CITY OF KODIAK
Channel Transient Float Replacement
Project No. 17-07/8525

ADDENDUM NO. 2

DATE: October 19, 2016

BIDS DUE: **Thursday, October 27th, 2016 no later than 2:00:00 p.m. local time**

PAGES: Addendum, 1 pages
Appendix E, Revised
Appendix H, Gangway Typical Section
Appendix H, Proposed Electrical Service
Appendix H.1, Foundation Geology Report

Acknowledge receipt of this Addendum on the Proposal Form. Failure to do so may subject Proposer to disqualification. The following additions, corrections and/or changes are hereby made to the Contract Documents, except all contents of Appendix H which remain Reference Documents.

APPENDIX E, ENVIRONMENTAL DOCUMENTS

Item 1 - DELETE Appendix E in its entirety and REPLACE it with the revised, attached Appendix E. This revision remains in draft form; no regulatory authorizations (permits) have been issued to date. A detailed marine mammal monitoring plan is contained in the revised application for Incidental Harassment Authorization.

APPENDIX H, REFERENCE DOCUMENTS

Item 2 - DELETE the Gangway Typical Section plan sheet in Appendix H (page 4 of 8) and REPLACE the revised, attached Gangway Typical Section (page 4 of 8), dated October 17th, 2016, as a Reference Document.

Item 3 - DELETE the Proposed Electrical Service plan sheet in Appendix H (page 7 of 8) and REPLACE the revised, attached Proposed Electrical Service (page 7 of 8), dated October 19th, 2016, as a Reference Document.

Item 4 - ADD the attached *Foundation Geology Report*, developed by R&M Consultants (October 18th, 2013) for the Kodiak Ferry Terminal & Dock Improvements to Appendix H, as a Reference Document. This information is being provided as a courtesy only and in no way is intended to represent conditions for this Project. Use of this information is at the sole discretion of the Proposer. The City of Kodiak shall not be responsible for the accuracy, applicability, and/or any conclusions made from the contents of Appendix H.

END OF ADDENDUM NO. 2

CITY OF KODIAK
Channel Transient Float Replacement
Project No. 17-07/8525

QUESTIONS & ANSWERS NO.2

DATE: October 19, 2016

BIDS DUE: **THURSDAY, October 27th, 2016 no later than 2:00:00 p.m. local time**

APPENDIX F, FACILITY MINIMUM PERFORMANCE CRITERIA

18. Question: The design vehicle plus attachment defined as the basis of design in addendum #1 is 4ft 6" wide. The concept drawing shows a 5 ft wide gangway. This appears too narrow for safe operation of the design vehicle. Please advise if the gangway should be increased from 5ft to 6ft width?

    Response: The minimum inside clear dimension remains at 5'-0," as noted in Section 5.0 of Appendix F. Please reference Addendum No. 2 for a revised typical section clarifying that this width represents inside-to-inside of handrail.

APPENIDX A, PROPOSAL FORMS:

19. Question: Are the Fire and Water systems considered part of the Safety Systems and Features in the Schedule of Values?

    Response: Yes.

APPENDIX E, ENVIRONMENTAL DOCUMENTS

20. Question: Permit, Appendix E, Sheet 6 of 6 (typical Float Section) – Which elements shown in this typical cross section are required for the float design? i.e. is "steel bar grating" required?

    Response: Please see RFP, Section 3.13 regarding Appendix E. Design related information contained in Appendix E and H are not intended to be interpreted as required or preferred solutions; the information was necessary for permitting purposes and should not restrict innovation, unless specifically noted in Appendix F and/or Section 3.0 of the RFP. The City of Kodiak intends to inform regulatory agencies throughout final design development with any minor changes.

21. Question: Appendix E – pertaining to the USACOE permit application drawings Sheet 2 of 6 (Existing Site Plan) indicates "existing fixed pier to remain" – is this an error? It seems this would need to be removed in its entirety.

    Response: Yes, this is an error. Please reference Addendum No. 2 for a revised figure. Narratives within the permit application correctly note that removal of the pier is anticipated.

22. Question: Sheet 4 of 6 (Typical Elevation) indicates the new abutment footing to be below the high tide line (HTL) and shows "undisturbed mudline" in front of the wall. The permit application indicates "no fill" and does not address scour protection in front of the wall. From a constructability standpoint and the long-term durability of the facility, it seems the operations of excavating and filling around the abutment, and the placement of armor rock is not sufficiently addressed in the permit application. Does the Owner anticipate making modifications to the permit, or will the Contractor be responsible for that?

    Response: Please reference Addendum No. 2 for a revised figure reflecting that the bottom of the abutment should be in close proximity to HTL. It is anticipated that the abutment and any scour protection can reasonably be designed and constructed above HTL and that fill below this elevation is not required. Should the Design-Builder determine that fill is required, the volume of fill shall not exceed 0.1 acres which would require mitigation and be considered a significant modification to the permit. The City of Kodiak will coordinate with the Design-Builder during final design development and be responsible for ensuring that the regulatory agencies are informed of any reasonably minor changes. It is in the Project's best interest that the final design does not significantly impact the permitting process.

APPENIDX H, REFERENCE DOCUMENTS:

23. Question: Are the base map and other drawings available in a AutoCAD or other similar format?

    Response: No.

GENERAL:

24. Question: Who will be reviewing the engineered drawings, specifications and submittals, providing quality assurance and determining that the system meets the design intent from the City of Kodiak?

    Response: Please reference Section 3.12.1 of the RFP. The Design-Builder is responsible for quality assurance and providing evidence that the system meets the design intent. A combination of City staff and consultants will provide quality verification that the Design-Builder is complying with its responsibility to perform quality control and assurance. The City of Kodiak will participate in reviewing deliverables as generally detailed in Section 3.11 of the RFP.

25. Question: Should our bids include preparation and submittal of permit applications to ADEC for the potable water system on behalf of the City? If so, will the permit application fee (payable to ADEC) be paid directly by the City?

    Response: The potable water system is not subject to review by ADEC; no permit is required.

END OF QUESTIONS & ANSWERS NO.2

APPENDIX E

ENVIRONMENTAL COMPLIANCE DOCUMENTS

- Department of the Army Permit Application
- Draft Biological Assessment, October 2016
- Draft Incidental Harassment Application, October 2016

NOTE:
This Appendix contains specific information related to the design of the facility; all such references are conceptual only as were necessary for the permitting process and are not requirements of the Contract, unless specifically noted otherwise in Appendix F.

The DRAFT documents are under consideration by the regulatory agencies and could change throughout the permitting process; however, substantial modifications to the documents and associated requirements are not expected.

The Design/Builder shall comply and account for costs associated with all restrictions contained in this Appendix, as may specifically relate to construction means and methods, and all other stated requirements enforceable by a regulatory agency, such as marine mammal monitoring and in-water work criteria.

Solstice Alaska Consulting, Inc.
2607 Fairbanks Street, Suite B
Anchorage, AK 99503
907.929.5960

April 18, 2016

Jen Martin
U.S. Army Corps of Engineers
Regulatory Division, Kenai Field Office
44669 Sterling Highway, Suite B
Soldotna, AK 99669-7915

Transmitted via email to: cepoa-rd-kenai@usace.army.mil

Subject: City of Kodiak Proposed Transient Float Replacement Project
Near Island Channel, Kodiak Island, Alaska
DA permit application submittal, Designation to consult request

Dear Ms. Martin,

The City of Kodiak (City) proposes to replace their existing transient float located in Kodiak's Near Island Channel. Solstice Alaska Consulting, Inc. (Solstice) is under contract to the City for permitting activities associated with this project.

The purpose of this project is to replace the transient float with one that meets modern standards for vessel mooring and public safety for the next 50 years. The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles (twenty one 12-inch), and installation of the replacement float and steel piles (twelve 24-inch). The replacement float will be located within nearly the same footprint as the existing facility. However, the overall float length will be shortened to improve all around accessibility within City right-of-way limits. Construction of the replacement float is expected to take 2.5 months beginning in March 2017.

No fill, dredging, or blasting is proposed as part of this project and the project will not impact coastal or fresh water wetlands. The project will be conducted within Near Island Channel, a navigable water under Federal jurisdiction. The City is seeking approval of a Department of Army Permit for project activities in navigable waters.

This project will require consultation with and approvals from the State Historic Preservation Officer (SHPO), the U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration Fisheries' National Marine Fisheries Service (NMFS). Research has been conducted and no cultural or historic properties have been identified in the project area; however, Endangered Species Act (ESA)-listed species are common in the project area.

We request that you delegate us as the non-federal designee to conduct National Historic Preservation Act Section 106 consultation with the SHPO and ESA Section 7 Consultation with NMFS and the USFWS on behalf of the U.S. Army Corps of Engineers (Corps). Once the replacement float has been permitted, the City intends to construct the project. The City and Solstice understand that mitigation measures arising from consultation will be included by the Corps as permit stipulations. We plan to copy the Corps on pertinent correspondence with USFWS, NMFS, and the SHPO.

Enclosed is a Department of the Army Permit Application, detailed project description, and permit figures.

If you have questions or need additional information please do not hesitate to call me at 907-929-5960 or email me at kate@solsticeak.com. Thank you for your efforts on this project.

Sincerely,

Kate Arduser

Kate Arduser
Solstice Alaska Consulting, Inc.

Attachments: Department of Army Permit Application; Project Description; Project Figures

Copies: Lon White, City of Kodiak Harbormaster; Amanda Wilson, Windward Project Solutions

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 30-SEPTEMBER-2015

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Lon Middle - Last - White	First - Kate Middle - Last - Arduser
Company - City of Kodiak, Port and Harbor Director	Company - Solstice Alaska Consulting, Inc.
E-mail Address - lwhite@city.kodiak.ak.us	E-mail Address - kate@solsticeak.com
6. APPLICANT'S ADDRESS:	**9. AGENT'S ADDRESS:**
Address- 403 Marine Way	Address- 2607 Fairbanks Street Suite B
City - Kodiak State - AK Zip - 99615 Country - USA	City - Anchorage State - AK Zip - 99503 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	**10. AGENTS PHONE NOs. w/AREA CODE**
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
cell 907-654-8100 907-486-8080 907-486-8090	907-929-5960

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Solstice Alaska Consulting, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT — DATE: 4/12/16

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

City of Kodiak Proposed Transient Float Replacement Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Near Island Channel	Address East Marine Way
15. LOCATION OF PROJECT	City - Kodiak State- AK Zip- 99615
Latitude: °N 57.788162 Longitude: °W -152.400287	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality Kodiak

Section - 32 Township - 27S Range - 19W

ENG FORM 4345, DEC 2014 PREVIOUS EDITIONS ARE OBSOLETE. Page 1 of 3

17. DIRECTIONS TO THE SITE

From the Kodiak Airport take Cape Decision Street to West Rezanof Drive. Turn right on West Rezanof Drive and continue for apprximately five and a half miles to the intersection with West Marine Way. Turn right on West Marine Way following the road as it curves into East Marine Way. Continue along East Marine way approximatley one tenth of a mile to the project site.

18. Nature of Activity (Description of project, include all features)

Please see the attached project description.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Please see the attached project description.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

This project replaces the existing Kodiak Transient Float. The project removes 19 12-inch steel piles from Waters of the United States and replaces them with 12 24-inch steel piles. No fill is associated with this project.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
0	0	0

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 0

or

Linear Feet 0

23. Description of Avoidance, Minimization, and Compensation (see instructions)

Please see the attached project description.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

a. Address- Channel Side Chowder House 420 East Marine Way

City - Kodiak State - AK Zip - 99615

b. Address- Petro Marine 105 East Marine Way

City - Kodiak State - AK Zip - 99615

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
ADEC	Water Quality Cert		concurrent w/ this app	pending	
USFWS	informal consultation		anticipate April 2016		
NMFS-AK	ESA BA		anticipate May 2016		
NMFS-OPR	ESA/MMPA IHA		anticipate May 2016		

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
[signature]	4/12/16	Kate Ardvser	4/12/16

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

City of Kodiak Proposed Transient Float Replacement Project
Near Island Channel, Kodiak Island, Alaska
Project Description
April 2016

OVERVIEW

The City of Kodiak (City) proposes to replace their existing Kodiak City Dock, locally known as the Channel Transient Float (or transient float), located in Kodiak's Near Island Channel. The existing float currently provides moorage for transient vessels, however, the float's components are failing and it needs to be replaced. The existing float would be removed and a replacement float that meets modern standards for vessel mooring and public safety would be constructed in the footprint of the existing facility. The project area is currently exposed to extensive vessel traffic and warfing activity. The project takes place in and over Waters of the United States; however no fill, dredging, or blasting is proposed as part of this project.

LOCATION

The City's transient float is located off East Marine Way in Near Island Channel as shown in Sheet 1 of 6 and the image below (Figure 1).

Figure 1. Proposed transient float replacement project location.

Near Island Channel separates downtown Kodiak from Near Island (City of Kodiak, Alaska; T27S, R19W, S32, Seward Meridian; USGS Quad Kodiak D-2; Latitude 57.788162°N, Longitude -152.400287°W). The channel is approximately 705 feet wide in the project area. The transient float is situated between a seafood wholesaler approximately 60 feet to the northeast (Alaska Seafood Systems) and marine fuel service floating dock approximately 60 feet to the southwest (Petro Marine Services). A dock is located

340 feet to the southwest (Pier 1) and a shore-based seafood processor is located approximately 590 feet to the southwest.

Purpose and Need

The purpose of this project is to replace the City's transient float with one that meets modern standards for vessel mooring and public safety for the next 50 years.

The existing float needs to be replaced due to its poor condition and reduced capacity. The transient float was built by the State of Alaska (State) in the 1960s. In 1999, the City took over ownership of the float. At that time age-related dilapidation, damage, and deferred maintenance left the dock in a deteriorated state. The City has performed extensive repairs to the float; however, its components are failing. The float has structural issues due to failing walers, stringers, and bullrails. Due to these structural problems the float's capacity has been reduced. The existing ramp is damaged from vessel impact; is steep, slippery when wet, does not meet Americans with Disabilities Act (ADA) requirements, and creates an unnecessary safety risk to users.

The Kodiak Harbor Port and Advisory Board has identified replacement of the existing float as the number one priority capital improvement project for Kodiak Harbors. Because the float provides moorage for vessels commuting from six villages and a diverse transient commercial fishing fleet from all over Alaska and the West Coast, this project is a vital facility for Kodiak's large and diverse transient fleet.

Alternatives

To ensure that the replacement float meets the purpose and need for the project the following design criteria was established:

- Design vessel: 130 foot long
- Design Wind Load: 150 miles/hour, 3 second gust (per American Society of Civil Engineers)
- Design Wave: 3.4 foot boat wake wave with 3.3 second period
- Design Snow Load: 40 pound/square foot
- Dead Load Freeboard: 24 inches
- Design Buoyant Live Load: 40 pound/square foot at 10 inches of freeboard

A No Action Alternative and the proposed alternative were considered for this project, as summarized below.

