A shutdown zone would not be visible (e.g., fog, heavy rain), pile driving and removal must be delayed until the PSOs are confident marine mammals within the shutdown zone could be detected.
- PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break between shifts, and will not perform PSO duties for more than 12 hours in a 24-hour period (to reduce PSO fatigue).

Observer Qualifications and Requirements

- Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface and ability to estimate target size and distance. Use of binoculars and/or spotting scope may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy or related fields (Bachelor's degree or higher is preferred), or equivalent Alaska Native traditional knowledge. PSOs may substitute education or training for experience.
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in field identification of marine mammals (cetaceans and pinnipeds).
- Training, knowledge of or experience with vessel operation and pile driving operations sufficient to provide personal safety during observations.
- Writing skills sufficient to prepare a report of observations. Reports should include: the number, type, and location of marine mammals observed; the behavior of marine mammals in the area of potential sound effects during construction; dates and times when observations and in-water construction activities were conducted; dates and times when in-water construction activities were suspended because of marine mammals; etc.
- Ability to communicate orally as needed, by radio or in person, with project personnel to provide real time information about marine mammals observed in the area.
- PSOs must be independent (*i.e.*, not construction personnel) and have no other assigned tasks during monitoring periods.
- A lead observer or monitoring coordinator must be designated if a team of three or more PSOs are required. The lead observer must have prior experience working as a marine mammal observer during construction.
- The contractor must submit PSO CVs for approval by NMFS prior to the onset of pile driving.

Data Collection

Environmental Conditions and Construction Activities

PSOs will use the environmental conditions and construction activities log to document the following (**Appendix A**):

- Environmental Conditions
    - Environmental conditions will be recorded at the beginning and end of every monitoring period and as conditions change.
    - Recordings will include PSO names, location of the observation station, time and date of the observation, weather conditions, air temperature, sea state, cloud cover, visibility, glare, tide, and ice coverage (if applicable).
- Construction Activities:
    - PSOs will record the time that observations begin and end as well as the durations of shutdowns.
    - PSOs will document the reason for stopping work, time of shutdown, and type of pile installation or other in-water work taking place.
    - PSOs will document other, non-project-related activities that could disturb marine mammals in the area, such as the presence of large and small vessels.

PSOs will record all communications with the construction crew. The environmental conditions and construction activities log will be checked for quality assurance and quality control (QA/QC) by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS along with the final report.

Sightings

Observers will use a NMFS-approved Marine Mammal Sighting Form (**Appendix A**) which will be completed by each observer for each survey day and location. Sighting forms will be used by observers to record the following:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state (determined by the Beaufort Wind Force Scale);
- Species, numbers, and, if possible, sex and age class of observed marine mammals;
- Construction activities occurring during each sighting;
- Behavioral patterns observed, including bearing and direction of travel;
- Behavioral reactions just prior to, or during, soft-start and shutdown procedures;
- The marine mammal's location, distance from the observer, and distance from pile removal activities;
- Whether mitigation measures, including shutdown procedures, were required by an observation, including the duration of each shutdown;

- Observer rotations including the time of rotation and the initials of the incoming observer.

The observation record forms will be checked for quality assurance and quality control (QA/QC) by the lead PSO for submission at the end of every monitoring day. Upon request, the data will be submitted to NMFS along with the final report.

Equipment

The following equipment will be required to conduct observations for this project:

- Appropriate Personal Protective Equipment;
- Portable VHF radios for the observers to communicate with other observers and the pile driving supervisor;
- Cellular phone as backup for radio communication;
- Contact information for the other observers, the pile driving supervisor, and the NMFS point of contact;
- Daily tide tables for the project area;
- Binoculars (quality 7 x 50 or better) and a rangefinder;
- Hand-held GPS unit, map and compass, or grid map to record locations of marine mammals;
- Copies of the 4MP, IHA, and other relevant permit requirement specifications in a sealed, clear, plastic cover;
- Notebook with pre-standardized monitoring Observation Record forms and Grid Maps (**Appendix A**).

Number and Location of PSOs

The number of locations of observers are determined to ensure that there is full coverage of the entire action area during all in-water activities. Locations are chosen based on site accessibility and field of vision.