No-Action Alternative

The City considered a no-action alternative. Under this alternative the existing float would not be replaced. This alternative was dismissed because it does not meet the project's purpose and need to replace the existing float to provide safe mooring for transient vessels in Kodiak. Without replacement, the existing float will continue to deteriorate and eventually become inoperable.

Replace Existing Float (Proposed Alternative)

The City proposes to remove the existing timber float and steel gangway and replace it in its entirety (Sheet 2 of 6). The 12 foot by 330 foot replacement float will be located within nearly the same

footprint as the existing facility. However, the overall float length will be shortened to improve all around accessibility within City right-of-way limits (Sheet 3, 4, 5, of 6). The replacement float will be approximately 57 feet shorter than the existing 387 foot long float. The photograph below shows an aerial view of the existing float (Figure 2).

Figure 2. Existing transient float in Near Island Channel, Kodiak.

Figure 3 shows the footprint of the existing float and the proposed replacement float.

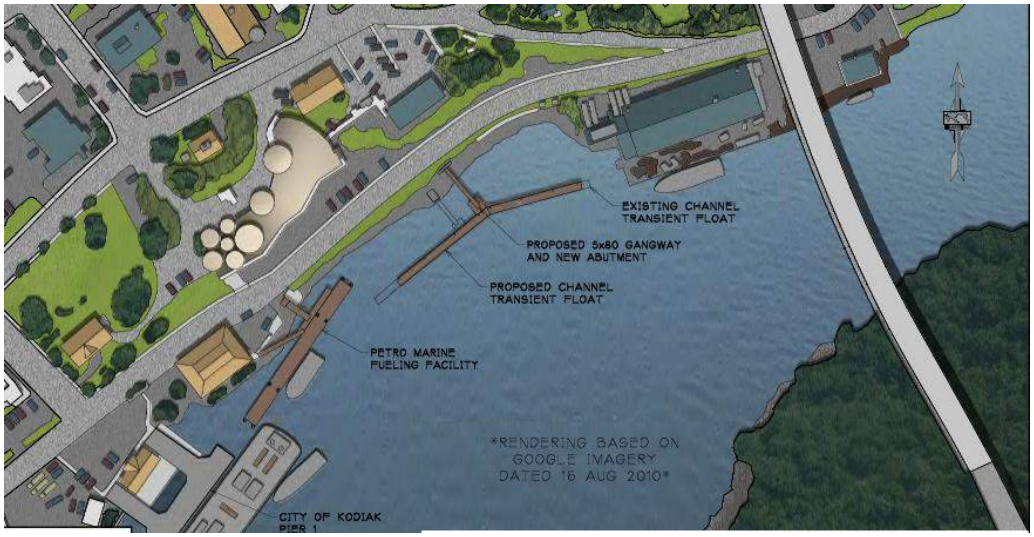


Figure 3. Rendering of proposed transient float in Near Island Channel, Kodiak.

The replacement float will consist of a 4-foot wide by 10-foot long by 3-foot tall concrete gangway abutment (located in uplands); a 5 foot by 80-foot covered aluminum gangway; a 24 foot by 20 foot

gangway float; and the 12 foot by 330 foot mooring float (made up of three 60-foot long and three 50-foot long sections). The float will be supported by twelve 24-inch diameter steel piles (Sheet 3 of 6).

The replacement float will include 50A/30 electrical service in 8 locations and 100A electrical service in 4 locations and water. Illumination poles (12 foot tall), life rings, and fire extinguisher cabinets will be installed on the float.

Construction Methods and Equipment

The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles, and installation of the replacement float and steel piles. No fill, dredging, or blasting is proposed as part of this project. Transient vessels will temporarily be moored at a wide variety of other existing Kodiak port and harbor facilities during construction of the replacement float.

The exact means and methods for construction will be determined by the contractor. It is expected that materials and equipment will be transported to the project site by barge and road. While work is conducted in the water, anchored barges will be used to stage construction materials equipment. The existing piles, fixed pier, float and gangway will be removed and disposed of properly and the new float will be installed.

The exact means and methods for pile installation and extraction will be determined by the contractor. It is estimated that it will take 10 minutes of vibratory pile driving and 4 hours of down-hole drilling per pile for installation, and 20 minutes of vibratory pile driving per pile for extraction. For the installation of 12 piles this is an estimated 2 hours of total time using active vibratory equipment and 48 hours of total time using down-hill drilling. For the in-water extraction of 19 piles this is an estimated 6.33 hours of total time using active vibratory equipment (Table 1).

The 24-inch steel piles will be driven 10-15 feet through sediment and drilled another 10 feet into bedrock. The sequence for installing the 24-inch piles will begin with insertion through overlying sediment with a vibratory hammer for about 8 minutes per pile. Next, a hole will be drilled in the underlying bedrock by using a down-hole drill. A down-hole drill is a drill bit that drills through the sediment and a pulse mechanism that functions at the bottom of the hole, using a pulsing bit to break up the harder materials or rock to allow removal of the fragments and insertion of the pile. The head extends so that the drilling takes place below the pile. Drill cuttings are expelled from the top of the pile as dust or mud. It is estimated that drilling piles through the layered bedrock will take about 4 hours per pile. Finally, the vibratory hammer will be used again to finish driving the piles into bedrock, for approximately 2 minutes per pile (Table 1).

Although impact pile driving is not expected for this project, the contractor may choose to impact proof the piles after down-hole drilling. In this case, two to five blows of an impact hammer would be used to confirm that piles are set into bedrock (impact proofing), for an expected maximum time of 3 minutes of impact hammering per pile. When the impact hammer is employed for proofing, a pile cap or cushion will be placed between the impact hammer and the pile.

The proposed action will require an estimated 7 days total of vibratory extraction and installation, including down-hole drilling. Note that this is an estimate of the number of days when an activity may occur at some point during the day. The number and type of piles and estimated total hours of pile installation and extraction is detailed below (Table 1).

Table 1. Pilings number, type, and estimated number of hours required for driving and extraction

Pile Type, Location, Method	#of Piles	Vibratory Hammer		Down-hole Drill		Impact Hammer	
		# of Piles	Hours	# of Piles	Hours	# of Piles	Hours
12-inch Timber Creosote Existing Abutment Remain in Place	2	0	0	0	0	0	0
12-inch Untreated Existing Float Extraction, Out-of-Water	2	2	0.67	0	0	0	0
12-inch steel Existing Float Extraction, In-Water	19	19	6.33	0	0	0	0
24-inch steel Replacement Float Installation, In-Water	12	12	2	12	48	12	0.6
Total Hours Out-of-Water		--	**0.67**	--	**0**	--	**0**
Total Hours In-Water		--	**8.33**	--	**48**	--	**0.6**

Timeline
Construction is expected to take 2.5 months beginning in March 2017 and ending in May 2017.

Potential Impacts

Wetlands and Waters of the United States

This project will not impact coastal or fresh water wetlands. The project will impact Near Island Channel, a navigable water under Federal jurisdiction. The project removes and replaces an existing float in and over the channel. Twelve 24-inch piles would be placed in the channel to construct the replacement float. No fill is required for this project.

ESA and MMPA Protected Species

All marine mammal species are protected under the Marine Mammal Protection Act (MMPA) and some are also protected under the Endangered Species Act (ESA). Table 2 lists the protected species that may occur in the project area.

Table 2. Protected Species that may occur in the project area

Species	Status	Agency
Northern Sea Otter (Southwest AK DPS ; *Enhydra lutris kenyoni*)	Threatened under ESA	USFWS
Steller's Eider (AK breeding population; *Polysticta stelleri*)	Threatened under ESA	USFWS
Steller Sea Lion (Western DPS; *Eumatopia jubatus)*	Endangered under ESA	NMFS
Humpback Whale (*Megaptera novaeangliae*)	Endangered under ESA	NMFS
Fin Whale (*Balaenoptera physalus*)	Endangered under ESA	NMFS
Harbor Seal (*Phoca vitulina*)	MMPA	NMFS
Harbor Porpoise (*Phocoena phocoena*)	MMPA	NMFS
Killer Whale (*Orcinus orca*)	MMPA	NMFS
Dall's Porpoise (*Phocoenoides dalli*)	MMPA	NMFS

DPS= Distinct Population Segment
Sources: NMFS 2015, HDR 2015

Although the above listed species may occur in the project area, Northern sea otter, Steller sea lions, harbor seals, harbor porpoises, and killer whales are the species most commonly found in the project area. Recent documentation from construction monitoring at the nearby Pier 1 project shows that Steller sea lions and sea otters occur frequently in the project area (Pier 1 is located approximately 590 feet from the transient float). Many individual sea lions have become habituated to human activity in the Kodiak harbor/port area and utilize an artificial haulout float called Dog Bay Float located in St. Herman Harbor, about 4,757 feet from the transient float (Figure 1). This haulout is not federally designated as a "major haulout" and is not considered Steller sea lion critical habitat.

Humpback whales, fin whales, gray whales, and Dall's porpoises generally inhabit more offshore habitats than the Near Island channel and are not expected to occur in the vicinity of the project area (NMFS 2015). Steller's eider are not found near Kodiak in the summer (March-October) and are not common in the project area during the winter. In summer months, the Alaska breeding population of Steller's eiders is typically found in the Arctic Coastal Plain and most Steller's eider migrate to the Alaska Peninsula, Aleutian Islands, and Kodiak Island for the winter (ADF&G 2016a).

To ensure compliance with the ESA and MMPA consultation with the USFWS and NMFS will be required. The City anticipates informal consultation regarding effects to Steller's eider, Northern sea otter, and humpback whales; and to sea otter and Steller sea lion critical habitat. The City anticipates formal consultation regarding effects to the western DPS Steller sea lion. The City plans to develop an Endangered Species Act Section 7 Biological Assessment (BA) for Western DPS Steller sea lion; plans to develop a Marine Mammal Monitoring and Mitigation Plan (4MP) that will be implemented during in-water pile driving and down-hole drilling; and plans to request an Incidental Harassment Authorization (IHA) from NMFS Office of Protected Resources (OPR) for harassment (Level B Take) of Steller sea lion, killer whale, harbor porpoise, and harbor seal, and for possible injury (Level A Take) of Steller sea lion. Mitigation measures arising from consultation will be implemented during construction; anticipated measure are listed below.

ESA Critical Habitat

The project area falls within ESA critical habitat for the northern sea otter and Steller sea lion. In 2009, 5,900 square miles of nearshore marine waters, including all of the Kodiak Archipelago, were designated as Northern sea otter critical habitat under the ESA. The essential elements of Northern sea otter critical habitat are shallow, rocky areas; nearshore waters; kelp forests; and sufficient prey.

The 1993 critical habitat was defined for Steller sea lions as a 20 nautical mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (50 CFR 226.202). Haulouts are located on Long Island and Cape Chiniak, approximately 4 and 12 nautical miles away from the project site, respectively.

Minimal modifications to sea otter and Steller sea lion critical habitat are anticipated in the footprint of the replacement float; however, this area of modification is negligible in terms of the overall impact to the critical habitats, and because the footprint of the replacement float is 57 feet shorter than the existing float.

Essential Fish Habitat

The following Essential Fish Habitat (EFH) species may occur in the project area during at least one phase of their lifestage: flathead sole (*Hippoglossoides elassodon*), rock sole (*Lepidopsetta bilineata*), walleye pollock (*Theragra chalcogramma*), squid (various species), yellowfin sole (*Limanda aspera*), arrowtooth flounder (*Atheresthes stomias*), sculpin (*Cottoidea* spp), Pacific cod (*Gadus macrocephalus*), skate (*Rajidae* spp), chum salmon (*Oncorhynchus keta*), pink salmon (*Oncorhynchus gorbuscha*), coho salmon (*Oncorhynchus kisutch*), sockeye salmon (*Oncorhynchus* nerka), and Chinook salmon (*Oncorhynchus tshawytscha*) (NMFS 2016).

There are no anadromous fish streams in the project area (ADF&G 2016b).

Because no fill would be placed for this project and piles would be placed in a previously disturbed and busy marine traffic area, and because of the conservation measures listed below, the project is not likely to adversely affect EFH.

Avoidance, Minimization, and Mitigation Measures

Waters of the United States Mitigation Statements

Avoidance of impacts to waters of the United States:

The purpose of this project is to replace the existing transient float. The project is needed to provide safe moorage for transient vessels in Kodiak. To meet the project purpose and need the project must be constructed in and over waters of the United States.

Minimization of unavoidable impacts to waters of the United States, including wetlands:

The project uses the most compact design practicable to minimize impacts to waters of the United States. The replacement float will be located in nearly the same footprint and with the same alignment as the existing float. However, the replacement float will be approximately 45 feet shorter than the

existing float. The replacement float will require fewer piles than the existing float. The project will remove 21 piles (2 wood piles and 19 steel piles) and replace them with twelve 24-inch diameter steel piles.

Compensation for unavoidable impacts to waters of the U.S., including wetlands:
Compensatory mitigation is not proposed for this project because this project does not require fill, dredging, or blasting and is located in the previously disturbed footprint of the existing float. Also, the project is a City sponsored public facility used to support Kodiak's large and diverse transient fleet.

Protected Species, Critical Habitat, and EFH Mitigation Measures

The City of Kodiak plans to incorporate the following measures to avoid and minimize impacts to protected species and habitat:

General Construction Mitigation Measures

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

- The project uses a design that does not require fill.
- The project uses a design that does not require blasting.
- The project uses a design that does not require dredging.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented. A contractor supplied Storm Water Pollution Prevention Plan will be in place during construction.
- Spill response equipment will be kept on-site during construction.

General Pile Driving Measures

- The replacement float uses a design that incorporates the smallest-diameter piles practicable while still minimizing the overall number of piles. This design was selected to minimize noise impacts associated with larger piles.
- To minimized construction noise levels as much as possible the contractor will first attempt to direct pull piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- Vibratory hammers and down-hole drilling methods will be used to install piles; the impact hammer will be used only to ensure the piles are secure (proofed) in bedrock.
- Noise associated with in-water pile driving will be localized and short-term. In-water construction would last approximately 2.5 months; during that time vibratory pile driving would occur for approximately 8 hours and down-hole drilling would occur for approximately 48 hours.
- As recommended by the Alaska Department of Fish and Game, to minimize impacts to pink salmon fry and coho salmon smolt, the contractor will refrain from impact pile driving from May 1 through June 30, within the 12-hour period beginning daily at the start of civil dawn. If impact pile driving occurs from May 1 through June 30, it will occur in the evenings during daylight hours, after the 12-hour period that begins at civil dawn (Frost 2016).

Marine Mammal Mitigation Measures

- The USFWS's recommended draft protocols for avoiding harm to sea otters from noise during pile driving will be implemented to protect sea otters and Steller's eiders.
- NMFS recommended protocols will be implemented to protect ESA and MMPA species as outlined in the forthcoming 4MP, BA, and IHA.
- It is expected that these documents will included the following procedures:
  - **Shutdown Zones**
    The City will implement shutdown zones as defined in the BA, IHA, and described in the 4MP. If a marine mammal comes within or approaches the relevant shutdown zone, such operations shall cease.
  - **Clearing of the Shutdown Zones**
    Prior to the start of in-water down-hole drilling and pile driving activity, the PSO will clear the safety zones for a period of 30 minutes. Clearing the safety zone means a marine mammal has not been observed within the safety zones for that 30 minute period. If a marine mammal is observed within the safety zones, a soft-start cannot proceed until the marine mammal has left the safety zones or has not been observed for 30 minutes.
  - **Soft Start Procedures**
    Before impact or vibratory pile-driving occurs, the contractor will employ soft start procedures. These procedures will be used at the beginning of each pile installation to allow any marine mammal that may be in the immediate area to leave before pile driving reaches full energy. The soft start technique requires pile-driving operators to initiate noise from vibratory hammers for 15 seconds, followed by a 1-minute waiting period. The procedure will be repeated two additional times. For impact driving, operators will be required to provide an initial set of three strikes from the impact hammer, followed by a 1-minute waiting period, then two subsequent three–strike sets.
  - **Shut Down Procedures**
    A shut down will occur when pile driving is suspended. Shut down procedures will be implemented if a marine mammal is observed in or approaching the relevant shutdown zone. Activity will cease until the observer is confident that the marine mammal is clear of the zone of exclusion: The animal will be considered clear if it has been observed leaving the exclusion zone; or it has not been seen in the exclusion zone for 15 minutes.
  - **Sound Attenuation Devices**
    Sound attenuation devices such as pile caps will be used during impact pile driving.
  - **Protected Species Observers (PSOs)**
    Qualified PSOs will be employed for marine mammal monitoring during in-water pile driving activities.

References

Alaska Department of Fish and Game (ADF&G). 2016a. *Species Information, Birds. Steller's Eider (Polysticta stelleri) Species Profile.*Viewed March 2016 at http://www.adfg.alaska.gov/index.cfm?adfg=animals.listbirds

ADF&G. 2016b. Anadromous Fish Streams Interactive Maps, Fish Resource Monitor. Viewed March 2016 at http://extra.sf.adfg.state.ak.us/FishResourceMonitor/?mode=awc

Frost, Will. 2016. April 4, 2016 email correspondence between Will Frost, ADF&G and Kate Arduser, Solstice regarding fish timing windows.

HDR. 2015. Marine Mammal Monitoring and Mitigation Plan Kodiak Ferry Terminal and Dock Improvements Project State Project #68938. Prepared for: Alaska Department of Transportation and Public Facilities 6860 Glacier Highway Juneau, Alaska 99801. Prepared by: HDR. With Input from: R&M Consultants, Inc. June 2015.

National Oceanic Atmospheric Administration (NOAA) Fisheries (NMFS). No Date. *Steller Sea Lion Designated Critical Habitat 50 CFR 226.202.* Viewed March 2016 at https://alaskafisheries.noaa.gov/pr/ssl-critical-habitat

NMFS. 2016. *Essential Fish Habitat Mapper v3.0.* As viewed March 2016 at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html

NMFS. 2015. NMFS Biological Opinion on the Kodiak Ferry Terminal Improvements Project. NMFS Alaska Region.

USFWS. 2012. *U.S. Fish and Wildlife Service Protocols for Impact and Vibratory Pile Driving*. Draft 7/3/2012.

Solstice Alaska Consulting, Inc.
2607 Fairbanks Street, Suite B
Anchorage, AK 99503
907.929.5960

April 11, 2016

Jen Martin
U.S. Army Corps of Engineers
Regulatory Division, Kenai Field Office
44669 Sterling Highway, Suite B
Soldotna, AK 99669-7915

Transmitted via email to: cepoa-rd-kenai@usace.army.mil

Subject: City of Kodiak Proposed Transient Float Replacement Project
Near Island Channel, Kodiak Island, Alaska
DA permit application submittal, Designation to consult request

Dear Ms. Martin,

The City of Kodiak (City) proposes to replace their existing transient float located in Kodiak's Near Island Channel. Solstice Alaska Consulting, Inc. (Solstice) is under contract to the City for permitting activities associated with this project.

The purpose of this project is to replace the transient float with one that meets modern standards for vessel mooring and public safety for the next 50 years. The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles (twenty one 12-inch), and installation of the replacement float and steel piles (twelve 24-inch). The replacement float will be located within nearly the same footprint as the existing facility. However, the overall float length will be shortened to improve all around accessibility within City right-of-way limits. Construction of the replacement float is expected to take 2.5 months beginning in March 2017.

No fill, dredging, or blasting is proposed as part of this project and the project will not impact coastal or fresh water wetlands. The project will be conducted within Near Island Channel, a navigable water under Federal jurisdiction. The City is seeking approval of a Department of Army Permit for project activities in navigable waters.

This project will require consultation with and approvals from the State Historic Preservation Officer (SHPO), the U.S. Fish and Wildlife Service (USFWS), and the National Oceanic and Atmospheric Administration Fisheries' National Marine Fisheries Service (NMFS). Research has been conducted and no cultural or historic properties have been identified in the project area; however, Endangered Species Act (ESA)-listed species are common in the project area.

We request that you delegate us as the non-federal designee to conduct National Historic Preservation Act Section 106 consultation with the SHPO and ESA Section 7 Consultation with NMFS and the USFWS on behalf of the U.S. Army Corps of Engineers (Corps). Once the replacement float has been permitted, the City intends to construct the project. The City and Solstice understand that mitigation measures arising from consultation will be included by the Corps as permit stipulations. We plan to copy the Corps on pertinent correspondence with USFWS, NMFS, and the SHPO.

Enclosed is a Department of the Army Permit Application, detailed project description, and permit figures.

If you have questions or need additional information please do not hesitate to call me at 907-929-5960 or email me at kate@solsticeak.com. Thank you for your efforts on this project.

Sincerely,

Kate Arduser

Kate Arduser
Solstice Alaska Consulting, Inc.

Attachments: Department of Army Permit Application; Project Description; Project Figures

Copies: Lon White, City of Kodiak Harbormaster; Amanda Wilson, Windward Project Solutions

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved - OMB No. 0710-0003 Expires: 30-SEPTEMBER-2015

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Lon Middle - Last - White	First - Kate Middle - Last - Arduser
Company - City of Kodiak, Port and Harbor Director	Company - Solstice Alaska Consulting, Inc.
E-mail Address - lwhite@city.kodiak.ak.us	E-mail Address - kate@solsticeak.com
6. APPLICANT'S ADDRESS:	**9. AGENT'S ADDRESS:**
Address- 403 Marine Way	Address- 2607 Fairbanks Street Suite B
City - Kodiak State - AK Zip - 99615 Country - USA	City - Anchorage State - AK Zip - 99503 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	**10. AGENTS PHONE NOs. w/AREA CODE**
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
cell 907-654-8100 907-486-8080 907-486-8090	907-929-5960

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Solstice Alaska Consulting, Inc. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ SIGNATURE OF APPLICANT _____ DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

City of Kodiak Proposed Transient Float Replacement Project

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Near Island Channel	Address East Marine Way
15. LOCATION OF PROJECT Latitude: ◦N 57.788162 Longitude: ◦W -152.400287	City - Kodiak State- AK Zip- 99615

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID Municipality Kodiak

Section - 32 Township - 27S Range - 19W

17. DIRECTIONS TO THE SITE

From the Kodiak Airport take Cape Decision Street to West Rezanof Drive. Turn right on West Rezanof Drive and continue for apprximately five and a half miles to the intersection with West Marine Way. Turn right on West Marine Way following the road as it curves into East Marine Way. Continue along East Marine way approximatley one tenth of a mile to the project site.

18. Nature of Activity (Description of project, include all features)

Please see the attached project description.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

Please see the attached project description.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

This project replaces the existing Kodiak Transient Float. The project removes 19 12-inch steel piles from Waters of the United States and replaces them with 12 24-inch steel piles. No fill is associated with this project.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
0	0	0

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres 0

or

Linear Feet 0

23. Description of Avoidance, Minimization, and Compensation (see instructions)

Please see the attached project description.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- Channel Side Chowder House 420 East Marine Way

City - Kodiak State - AK Zip - 99615

b. Address- Petro Marine 105 East Marine Way

City - Kodiak State - AK Zip - 99615

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
ADEC	Water Quality Cert		concurrent w/ this app	pending	
USFWS	informal consultation		anticipate April 2016		
NMFS-AK	ESA BA		anticipate May 2016		
NMFS-OPR	ESA/MMPA IHA		anticipate May 2016		

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

City of Kodiak Proposed Transient Float Replacement Project
Near Island Channel, Kodiak Island, Alaska
Project Description
April 2016

OVERVIEW

The City of Kodiak (City) proposes to replace their existing Kodiak City Dock, locally known as the Channel Transient Float (or transient float), located in Kodiak's Near Island Channel. The existing float currently provides moorage for transient vessels, however, the float's components are failing and it needs to be replaced. The existing float would be removed and a replacement float that meets modern standards for vessel mooring and public safety would be constructed in the footprint of the existing facility. The project area is currently exposed to extensive vessel traffic and warfing activity. The project takes place in and over Water of the United States; however no fill, dredging, or blasting is proposed as part of this project.

LOCATION

The City's transient float is located off East Marine Way in Near Island Channel as shown in Sheet 1 of 6 and the image below (Figure 1).

Figure 1. Proposed transient float replacement project location.

Near Island Channel separates downtown Kodiak from Near Island (City of Kodiak, Alaska; T27S, R19W, S32, Seward Meridian; USGS Quad Kodiak D-2; Latitude 57.788162°N, Longitude -152.400287°W). The channel is approximately 705 feet wide in the project area. The transient float is situated between a seafood wholesaler approximately 60 feet to the northeast (Alaska Seafood Systems) and marine fuel service floating dock approximately 60 feet to the southwest (Petro Marine Services). A dock is located

340 feet to the southwest (Pier 1) and a shore-based seafood processor is located approximately 590 feet to the southwest.

Purpose and Need

The purpose of this project is to replace the City's transient float with one that meets modern standards for vessel mooring and public safety for the next 50 years.

The existing float needs to be replaced due to its poor condition and reduced capacity. The transient float was built by the State of Alaska (State) in the 1960s. In 1999, the City took over ownership of the float. At that time age-related dilapidation, damage, and deferred maintenance left the dock in a deteriorated state. The City has performed extensive repairs to the float; however, its components are failing. The float has structural issues due to failing walers, stringers, and bullrails. Due to these structural problems the float's capacity has been reduced. The existing ramp is damaged from vessel impact; is steep, slippery when wet, does not meet Americans with Disabilities Act (ADA) requirements, and creates an unnecessary safety risk to users.

The Kodiak Harbor Port and Advisory Board has identified replacement of the existing float as the number one priority capital improvement project for Kodiak Harbors. Because the float provides moorage for vessels commuting from six villages and a diverse transient commercial fishing fleet from all over Alaska and the West Coast, this project is a vital facility for Kodiak's large and diverse transient fleet.

Alternatives

To ensure that the replacement float meets the purpose and need for the project the following design criteria was established:

- Design vessel: 130 foot long
- Design Wind Load: 150 miles/hour, 3 second gust (per American Society of Civil Engineers)
- Design Wave: 3.4 foot boat wake wave with 3.3 second period
- Design Snow Load: 40 pound/square foot
- Dead Load Freeboard: 24 inches
- Design Buoyant Live Load: 40 pound/square foot at 10 inches of freeboard

A No Action Alternative and the proposed alternative were considered for this project, as summarized below.

No-Action Alternative

The City considered a no-action alternative. Under this alternative the existing float would not be replaced. This alternative was dismissed because it does not meet the project's purpose and need to replace the existing float to provide safe mooring for transient vessels in Kodiak. Without replacement, the existing float will continue to deteriorate and eventually become inoperable.

Replace Existing Float (Proposed Alternative)

The City proposes to remove the existing timber float and steel gangway and replace it in its entirety (Sheet 2 of 6). The 12 foot by 330 foot replacement float will be located within nearly the same

footprint as the existing facility. However, the overall float length will be shortened to improve all around accessibility within City right-of-way limits (Sheet 3, 4, 5, of 6). The replacement float will be approximately 57 feet shorter than the existing 387 foot long float. The photograph below shows an aerial view of the existing float (Figure 2).

Figure 2. Existing transient float in Near Island Channel, Kodiak.

Figure 3 shows the footprint of the existing float and the proposed replacement float.

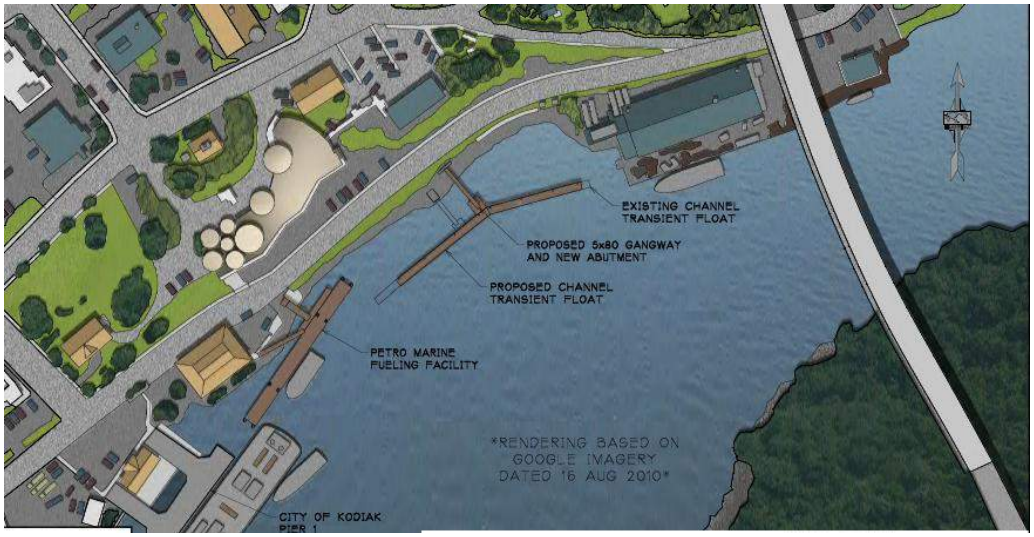


Figure 3. Rendering of proposed transient float in Near Island Channel, Kodiak.