One to five PSOs will be onsite during in-water activities associated with the Seward Passenger Terminal Development Project, stationed in the following locations (**Figure 5**):

- PSO 1: stationed at the pile site on the project barge.
- PSO 2: stationed on Nash Road at the lookout site.
- PSO 3: stationed at the Sealife Center in the RV/Bus parking lot.
- PSO 4: stationed approximately 1.02 km (0.63 miles) south of the bridge on Lowell Point Road.
- PSO 5: stationed at the Lowell Point beach.

- PSO 6: stationed on a vessel running a transect through southern portion of the action area in Resurrection Bay.[1]

The number and locations of monitors will be based on the following in-water work scenarios:

- Scenario #1: Dredging, Filling, and Jetting
    - One Location: PSO 1
- Scenarios #2: Impact Hammer Installation of 36-inch and 42-inch piles
    - Four locations: PSO 1, PSO 2, PSO 3, and PSO 4
- Scenario #3: Vibratory Removal/Installation of 20-inch piles
    - Four Locations: PSO 1, PSO 2, PSO 3, and PSO 5
- Scenario #4: Vibratory Removal/Installation of 14-inch h-piles, 36-inch piles, and 42-inch piles
    - Five Locations: PSO 1, PSO 2, PSO 3, PSO 5, and PSO 6

[1] A separate individual will serve as a boat captain. The boat captain can also be approved as a PSO to rotate with the vessel-based PSO to ensure mitigation measures to prevent observer fatigue are followed.

Figure 4. Seward Passenger Terminal Development Project PSO Locations`

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:

- Do not approach, or cause a vessel or object to approach, within 100 yards of a humpback whale;
- Do not obstruct the path of oncoming humpback whales causing them to surface within 100 yards of the vessel;
- Do 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 33 CFR § 83.06).

Vessels will 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 between boats and the shore; and putting engines in neutral if approached by a whale or other marine mammal to allow the animals to pass.

Monitoring Techniques

Pre-Activity Monitoring

The following monitoring methods will be implemented before permitted construction begins:

- The lead PSO and Contractor Superintendent will meet at the start of each day to discuss planned construction activities for the day and to conduct a radio/phone check.
- Prior to the start of permitted activities, observers will conduct a 30-minute pre-watch of the shutdown and monitoring zones. They will ensure that no marine mammals are present within the shutdown zone before permitted activities begin.
- The shutdown zone will be cleared when marine mammals have not been observed within the zone for the 30-minute pre-watch period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes (for pinnipeds) or 30 minutes (for cetaceans).
- When all applicable exclusion zones are clear, the observers will radio the pile driving supervisor. Permitted activities will not commence until the pile driving supervisor receives verbal confirmation that the zones are clear.
- If permitted species are present within the monitoring zone, work will not be delayed, but observers will monitor and document the behavior of individuals that remain in the monitoring zone.
- In case of fog or reduced visibility, observers must be able to see all of the shutdown zones before permitted activities can begin.

Soft Start Procedures

Soft start procedures will be used prior to periods of vibratory and impact driving to allow marine mammals to leave the area prior to exposure to maximum noise levels.

- For vibratory hammers, the contractor shall run the vibratory hammer for no more than 30 seconds followed by a quiet period of at least 60 seconds without vibratory removal of piles. This process shall be repeated twice more within 10 minutes before beginning vibratory removal operations that last longer than 30 seconds.
- For impact hammers, the contractor will initiate approximately three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would be repeated twice more.
- If work ceases for more than 30 minutes, soft start procedures must be used prior to continuing work.

During Activity Monitoring

If permitted species are observed within the monitoring zone during permitted activities, an exposure will be recorded and behaviors will be documented. Work will not stop unless an animal enters or appears likely to enter the shutdown zone.

Inclement Weather

If inclement weather, limited visibility, or increased sea state restricts the observers' ability to make observations, pile driving activities will not be initiated or continued until the largest Level A shutdown zone for the activity is visible.

Resurrection Bay often experiences increased sea states and inclement weather. The vessel-based monitoring location will be vacated for the monitoring period if sea state or weather conditions make it unsafe for the observer to be in position. The lead PSO will document the change and takes will be extrapolated following the equation below.

Takes Recorded by Lowell Point PSO x *2= extrapolated takes*

Shutdowns

If a marine mammal enters or appears likely to enter its respective shutdown zone:

- The observers will immediately alert the pile driving supervisor.
- All permitted activities will immediately halt.
- In the event of a shutdown, permitted pile installation or removal activities may resume only when the animal(s) within or approaching the shutdown zone has been visually confirmed beyond or heading away from the shutdown zone, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) have passed without observation of the animal. Observers will contact the pile driving supervisor and inform them that activities can re-commence.