The replacement float will consist of a 4-foot wide by 10-foot long by 3-foot tall concrete gangway abutment (located in uplands); a 5 foot by 80-foot covered aluminum gangway; a 24 foot by 20 foot

gangway float; and the 12 foot by 330 foot mooring float (made up of three 60-foot long and three 50-foot long sections). The float will be supported by twelve 24-inch diameter steel piles (Sheet 3 of 6).

The replacement float will include 50A/30 electrical service in 8 locations and 100A electrical service in 4 locations and water. Illumination poles (12 foot tall), life rings, and fire extinguisher cabinets will be installed on the float.

Construction Methods and Equipment

The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles, and installation of the replacement float and steel piles. No fill, dredging, or blasting is proposed as part of this project. Transient vessels will temporarily be moored at a wide variety of other existing Kodiak port and harbor facilities during construction of the replacement float.

The exact means and methods for construction will be determined by the contractor. It is expected that materials and equipment will be transported to the project site by barge and road. While work is conducted in the water, anchored barges will be used to stage construction materials equipment. The existing piles, fixed pier, float and gangway will be removed and disposed of properly and the new float will be installed.

The exact means and methods for pile installation and extraction will be determined by the contractor. It is estimated that it will take 10 minutes of vibratory pile driving and 4 hours of down-hole drilling per pile for installation, and 20 minutes of vibratory pile driving per pile for extraction. For the installation of 12 piles this is an estimated 2 hours of total time using active vibratory equipment and 48 hours of total time using down-hill drilling. For the in-water extraction of 19 piles this is an estimated 6.33 hours of total time using active vibratory equipment (Table 1).

The 24-inch steel piles will be driven 10-15 feet through sediment and drilled another 10 feet into bedrock. The sequence for installing the 24-inch piles will begin with insertion through overlying sediment with a vibratory hammer for about 8 minutes per pile. Next, a hole will be drilled in the underlying bedrock by using a down-hole drill. A down-hole drill is a drill bit that drills through the sediment and a pulse mechanism that functions at the bottom of the hole, using a pulsing bit to break up the harder materials or rock to allow removal of the fragments and insertion of the pile. The head extends so that the drilling takes place below the pile. Drill cuttings are expelled from the top of the pile as dust or mud. It is estimated that drilling piles through the layered bedrock will take about 4 hours per pile. Finally, the vibratory hammer will be used again to finish driving the piles into bedrock, for approximately 2 minutes per pile (Table 1).

Although impact pile driving is not expected for this project, the contractor may choose to impact proof the piles after down-hole drilling. In this case, two to five blows of an impact hammer would be used to confirm that piles are set into bedrock (impact proofing), for an expected maximum time of 3 minutes of impact hammering per pile. When the impact hammer is employed for proofing, a pile cap or cushion will be placed between the impact hammer and the pile.

The proposed action will require an estimated 7 days total of vibratory extraction and installation, including down-hole drilling. Note that this is an estimate of the number of days when an activity may occur at some point during the day. The number and type of piles and estimated total hours of pile installation and extraction is detailed below (Table 1).

Table 1. Pilings number, type, and estimated number of hours required for driving and extraction

Pile Type, Location, Method	#of Piles	Vibratory Hammer		Down-hole Drill		Impact Hammer	
		# of Piles	Hours	# of Piles	Hours	# of Piles	Hours
12-inch Timber Creosote Existing Abutment Remain in Place	2	0	0	0	0	0	0
12-inch Untreated Existing Float Extraction, Out-of-Water	2	2	0.67	0	0	0	0
12-inch steel Existing Float Extraction, In-Water	19	19	6.33	0	0	0	0
24-inch steel Replacement Float Installation, In-Water	12	12	2	12	48	12	0.6
Total Hours Out-of-Water		--	**0.67**	--	**0**	--	**0**
Total Hours In-Water		--	**8.33**	--	**48**	--	**0.6**

Timeline
Construction is expected to take 2.5 months beginning in March 2017 and ending in May 2017.

Potential Impacts

Wetlands and Waters of the United States
This project will not impact coastal or fresh water wetlands. The project will impact Near Island Channel, a navigable water under Federal jurisdiction. The project removes and replaces an existing float in and over the channel. Twelve 24-inch piles would be placed in the channel to construct the replacement float. No fill is required for this project.

ESA and MMPA Protected Species
All marine mammal species are protected under the Marine Mammal Protection Act (MMPA) and some are also protected under the Endangered Species Act (ESA). Table 2 lists the protected species that may occur in the project area.

Table 2. Protected Species that may occur in the project area

Species	Status	Agency
Northern Sea Otter (Southwest AK DPS ; *Enhydra lutris kenyoni*)	Threatened under ESA	USFWS
Steller's Eider (AK breeding population; *Polysticta stelleri*)	Threatened under ESA	USFWS
Steller Sea Lion (Western DPS; *Eumatopia jubatus)*	Endangered under ESA	NMFS
Humpback Whale (*Megaptera novaeangliae*)	Endangered under ESA	NMFS
Fin Whale (*Balaenoptera physalus*)	Endangered under ESA	NMFS
Harbor Seal (*Phoca vitulina*)	MMPA	NMFS
Harbor Porpoise (*Phocoena phocoena*)	MMPA	NMFS
Killer Whale (*Orcinus orca*)	MMPA	NMFS
Dall's Porpoise (*Phocoenoides dalli*)	MMPA	NMFS

DPS= Distinct Population Segment
Sources: NMFS 2015, HDR 2015

Although the above listed species may occur in the project area, Northern sea otter, Steller sea lions, harbor seals, harbor porpoises, and killer whales are the species most commonly found in the project area. Recent documentation from construction monitoring at the nearby Pier 1 project shows that Steller sea lions and sea otters occur frequently in the project area (Pier 1 is located approximately 590 feet from the transient float). Many individual sea lions have become habituated to human activity in the Kodiak harbor/port area and utilize an artificial haulout float called Dog Bay Float located in St. Herman Harbor, about 4,757 feet from the transient float (Figure 1). This haulout is not federally designated as a "major haulout" and is not considered Steller sea lion critical habitat.

Humpback whales, fin whales, gray whales, and Dall's porpoises generally inhabit more offshore habitats than the Near Island channel and are not expected to occur in the vicinity of the project area (NMFS 2015). Steller's eider are not found near Kodiak in the summer (March-October) and are not common in the project area during the winter. In summer months, the Alaska breeding population of Steller's eiders is typically found in the Arctic Coastal Plain and most Steller's eider migrate to the Alaska Peninsula, Aleutian Islands, and Kodiak Island for the winter (ADF&G 2016a).

To ensure compliance with the ESA and MMPA consultation with the USFWS and NMFS will be required. The City anticipates informal consultation regarding effects to Steller's eider, Northern sea otter, and humpback whales; and to sea otter and Steller sea lion critical habitat. The City anticipates formal consultation regarding effects to the western DPS Steller sea lion. The City plans to develop an Endangered Species Act Section 7 Biological Assessment (BA) for Western DPS Steller sea lion; plans to develop a Marine Mammal Monitoring and Mitigation Plan (4MP) that will be implemented during in-water pile driving and down-hole drilling; and plans to request an Incidental Harassment Authorization (IHA) from NMFS Office of Protected Resources (OPR) for harassment (Level B Take) of Steller sea lion, killer whale, harbor porpoise, and harbor seal, and for possible injury (Level A Take) of Steller sea lion. Mitigation measures arising from consultation will be implemented during construction; anticipated measure are listed below.

ESA Critical Habitat

The project area falls within ESA critical habitat for the northern sea otter and Steller sea lion. In 2009, 5,900 square miles of nearshore marine waters, including all of the Kodiak Archipelago, were designated as Northern sea otter critical habitat under the ESA. The essential elements of Northern sea otter critical habitat are shallow, rocky areas; nearshore waters; kelp forests; and sufficient prey.

The 1993 critical habitat was defined for Steller sea lions as a 20 nautical mile buffer around all major haulouts and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (50 CFR 226.202). Haulouts are located on Long Island and Cape Chiniak, approximately 4 and 12 nautical miles away from the project site, respectively.

Minimal modifications to sea otter and Steller sea lion critical habitat are anticipated in the footprint of the replacement float; however, this area of modification is negligible in terms of the overall impact to the critical habitats, and because the footprint of the replacement float is 57 feet shorter than the existing float.

Essential Fish Habitat

The following Essential Fish Habitat (EFH) species may occur in the project area during at least one phase of their lifestage: flathead sole (*Hippoglossoides elassodon*), rock sole (*Lepidopsetta bilineata*), walleye pollock (*Theragra chalcogramma*), squid (various species), yellowfin sole (*Limanda aspera*), arrowtooth flounder (*Atheresthes stomias*), sculpin (*Cottoidea* spp), Pacific cod (*Gadus macrocephalus*), skate (*Rajidae* spp), chum salmon (*Oncorhynchus keta*), pink salmon (*Oncorhynchus gorbuscha*), coho salmon (*Oncorhynchus kisutch*), sockeye salmon (*Oncorhynchus* nerka), and Chinook salmon (*Oncorhynchus tshawytscha*) (NMFS 2016).

There are no anadromous fish streams in the project area (ADF&G 2016b).

Because no fill would be placed for this project and piles would be placed in a previously disturbed and busy marine traffic area, and because of the conservation measures listed below, the project is not likely to adversely affect EFH.

Avoidance, Minimization, and Mitigation Measures

Waters of the United States Mitigation Statements

Avoidance of impacts to waters of the United States:

The purpose of this project is to replace the existing transient float. The project is needed to provide safe moorage for transient vessels in Kodiak. To meet the project purpose and need the project must be constructed in and over waters of the United States.

Minimization of unavoidable impacts to waters of the United States, including wetlands:

The project uses the most compact design practicable to minimize impacts to waters of the United States. The replacement float will be located in nearly the same footprint and with the same alignment as the existing float. However, the replacement float will be approximately 45 feet shorter than the

existing float. The replacement float will require fewer piles than the existing float. The project will remove 21 piles (2 wood piles and 19 steel piles) and replace them with twelve 24-inch diameter steel piles.

Compensation for unavoidable impacts to waters of the U.S., including wetlands:
Compensatory mitigation is not proposed for this project because this project does not require fill, dredging, or blasting and is located in the previously disturbed footprint of the existing float. Also, the project is a City sponsored public facility used to support Kodiak's large and diverse transient fleet.

Protected Species, Critical Habitat, and EFH Mitigation Measures

The City of Kodiak plans to incorporate the following measures to avoid and minimize impacts to protected species and habitat:

General Construction Mitigation Measures

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

- The project uses a design that does not require fill.
- The project uses a design that does not require blasting.
- The project uses a design that does not require dredging.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented. A contractor supplied Storm Water Pollution Prevention Plan will be in place during construction.
- Spill response equipment will be kept on-site during construction.

General Pile Driving Measures

- The replacement float uses a design that incorporates the smallest-diameter piles practicable while still minimizing the overall number of piles. This design was selected to minimize noise impacts associated with larger piles.
- To minimized construction noise levels as much as possible the contractor will first attempt to direct pull piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- Vibratory hammers and down-hole drilling methods will be used to install piles; the impact hammer will be used only to ensure the piles are secure (proofed) in bedrock.
- Noise associated with in-water pile driving will be localized and short-term. In-water construction would last approximately 2.5 months; during that time vibratory pile driving would occur for approximately 8 hours and down-hole drilling would occur for approximately 48 hours.
- As recommended by the Alaska Department of Fish and Game, to minimize impacts to pink salmon fry and coho salmon smolt, the contractor will refrain from impact pile driving from May 1 through June 30, within the 12-hour period beginning daily at the start of civil dawn. If impact pile driving occurs from May 1 through June 30, it will occur in the evenings during daylight hours, after the 12-hour period that begins at civil dawn (Frost 2016).

Marine Mammal Mitigation Measures

- The USFWS's recommended draft protocols for avoiding harm to sea otters from noise during pile driving will be implemented to protect sea otters and Steller's eiders.
- NMFS recommended protocols will be implemented to protect ESA and MMPA species as outlined in the forthcoming 4MP, BA, and IHA.
- It is expected that these documents will included the following procedures:
  - **Shutdown Zones**
    The City will implement shutdown zones as defined in the BA, IHA, and described in the 4MP. If a marine mammal comes within or approaches the relevant shutdown zone, such operations shall cease.
  - **Clearing of the Shutdown Zones**
    Prior to the start of in-water down-hole drilling and pile driving activity, the PSO will clear the safety zones for a period of 30 minutes. Clearing the safety zone means a marine mammal has not been observed within the safety zones for that 30 minute period. If a marine mammal is observed within the safety zones, a soft-start cannot proceed until the marine mammal has left the safety zones or has not been observed for 30 minutes.
  - **Soft Start Procedures**
    Before impact or vibratory pile-driving occurs, the contractor will employ soft start procedures. These procedures will be used at the beginning of each pile installation to allow any marine mammal that may be in the immediate area to leave before pile driving reaches full energy. The soft start technique requires pile-driving operators to initiate noise from vibratory hammers for 15 seconds, followed by a 1-minute waiting period. The procedure will be repeated two additional times. For impact driving, operators will be required to provide an initial set of three strikes from the impact hammer, followed by a 1-minute waiting period, then two subsequent three–strike sets.
  - **Shut Down Procedures**
    A shut down will occur when pile driving is suspended. Shut down procedures will be implemented if a marine mammal is observed in or approaching the relevant shutdown zone. Activity will cease until the observer is confident that the marine mammal is clear of the zone of exclusion: The animal will be considered clear if it has been observed leaving the exclusion zone; or it has not been seen in the exclusion zone for 15 minutes.
  - **Sound Attenuation Devices**
    Sound attenuation devices such as pile caps will be used during impact pile driving.
  - **Protected Species Observers (PSOs)**
    Qualified PSOs will be employed for marine mammal monitoring during in-water pile driving activities.

References

Alaska Department of Fish and Game (ADF&G). 2016a. *Species Information, Birds. Steller's Eider (Polysticta stelleri) Species Profile.*Viewed March 2016 at http://www.adfg.alaska.gov/index.cfm?adfg=animals.listbirds

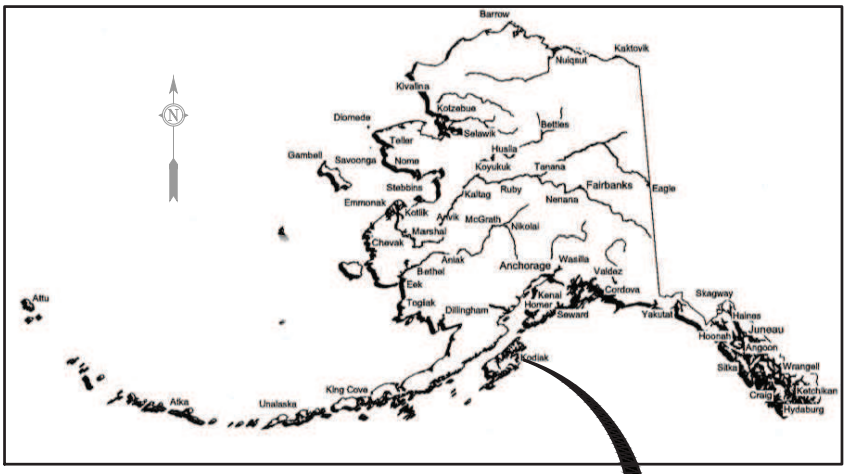
ADF&G. 2016b. Anadromous Fish Streams Interactive Maps, Fish Resource Monitor. Viewed March 2016 at http://extra.sf.adfg.state.ak.us/FishResourceMonitor/?mode=awc

Frost, Will. 2016. April 4, 2016 email correspondence between Will Frost, ADF&G and Kate Arduser, Solstice regarding fish timing windows.

National Oceanic Atmospheric Administration (NOAA) Fisheries. No Date. *Steller Sea Lion Designated Critical Habitat 50 CFR 226.202.* Viewed March 2016 at https://alaskafisheries.noaa.gov/pr/ssl-critical-habitat

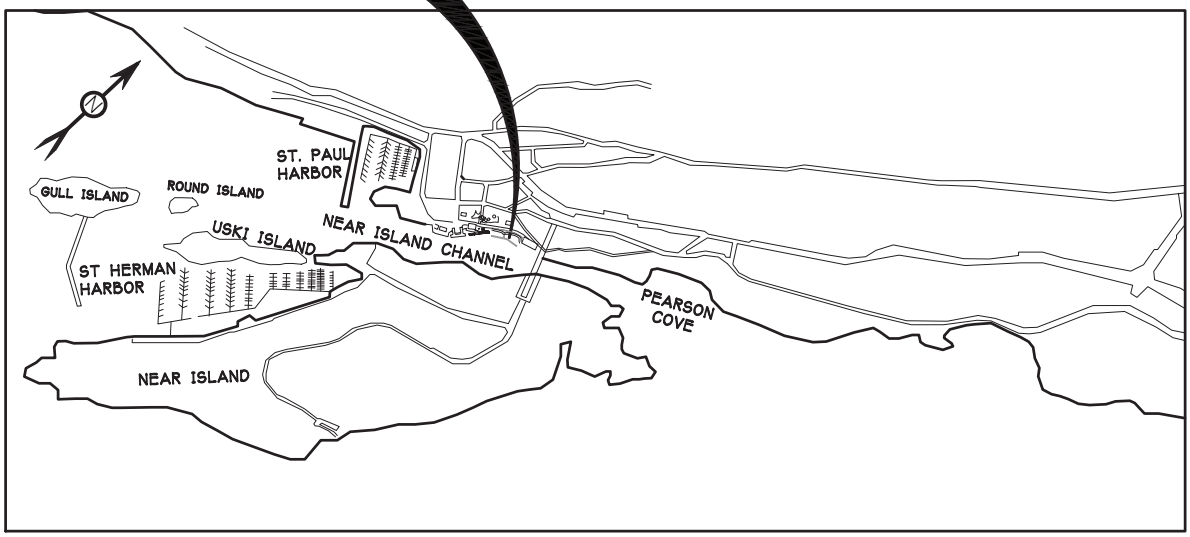
NOAA Fisheries. 2016. *Essential Fish Habitat Mapper v3.0.* As viewed March 2016 at http://www.habitat.noaa.gov/protection/efh/habitatmapper.html

USFWS. July 2012. *U.S. Fish and Wildlife Service Protocols for Impact and Vibratory Pile Driving*. Draft 7/3/2012.



PROJECT LOCATION

PROJECT VICINITY



ADJACENT PROPERTY OWNERS:

CHANNEL SIDE CHOWDER HOUSE
420 E MARINE WAY
KODIAK, AK 99615

PETRO MARINE SERVICES
105 E. MARINE WAY,
KODIAK, AK 99615

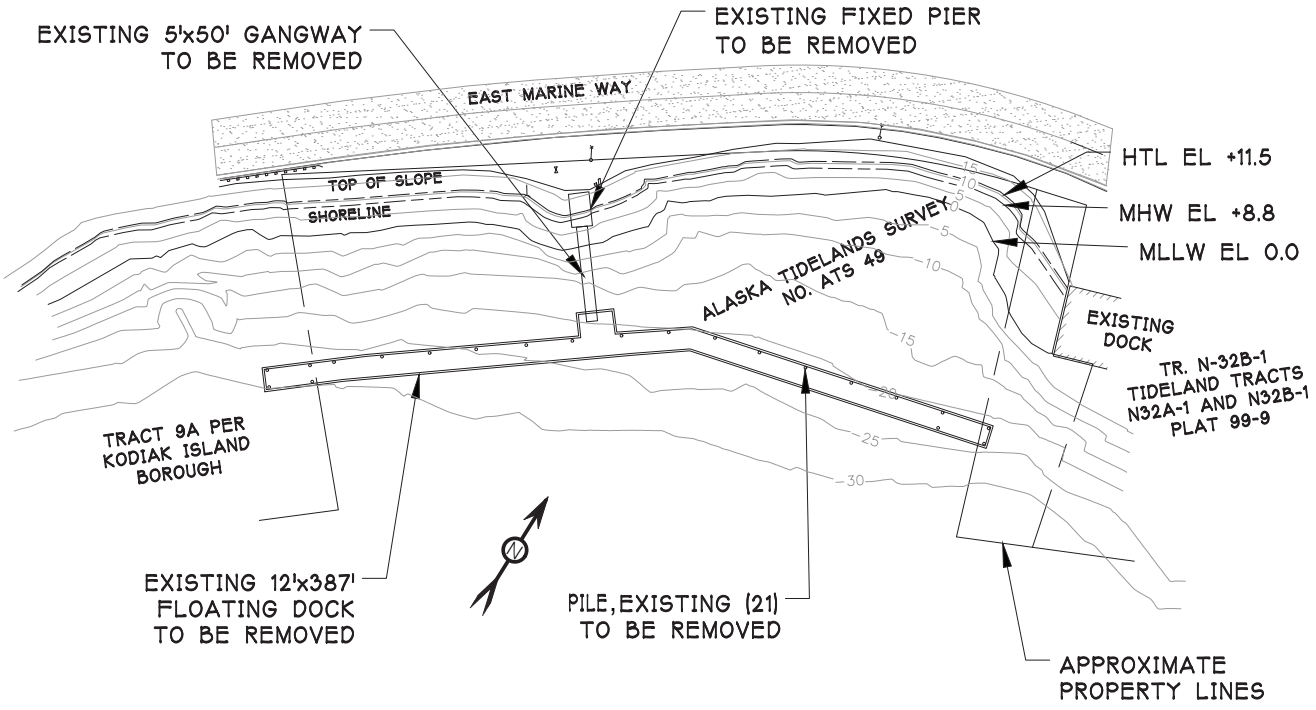
PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT

DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'

VICINITY MAP & LOCATION MAP

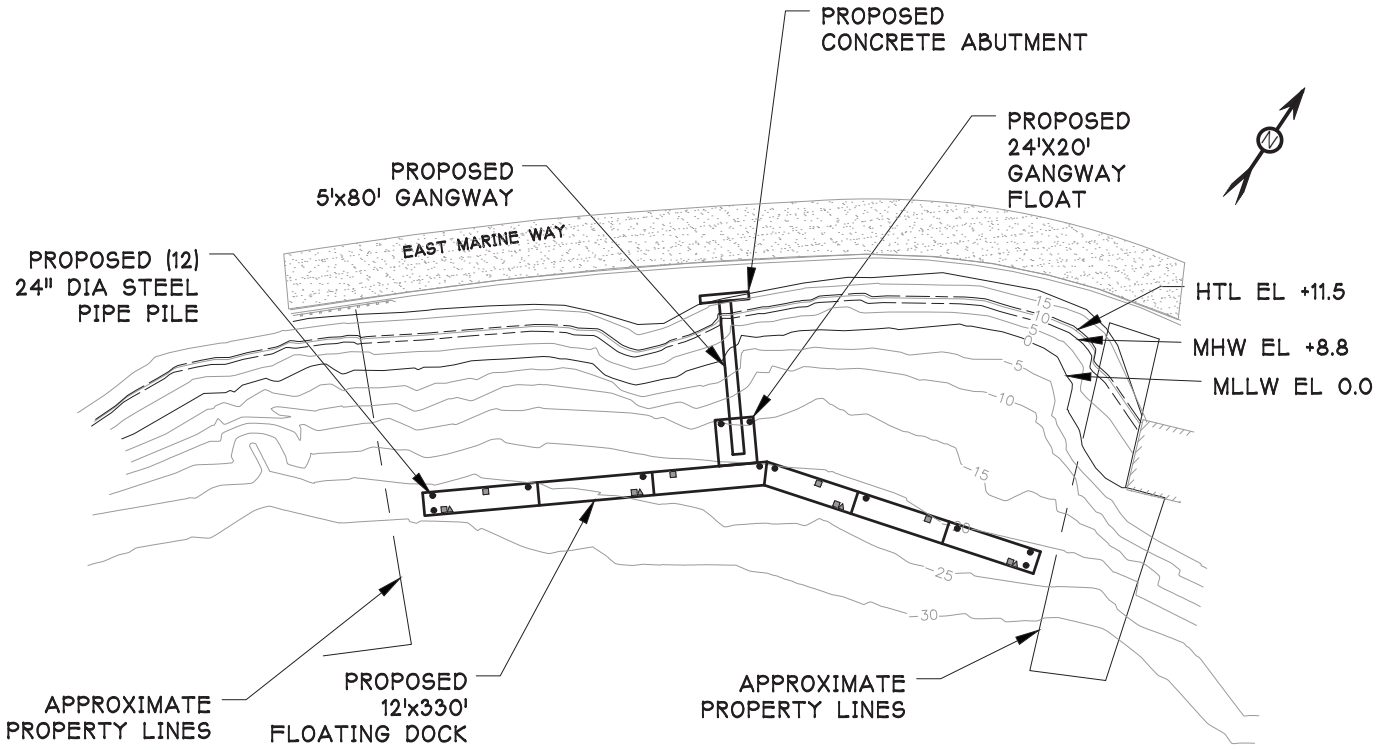
CITY OF KODIAK
JOB NO. 13_145_A

PROPOSED: TRANSIENT FLOAT
IN: NEAR ISLAND CHANNEL
AT: KODIAK, AK
APPLICATION BY: CITY OF KODIAK
DATE: 6 APR '16 SHEET: 1 OF 6



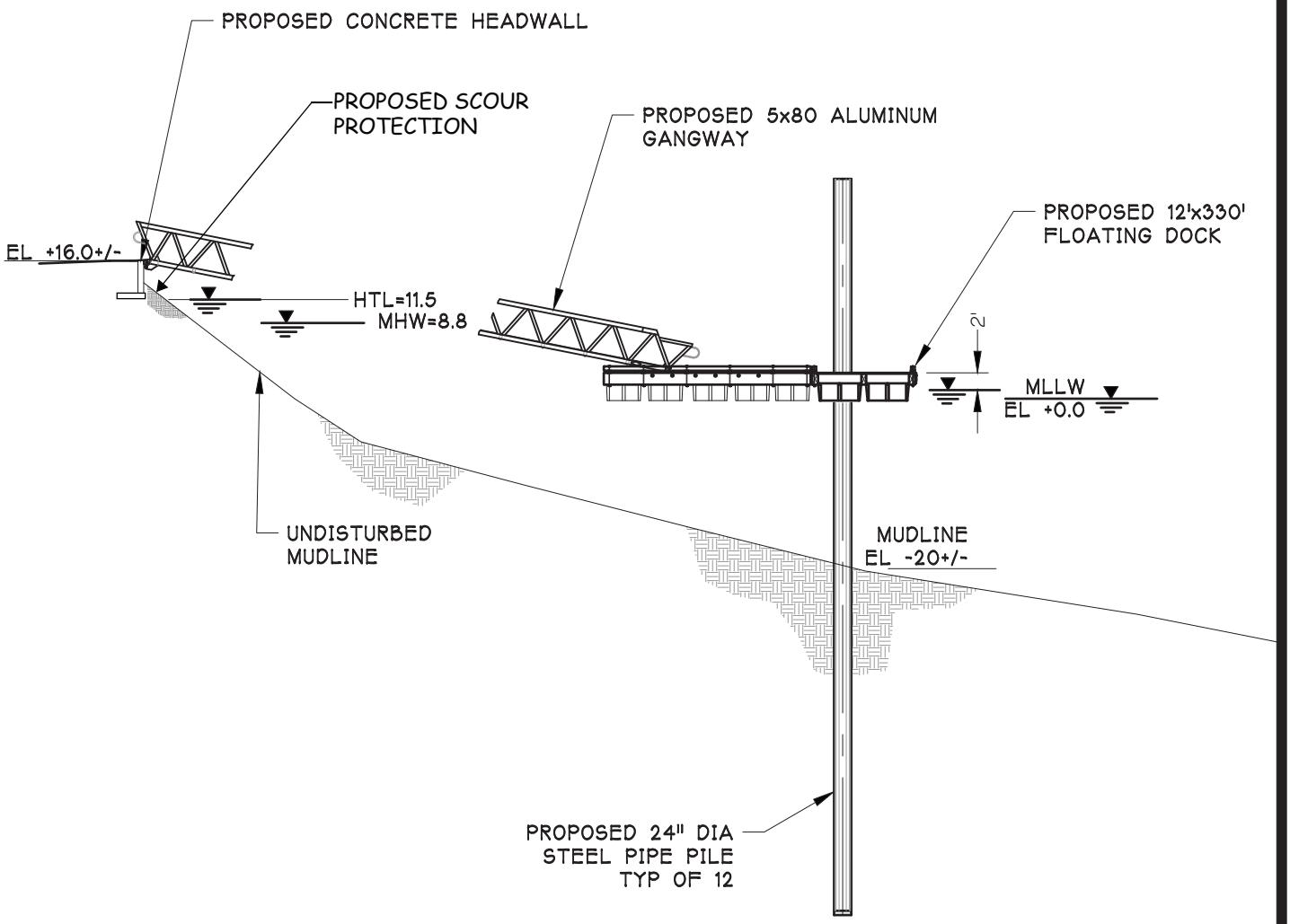
EXISTING SITE PLAN

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	EXISTING SITE PLAN	PROPOSED: KODIAK TRANSIENT FLOAT
	0 50 100	IN: NEAR ISLAND CHANNEL
	SCALE: 1" = 100'	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 17 OCT '16 SHEET: 2 OF 6