Breaks in Work

Shutdown and monitoring zones will continue to be monitored during an in-water construction delay. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. Work can begin following the 30-minute pre-watch monitoring protocols. Work cannot begin if an animal is within the shutdown zone or if visibility is not clear throughout the shutdown and monitoring zones.

Post Activity Monitoring

Monitoring of the shutdown and monitoring zones will continue for 30 minutes following completion of in-water activities. PSOs will continue to record observations during this post-watch period, with a focus on observing and reporting unusual or abnormal behaviors.

If construction were to resume during the post-watch period, PSOs will follow pre-watch protocols to ensure that that the shutdown and monitoring zones are clear prior to work resuming.

REPORTING

Notification of Intent to Commence Construction

The contractor will inform NMFS OPR,NMFS Alaska Region Protected Resources Division, and USFWS one week prior to commencing construction activities.

Weekly Sighting Counts

A summary of the following will be submitted to the construction project manager at the conclusion of each week of construction activity (Friday evening):

- Completed monitoring forms for the week

- Completed environmental conditions and construction activity logs for the week
- Preliminary counts of sightings and takes per species

Interim Monthly Reports

The contractor will submit brief, monthly reports to the NMFS Alaska Region Protected Resources Division summarizing PSO observations and recorded takes during construction. Monthly reporting will allow NMFS to track takes (including extrapolated takes) and reinitiate consultation in a timely manner, if necessary. Monthly reports will be submitted by email to akr.section7@noaa.gov and USFWS TBD.

The reporting period for each monthly PSO report will be the entire calendar month, and reports will be submitted by the end of business hours on the tenth day of the month following the end of the reporting period (e.g., the monthly report covering April 1–31, 2021, would be submitted to the NMFS and USFWS by close of business on May 10, 2021).

Final Report

The contractor will submit a draft final report by email to akr.section7@noaa.gov and USFWS TBD no later than 90 days following the end of construction activities. The contractor will provide a final report within 30 days following resolution of NMFS and USFWS's comments on the draft report. If no comments are received from the agencies within 30 days, the draft final report will be considered the final report.

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

- A summary of construction activities, including start and end dates.
- A description of any deviation from the initially proposed pile numbers, pile types, average driving times, etc.
- A table summarizing all marine mammal sightings during the construction period, including:
    - dates, times, species, numbers, locations, and behaviors of any observed ESA-listed marine mammals, including all observed humpback whales and Steller sea lions;
    - daily average number of individuals of each species (differentiated by month as appropriate) detected within the Level A and Level B zones, and whether estimated as taken, if appropriate; and
    - the number of shut-downs throughout all monitoring activities.
- A brief description of any impediments to obtaining reliable observations during construction period.
- A description of any impediments to complying with these mitigation measures.
- Appendices containing all PSO daily logs and marine mammal sighting forms.

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, the contractor shall immediately cease the specified activities and report the incident to NMFS OPR, the NMFS Alaska Region Protected Resources Division, and the NMFS statewide 24-hour Stranding Hotline (877) 925-7773. If a northern sea otter is observed injured or deceased, USFWS will be alerted at TBD.

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 The contractor to determine what measures are necessary to minimize the likelihood of further unauthorized take and ensure ESA and MMPA compliance. The contractormay not resume their activities until notified by NMFS.

In the event that the contractor 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), the contractor 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 the contractor to determine whether additional mitigation measures or modifications to the activities are
appropriate.

In the event that the contractordiscovers 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), the contractor must report the incident to the NMFS OPR and the NMFS Alaska Regional Stranding Coordinator or Hotline (or USFWS, if a sea otter) within 24 hours of the discovery. The contractor will provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS.