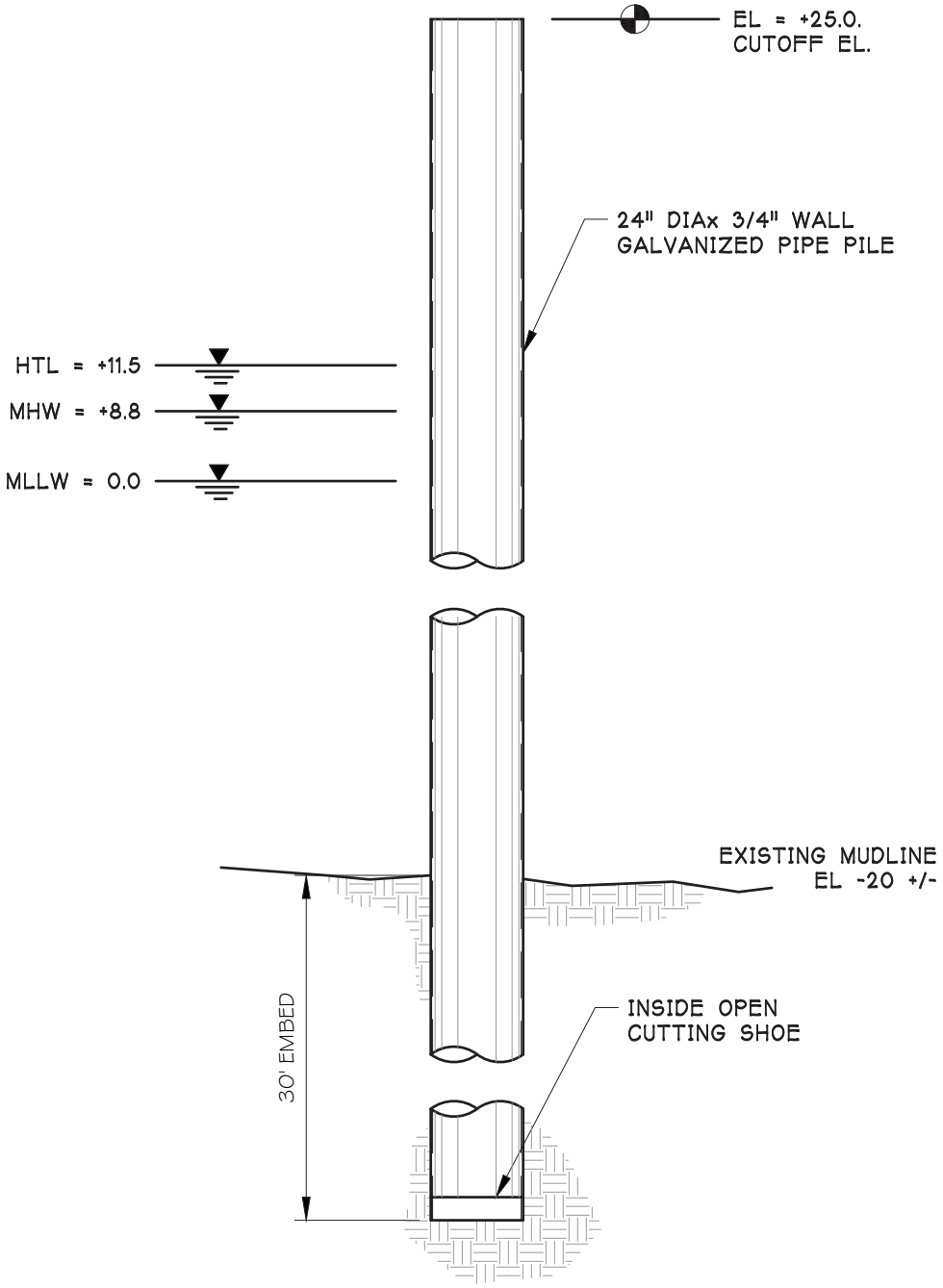
PROPOSED SITE PLAN

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	SITE PLAN OF IMPROVEMENTS	PROPOSED: KODIAK TRANSIENT FLOAT
	0 50 100	IN: NEAR ISLAND CHANNEL
	SCALE: 1" = 100'	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 06 APR '16 SHEET: 3 OF 6



TYPICAL ELEVATION

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	TYPICAL ELEVATION	PROPOSED: KODIAK TRANSIENT FLOAT
	0 10 20	IN: NEAR ISLAND CHANNEL
	SCALE: 1" = 20'	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 17 OCT '16 SHEET: 4 OF 6



TYPICAL PILE

* FLOAT NOT SHOWN FOR CLARITY

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT

DATUM: 0.0'

HTL = 11.5'
MHW = 8.78'
MLLW = 0.0'

PILE DETAILS

0 1' 2' 4'

SCALE: 1/4" = 1'-0"

CITY OF KODIAK

JOB NO. 13_145_A

PROPOSED: KOKIAK TRANSIENT FLOAT

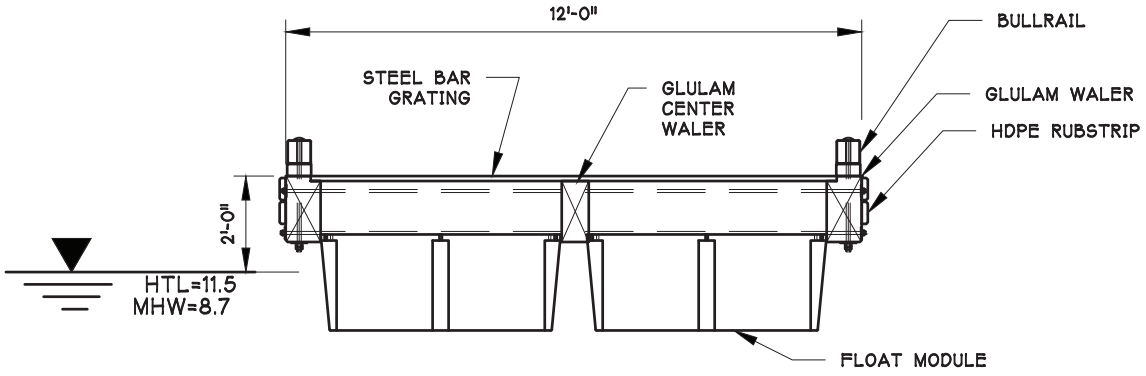
IN: NEAR ISLAND CHANNEL

AT: KODIAK, AK

APPLICATION BY: CITY OF KODIAK

DATE: 06 APR '16

SHEET: 5 OF 6



TYPICAL FLOAT SECTION

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	FLOAT TYPICAL SECTION	PROPOSED: KODIAK TRANSIENT FLOAT
	0 1' 2' 4'	IN: NEAR ISLAND CHANNEL
	SCALE: 1/4" = 1'-0"	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 06 APR '16 SHEET: 6 OF 6

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

City of Kodiak Transient Float Replacement Project
Kodiak, Alaska

October 2016

Prepared for:
City of Kodiak Port and Harbors
403 Marine Way
Kodiak, Alaska 99615

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

Submitted to:
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

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Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
BA	Biological Assessment
City	City of Kodiak
dB	decibels
dB re 1 µPa	decibels referenced to one microPascal
BMP	best management practice
DPS	distinct population segment
eDPS	eastern distinct population segment
ESA	Endangered Species Act
ft	feet
Hz	hertz
IHA	Incidental Harassment Authorization
kHz	kilohertz
km	kilometer
m	meter
MMPA	Marine Mammal Protection Act
nm	nautical mile
NMFS	National Marine Fisheries Service
NMFS OPR	NMFS Office of Protected Resources- Permits and Conservation Division
PSO	Protected Species Observer
rms	root mean square
TS	threshold shift
TTS	temporary threshold shift
PTS	permanent threshold shift
SPL	sound pressure level
USACE	U.S. Army Corp of Engineers
USFWS	U.S. Fish and Wildlife Service
wDPS	western distinct population segment

1 INTRODUCTION

1.1 Background and Project History

Section 7(a)(2) of the Endangered Species Act (ESA), 16 U.S.C. § 1531 et seq., requires that each federal agency shall insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or destroy or adversely modify critical habitat of such species. When the action of a federal agency may adversely affect a protected species, that agency is required to consult with either the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the species that may be affected. For the actions described in this Biological Assessment (BA), the action agency is the U.S. Army Corps of Engineers (USACE), which is issuing a Section 10 permit for the proposed action in and over navigable waters of the United States to the applicant, the City of Kodiak (City). In addition, the NMFS Office of Protected Resources- Permits and Conservation Division (NMFS OPR) proposes to issue a permit to the City to incidentally take marine mammals under the Marine Mammal Protection Act (MMPA) in association with this project. The consulting agency is the NMFS Alaska Region. The USACE has designated Solstice Alaska Consulting, Inc, as their designated non-federal representative to assist with these consultations.

The City proposes to replace their existing Kodiak City Dock, locally known as the Channel Transient Float (Transient Float). The project action area encompasses approximately 0.47 square kilometers (0.18 square miles) originating from the Transient Float in Kodiak's Near Island Channel. The purpose of this project is to replace the Transient Float with one that meets modern standards for vessel mooring and public safety for the next 50 years. The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles, and installation of the replacement float and steel piles.

In the action area, the waters off Kodiak Island are listed as habitat for the federally-listed endangered western Distinct Population Segment (wDPS) of Steller sea lions (*Eumetopias jubatus*), the federally-listed threatened Mexico DPS of humpback whales (*Megaptera novaeangliae*), the federally-listed endangered Western North Pacific (WNP) DPS of humpback whales, and the federally-listed endangered fin whale (*Balaenoptera physalus*). Portions of the action area are designated as critical habitat for Steller sea lions. Proposed activities included as part of the float replacement project with potential to affect species listed under the ESA include vibratory and impact pile-driving operations and use of a down-hole drill to install piles in bedrock and marine vessel uses associated with construction operations.

We conclude that the proposed Kodiak Transient Float Replacement Project **is likely to adversely affect the wDPS of Steller sea lions and the Mexico DPS of humpback** due to the noise associated with construction activity. Noise associated with the proposed project may reach levels exposing Steller sea lions and humpback whales to harassment (Level B) and injurious (Level A) take under the MMPA, and therefore, cannot be considered having insignificant or discountable effects on the species. However, mitigation measures will be implemented throughout the duration of the project to reduce exposure of Steller sea lions and humpback whales to noise associated with the construction activity.

Due to the limited exposure of designated critical habitat to increased underwater noise associated with in-water construction, and the currently degraded nature of designated critical habitat in the action area

(i.e., currently an active port and harbor), effects to critical habitat are anticipated to be insignificant. Therefore, we conclude that the proposed Kodiak Transient Float Replacement Project **may affect, but is not likely to adversely affect designated critical habitat for Steller sea lions in the action area**.

Endangered WNP DPS humpback whales are uncommon in Alaskan waters. This stock has been documented along the coast in the central Gulf of Alaska between Yakutat and the Alaska Peninsula with a low probability of occurrence (0.5%). Because the probability of encountering the WNP DBS of humpback whales within the action area is sufficiently low, it is considered discountable. Therefore, this project is **not likely to adversely affect the WNP DPS of humpback whales.**

Due to the unlikely potential that fin whales will occur within the project action area and the implementation of mitigation measures to reduce exposure of marine mammals to noise associated with the construction activity (i.e. shutting down if observed in the area), we conclude that the proposed float replacement project **will have no effect on fin whales**. Fin whales are typically found in deep, offshore waters. Fin whales were not observed during monitoring of Near Island Channel for Kodiak Ferry Terminal and Dock Improvements Project over 110 days between November 2015 through June 2016. Because fin whales are not expected to occur in the project area, they are not discussed in this BA.

Table 1. Determination of effects from the proposed Kodiak Transient Float Replacement Project on Steller sea lions.

Species/Critical Habitat	Listed Status	Determination of Effects
Steller sea lion (*Eumetopia jubatus*) (wDPS)	Endangered	Likely to Adversely Affect
Steller sea lion (*Eumetopia jubatus*) critical habitat	Designated	Not Likely to Adversely Affect
Humpback whale (*Megaptera novaeangliae)* (Mexico DPS)	Threatened	Likely to Adversely Affect
Humpback whale (*Megaptera novaeangliae)* (Western North Pacific DPS)	Endangered	Not Likely to Adversely Affect
Fin whale (*Balaenoptera physalus*)	Endangered	No Effect

2 PROJECT DESCRIPTION

2.1 Purpose and Need

The City of Kodiak (City) proposes to remove and replace their existing Transient Float. The float currently provides moorage for vessels commuting from six villages and a diverse transient commercial fishing fleet from all over Alaska and the West Coast. The purpose of this project is to replace the float with one that meets modern standards for vessel mooring and public safety for the next 50 years. The existing float has structural issues due to failing walers, stringers, and bullrails. Due to these structural problems the float's capacity has been reduced. The existing float needs to be replaced due to its poor condition and reduced capacity.

2.2 Project Location

The City's Transient Float is located in Near Island Channel in the City of Kodiak, Alaska. Near Island Channel separates downtown Kodiak from Near Island (City of Kodiak, Alaska; T27S, R19W, S32, Seward Meridian; USGS Quad Kodiak D-2; Latitude 57.788162°N, Longitude -152.400287°W; Figure). The channel is located within Chiniak Bay which opens to the Gulf of Alaska.

The proposed project is located in a busy industrial area (Figure 2). Channel Side Services' seafood packing facility is located approximately 25 meters (m; 82 feet [ft]) east of the float and Petro Marine Services floating fuel dock is located approximately 20 m (66 ft) west of the float. Pier 1, the Alaska Marine Highway Ferry dock, is located 100 m (328 ft) southwest of the float and Trident Seafood's shore-based seafood processing plant is located approximately 175 m (574 ft) to the southwest (Figure 3; Google Earth 2016). When in operation, Trident's plant receives numerous commercial fishing vessels daily for offloading and processing of catch. The replacement float will be constructed in nearly the same footprint as the existing float, within City right-of-way limits.