APPENDIX A:

Marine Mammal Sighting Forms and Grid

MARINE MAMMAL OBSERVATION RECORD

Project Name: ____________________

Monitoring Location: ____________________

Date: ____________________

Time Effort Initiated: ____________________

Time Effort Completed: ____________________

Page ________ of ________

Time	Visibility	Glare	Weather Condition	Wave Height	BSS	Wind	Swell
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W

Event Code	Sight # (1 or 1.1 if re-sight)	Time/Dur (Start/End time if cont.)	WP/ Grid #/ DIR of travel	Zone/ Radius/ Impact Pile #?	Obs.	Sighting Cue	Species	Group Size	Behavior Code (see code sheet)	Construction Type	Mitigation Type	Exposure (Y/N)	Behavior Change/ Response to Activity/Comments/Human Activity/Vessel Hull # or Name/ Visibility Notes
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	____ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:		DD JT FL V I OWC NOWC NONE	DE SD None		

Event

Code	Activity Type
E ON	Effort On
E OFF	Effort Off
PRE	Pre-Construction Watch
POST	Post-Construction Watch
CON	Construction (see types)
S	Sighting
M	Mitigation
OR	Observer Rotation

Sighting Cues

Code	Distance Visible
BL	Blow
BO	Body
BR	Breach
DF	Dorsal Fin
SA	Surface Activity
OTHR	Other

Marine Mammal Species

Code	Marine Mammal Species
STSL	Steller Sea Lion
HPBK	Humpback Whale
DAPO	Dall's Porpoise
SO	Sea Otter
HSEA	Harbor Seal
MINKE	Minke Whale
ORCA	Killer Whale

Construction Type

Code	Activity Type
OWC	Over-Water Construction
NOWC	No Over-Water Construction
DD	Dredging
FL	Filling
JT	Jetting
V	Vibratory Hammer
I	Impact Hammer
NONE	No Construction

Mitigation Codes

Code	Activity Type
DE	Delay onset of In-Water Work
SD	Shutdown In-Water Work

Visibility

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5-0.9km)
M	Moderate (0.9-3km)
G	Good (3-10km)
E	Excellent (>10km)

Weather Conditions

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	FOG
OC	Overcast
SN	Snow
HR	Heavy Rain

Wave Height

Code	Wave Height
Light	0-3 ft
Moderate	4-6 ft
Heavy	>6 ft

Marine Mammal Observation Record – Sighting Codes

Behavior Codes

Code	Behavior	Definition
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail etc.
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progress in a direction. Note general direction of travel when last seen [Example: "SW (N)" for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: "TR (N)" for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
AWA	Approach Work	
LWA	Leave Work Area	
Pinniped only		
EW	Enter Water (from haul out)	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out)	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc.
Cetacean only		
LG	Logging	Resting on surface of water with no obvious signs of movement

Sea State and Wave Height: Use Beaufort Sea State Scale for Sea State. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also considers the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

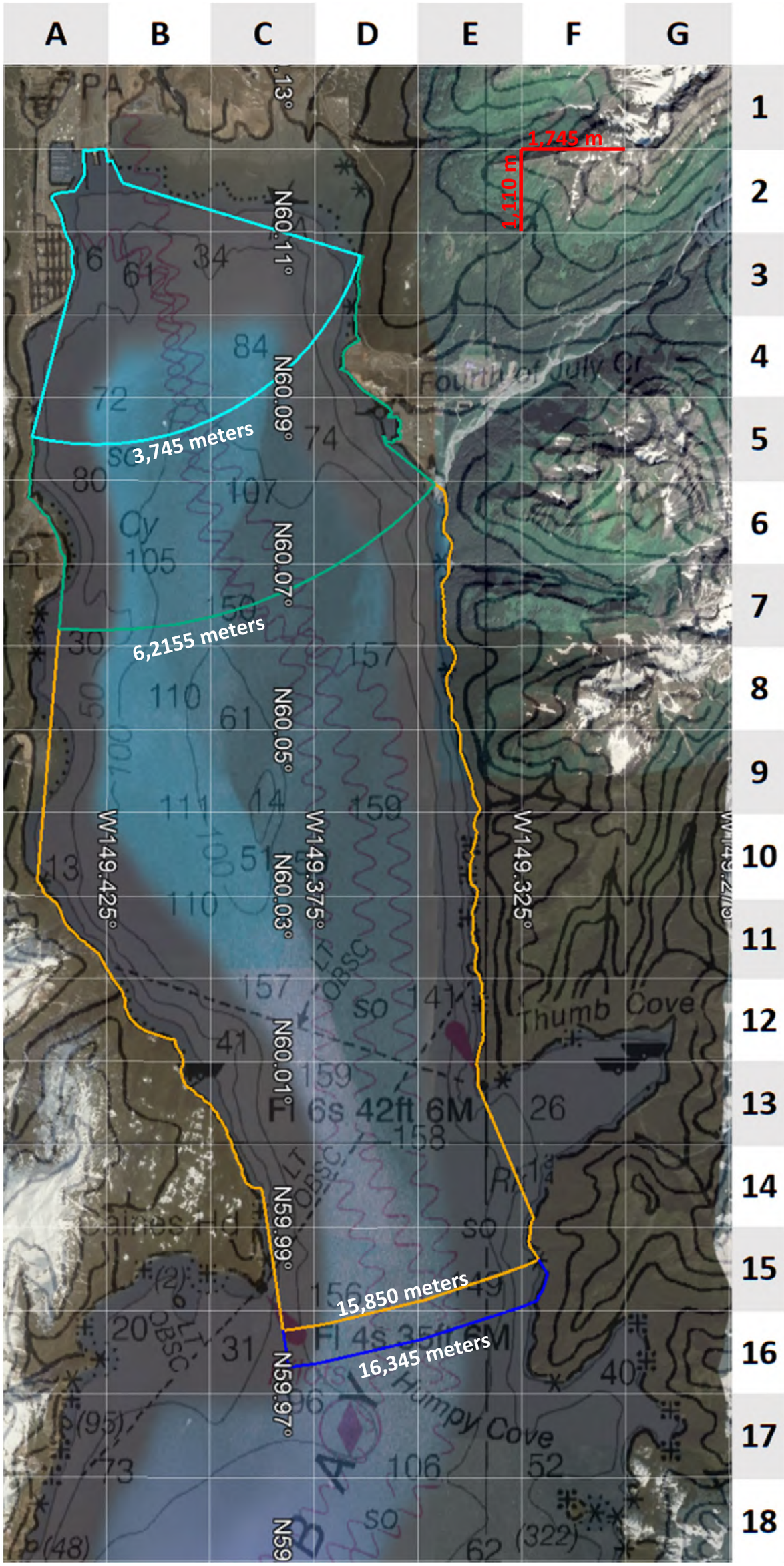
Glare: Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

Swell Direction: Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

Wind Direction: Wind direction should also be where the wind is coming from.