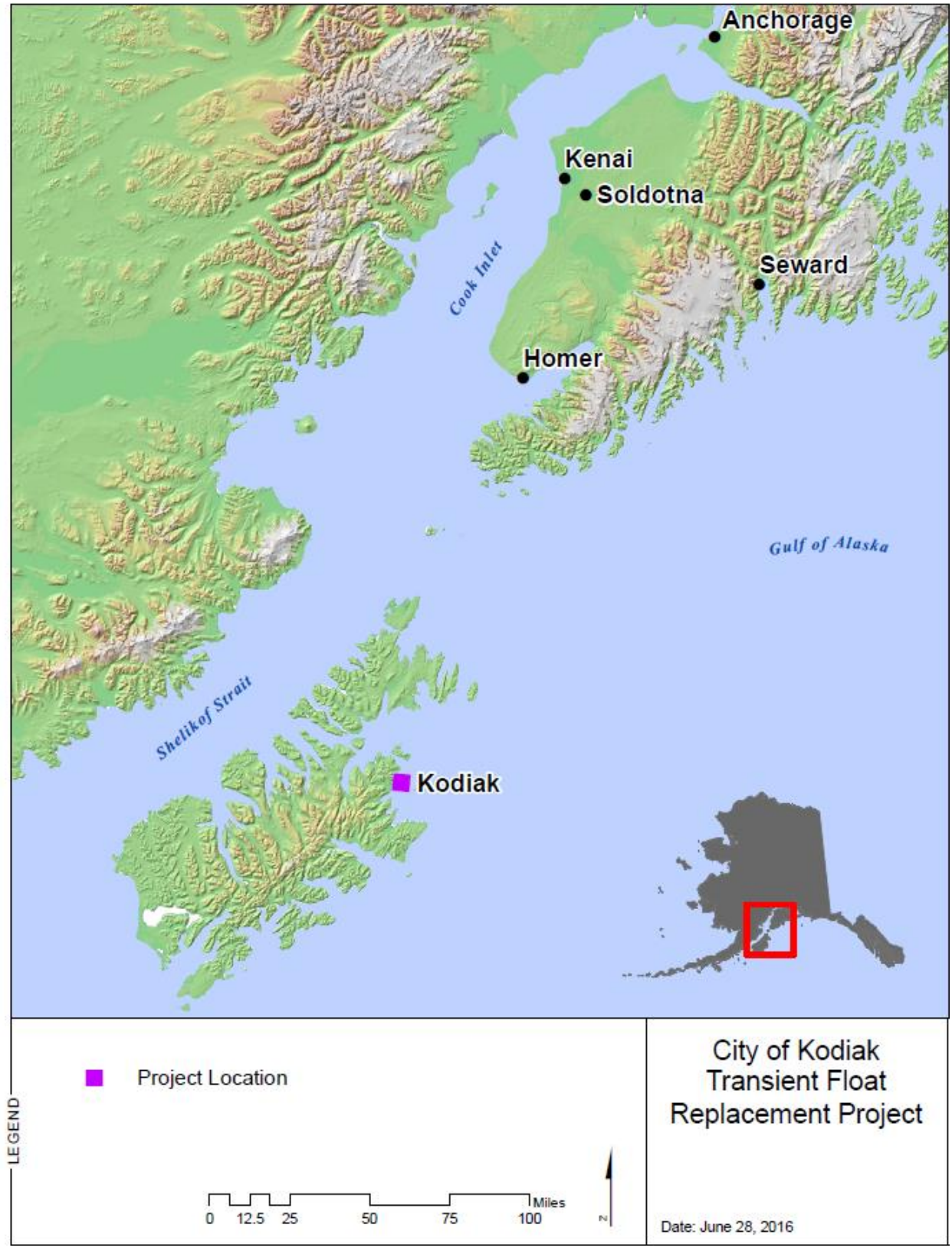

Figure 1. Map of the proposed project location.

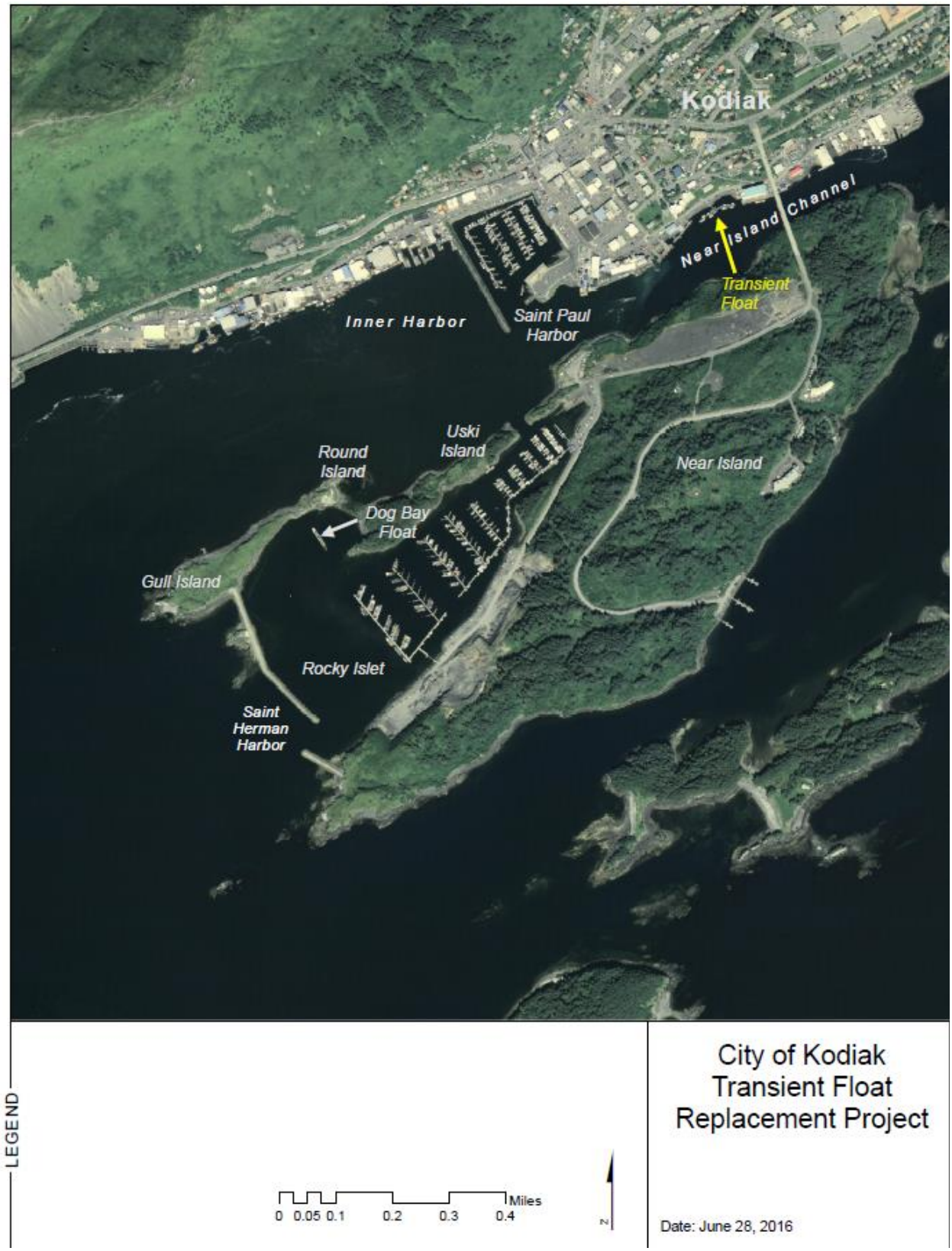

Figure 2. Proposed project location in Near Island Channel.

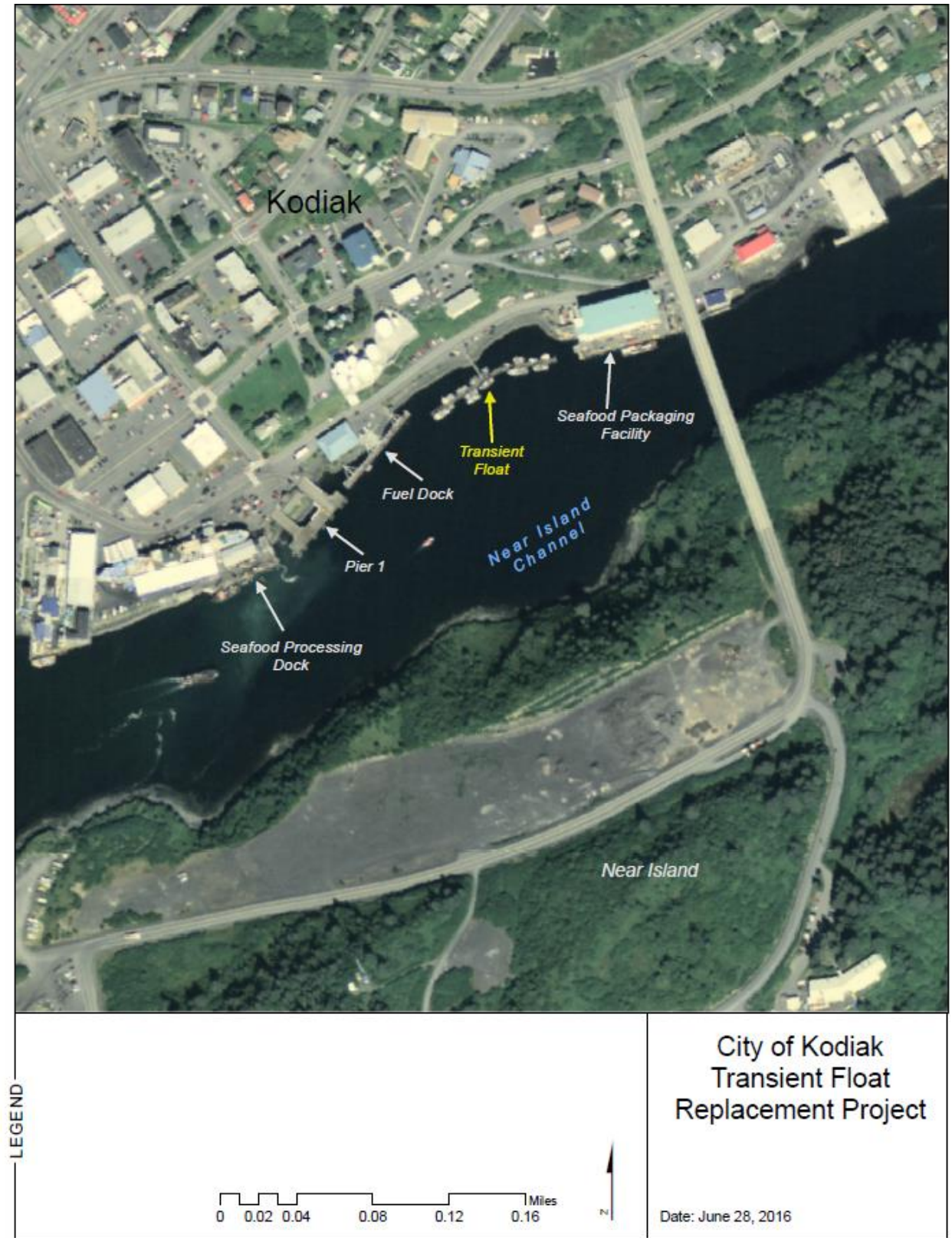

Figure 3. Proposed project location relative to nearby facilities.

2.3 Definition of Action Area

"Action areas" are defined as "all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action" (50 CFR §402.02(d)). The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

The action area for the proposed Kodiak Transient Float Replacement Project encompasses approximately 0.47 square kilometers (0.18 square miles) and includes a 7,000 m (22,966 ft) radius (that is truncated by landforms) around project area (Figure 4). The radius reflects the calculated distance for the sound level threshold of 120 decibels (dB) referenced to one microPascal root mean square (dB re 1 µPa rms) during down-hole drilling (Warner and Austin 2016a, Warner and Austin 2016b). The distance from 120 dB re 1 µPa rms was chosen because NMFS presently considers the exposure of marine mammals to continuous noise (e.g., down-hole drilling) sound levels above 120 dB re 1 µPa rms to cause harassment. Furthermore, the action area will be truncated where land masses obstruct underwater sound transmission. See Section 5.1.1 for details about how the area was determined.

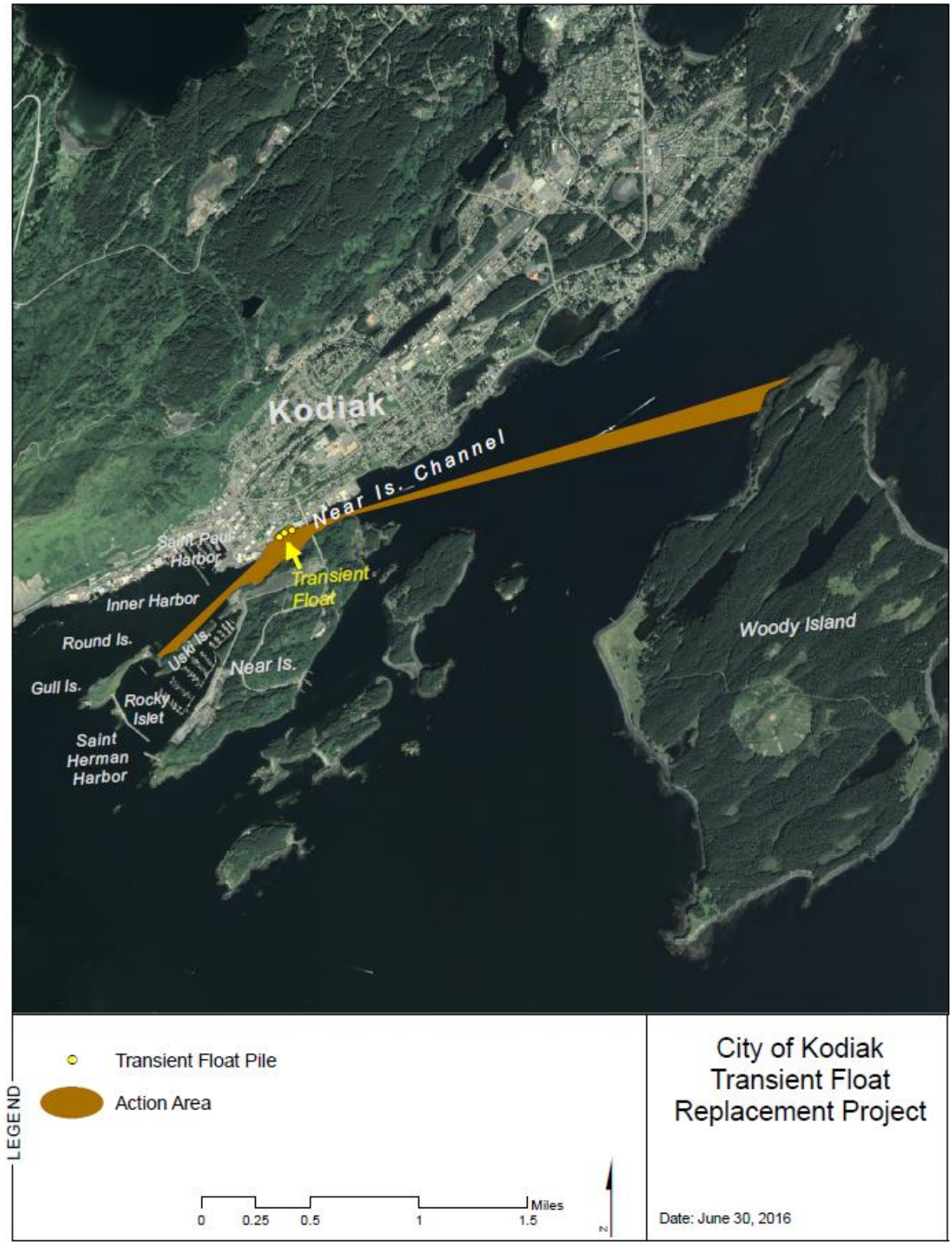

Figure 4. Action area for the proposed project.