Estimating Wind Speed and Sea State with Visual Clues

Beaufort number	Wind Description	Wind Speed	Wave Height	Visual Clues
0	Calm	0 knots	0 feet	Sea is like a mirror. Smoke rises vertically.
1	Light Air	1-3 kts	< 1/2	Ripples with the appearance of scales are formed, but without foam crests. Smoke drifts from funnel.
2	Light breeze	4-6 kts	1/2 ft (max 1)	Small wavelets, still short but more pronounced, crests have glassy appearance and do not break. Wind felt on face. Smoke rises at about 80 degrees.
3	Gentle Breeze	7-10 kts	2 ft (max 3)	Large wavelets, crests begin to break. Foam of glassy appearance. Perhaps scattered white horses (white caps). Wind extends light flag and pennants. Smoke rises at about 70 deg.
4	Moderate Breeze	11-16 kts	3 ft (max 5)	Small waves, becoming longer. Fairly frequent white horses (white caps). Wind raises dust and loose paper on deck. Smoke rises at about 50 deg. No noticeable sound in the rigging. Slack halyards curve and sway. Heavy flag flaps limply.
5	Fresh Breeze	17-21kts	6 ft (max 8)	Moderate waves, taking more pronounced long form. Many white horses (white caps) are formed (chance of some spray). Wind felt strongly on face. Smoke rises at about 30 deg. Slack halyards whip while bending continuously to leeward. Taut halyards maintain slightly bent position. Low whistle in the rigging. Heavy flag doesn't extended but flaps over entire length.
6	Strong Breeze	22-27 kts	9 ft (max 12)	Large waves begin to form. White foam crests are more extensive everywhere (probably some spray). Wind stings face in temperatures below 35 deg F (2C). Slight effort in maintaining balance against wind. Smoke rises at about 15 deg. Both slack and taut halyards whip slightly in bent position. Low moaning, rather than whistle, in the rigging. Heavy flag extends and flaps more vigorous.
7	Near Gale	28-33 kts	13 ft (max 19)	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of wind. Necessary to lean slightly into the wind to maintain balance. Smoke rises at about 5 to 10 deg. Higher pitched moaning and whistling heard from rigging. Halyards still whip slightly. Heavy flag extends fully and flaps only at the end. Oilskins and loose clothing inflate and pull against the body.
8	Gale	34-40 kts	18 ft (max 25)	Moderately high waves of greater length. Edges of crests begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind. Head pushed back by the force of the wind if allowed to relax. Oilskins and loose clothing inflate and pull strongly. Halyards rigidly bent. Loud whistle from rigging. Heavy flag straight out and whipping.
9	Strong Gale	41-47 kts	23 ft (max 32)	High waves. Dense streaks of foam along direction of wind. Crests of waves begin to topple, tumble and roll over. Spray may affect visibility.
10	Storm	48-55 kts	29 ft (max 41)	Very high waves with long overhanging crests. The resulting foam, in great patches is blown in dense streaks along the direction of the wind. On the whole, the sea takes on a whitish appearance. Tumbling of the sea becomes heavy and shock-like. Visibility affected.
11	Violent Storm	56-63 kts	37 ft (max 52)	Exceptionally high waves (small and medium-sized ships might be for time lost to view behind the waves). The sea is completely covered with long white patches of foam lying along the direction of the wind. Everywhere, the edges of the wave crests are blown into froth. Visibility greatly affected.
12	Hurricane	64+ kts	45+ ft	The air is filled with foam and spray. The sea is completely white with driving spray. Visibility is seriously affected.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Filling Out Sighting Forms	
Data Columns	**Definition and How to Record Data**
General Information *(Top of Form)*	
Project Name	ARRC Passenger Terminal Development Project
Monitoring Location	See 4MP
Date	MM/DD/YYYY
Time effort initiated and completed	Time started pre-watch and time post-watch ended (military time). If there is more than one monitoring period in a day, start a new form for each period.
Environmental Conditions	
Environmental Conditions	Record at the start of monitoring period, when changes, and at the end of monitoring period.
Visibility	B-bad, P-poor, M-moderate, G-good, and E-excellent
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, or another direction)
Weather conditions	Dominant weather conditions: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wave Height	Lt-light, Mod-moderate, Hvy-heavy
Wind and Swell direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Beaufort Sea State	Scale 1-12. See BSS sheet.
Sightings	
Event Code	Indicates what events are happening at the time of the sighting, what events may have occurred due to the sighting, and observer rotations.
Time/Duration	Time first sighted and time of last sighting (military time).
Sighting Number	Chronological (1,2,3, etc.) If the same marine mammal is resighted at a distances greater than 25 meters from the original sighting location record as a resight (Ex. 1.1- same marine mammal as sighting 1, but sighted for a second time in different location)
WP/Grid #/DIR of Travel	Grid number that marine mammal was sighted in and direction of travel
Distance from pile	Distance in meters from in-water work
Observer (Obs.)	Initials of the Observer who sighted the marine mammal or who is coming on shift during a rotation
Sighting Cue	How was the marine mammal sighted
Species	Appropriate species abbreviation from code sheet

Group Size	Record the minimum and maximum number of individuals that were sighted. Then determine and record the best number of individuals.
Behavior	Behaviors observed using appropriate abbreviations from code sheet
Construction Type	Circle construction type that is actively occurring at the time and for the duration of the sighting.
Mitigation Type	Circle mitigation type, if any. Based upon monitoring and shutdown zones does a delay of work (pre-watch and post-watch) or a shutdown (monitoring period) need to occur.
Exposure	If a marine mammal enters its Level A or Level B distance and work is actively occurring it will be an exposure indicate yes (Y). If no work is actively occurring indicate no (N)

APPENDIX B:

Construction Activity and Communication Log

Construction Activity and Communication Log

Project:_____ Location: _____ Observer(s): _____ Date:_____

Time	Pile Size	Pile Type	Construction Type	Obs.	Construction Personnel	Communication/Comments

Filling Out Construction Activity and Communication Logs	
Data Columns	**Definition and How to Record**
General Information *(top of form)*	
Project	Time that monitoring by MMOs/PSOs began and ended, without interruption (military time)
Project Name	HMIC Cargo Dock
Monitoring Location	City Dock, Halibut Island, Long Island, or Vessel
Observer	Names of Observers at that location
Date	MM/DD/YYYY
Construction and Communication Activities	
Time of event	Time that construction activities and all communications between MMOs/PSOs and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, type of pile installation technique, pile size, and pile type (permanent or temporary)
Communication	Information communicated between MMOs/PSOs and construction crew