The action area encompasses approximately 0.47 square kilometers (0.18 square miles).

2.4 Proposed Action

The City proposes to remove the existing 3.7 m by 114 m (12 ft by 375 ft) timber float and steel gangway (Figures 5 and 6) and replace it in its entirety.

The replacement float will be located within nearly the same footprint as the existing facility. However, the overall float length will be shortened to improve all around accessibility within City right-of-way limits. The replacement float will be approximately 14 m (45 ft) shorter than the existing float (Figures 7 and 8).

The replacement float will consist of a 1.2 m wide by 3 m long by 1 m tall (4 ft by 10 ft by 3 ft) concrete gangway abutment (located in uplands); a 1.5 m by 24 m (5 ft by 80 ft) covered aluminum gangway; a 7.3 m by 6 m (24 ft by 20 ft) gangway float; and the 3.7 m by 101 m (12 ft by 330 ft) mooring float (made up of three 18 m (60 ft) and three 15 m (50 ft) sections. The float will be supported by twelve 24-inch diameter steel piles (Figure 8).

The replacement float will include 50A/30 electrical service in 8 locations and 100A electrical service in 4 locations. Illumination poles (3.6 m tall [12 ft]), life rings, and fire extinguisher cabinets will be installed on the float.

Figure 5. Photo of the existing transient float.
(Photo credit: City of Kodiak).

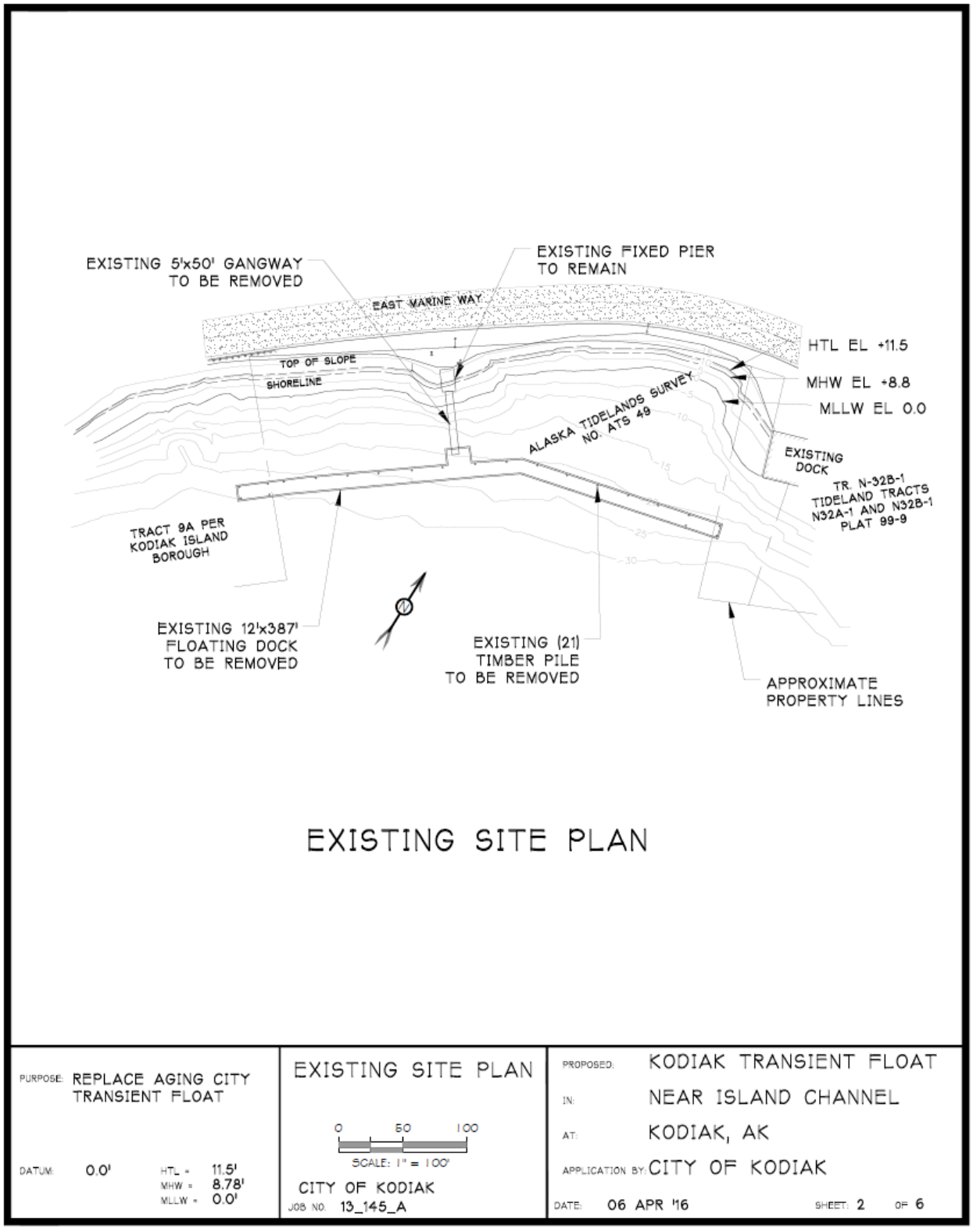

Figure 6. Existing site plan.

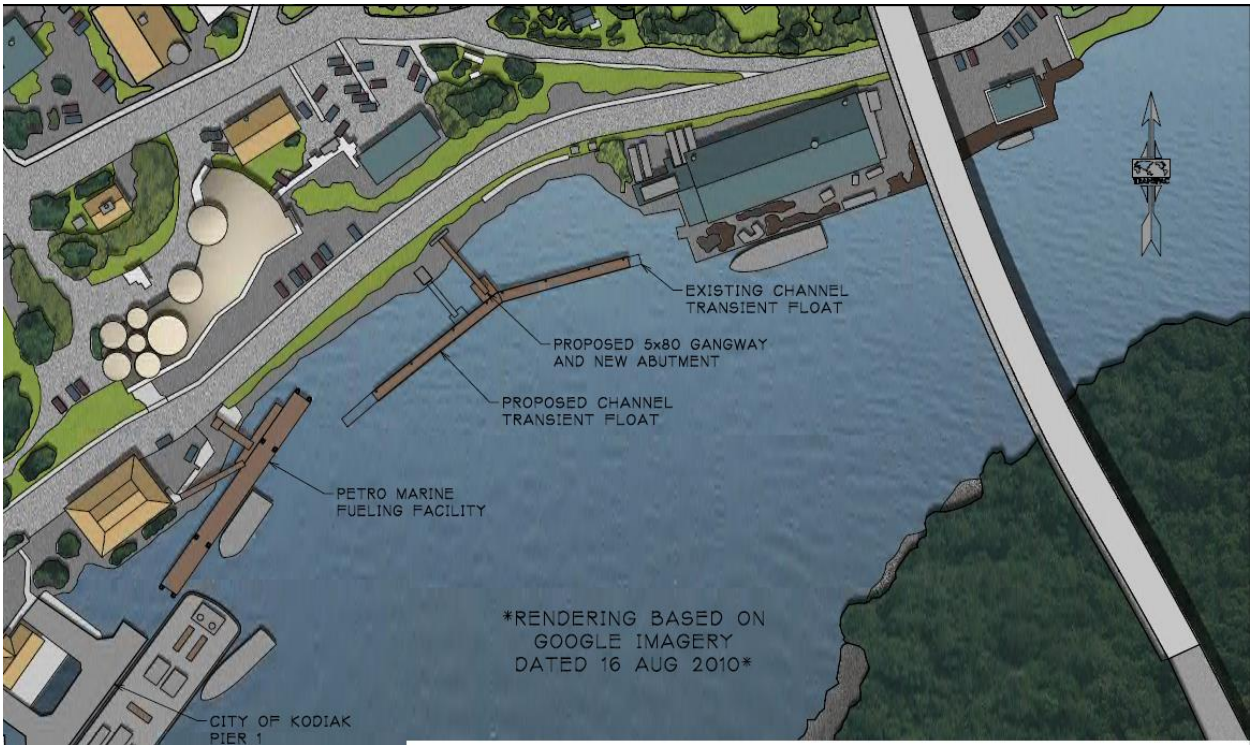

Figure 7. Rendering of existing and proposed float.
Rendering prepared by AJD Engineering for Transpac Marinas in August 2015.

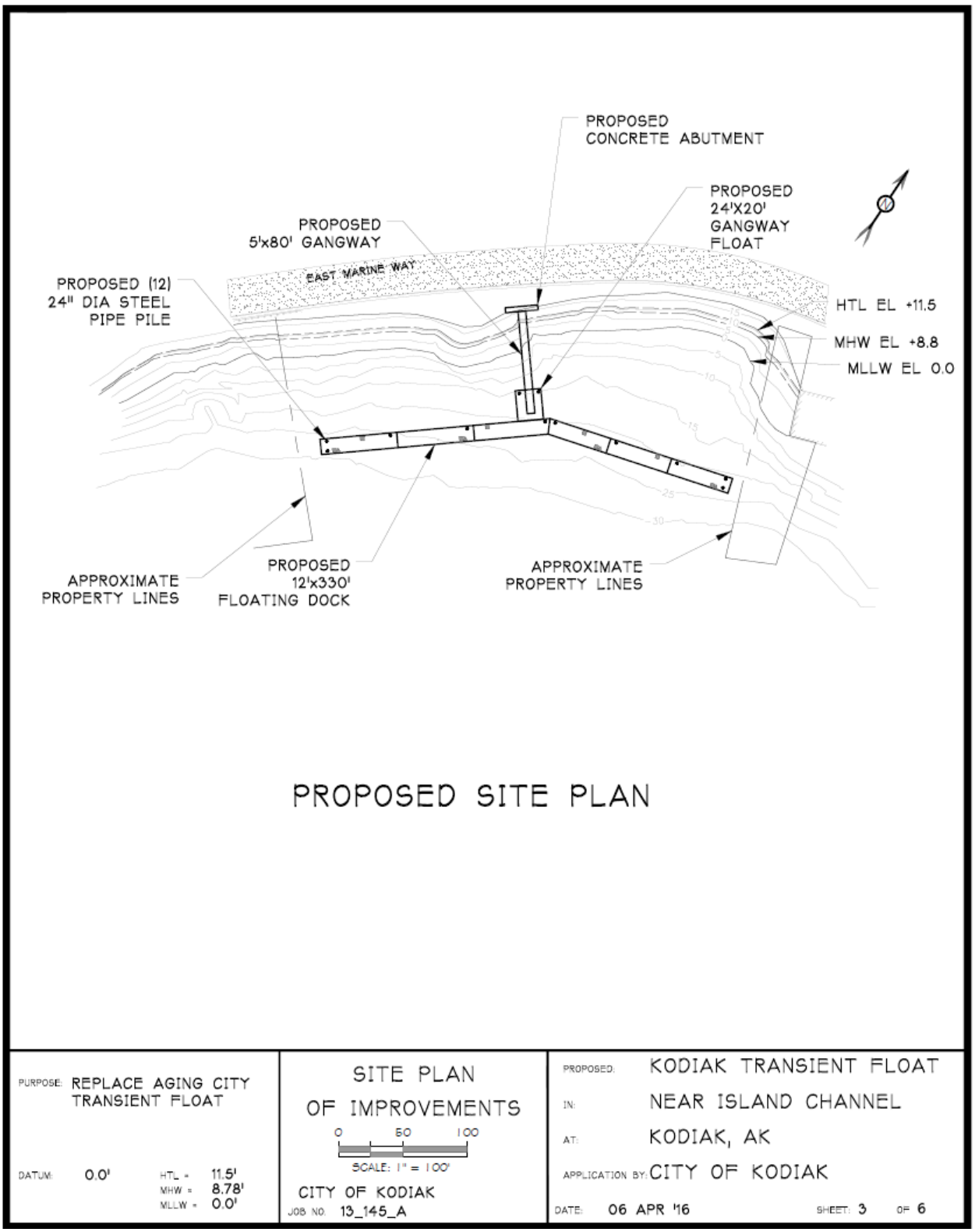

Figure 8. Proposed site plan.

2.4.1 Construction Methods and Equipment

The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles, and installation of the replacement float and steel piles. No fill, dredging, or blasting is proposed as part of this project. Transient vessels will temporarily be moored at a wide variety of other existing Kodiak port and harbor facilities during construction of the replacement float.

The exact means and methods for construction will be determined by the contractor. It is expected that materials and equipment will be transported to the project site by barge and road. While work is conducted in the water, anchored barges will be used to stage construction materials equipment. The existing piles, fixed pier, float and gangway will be removed and disposed of properly and the new float will be installed.

The exact means and methods for pile installation and extraction will be determined by the contractor. It is estimated that it will take 10 minutes of vibratory pile-driving and 4 hours of down-hole drilling per pile for installation, and 20 minutes of vibratory pile-driving per pile for extraction. For the installation of 12 piles this is an estimated 2 hours of total time using active vibratory equipment and 48 hours of total time using down-hole drilling. For the in-water extraction of 19 piles this is an estimated 6.33 hours of total time using active vibratory equipment (Table 2).

The 24-inch steel piles will be driven 3-4.6 m (10-15 ft) through sediment and drilled another 3m (10 ft) into bedrock. The sequence for installing the 24-inch piles will begin with insertion through overlying sediment with a vibratory hammer for about 8 minutes per pile. Next, a hole will be drilled in the underlying bedrock by using a down-hole drill. A down-hole drill is a drill bit that drills through the sediment and a pulse mechanism that functions at the bottom of the hole, using a pulsing bit to break up the harder materials or rock to allow removal of the fragments and insertion of the pile. The head extends so that the drilling takes place below the pile. Drill cuttings are expelled from the top of the pile as dust or mud. It is estimated that drilling piles through the layered bedrock will take about 4 hours per pile. Finally, the vibratory hammer will be used again to finish driving the piles into bedrock, for approximately 2 minutes per pile (Table 2).

Although impact pile-driving is not expected for this project, the contractor may choose to impact proof the piles after down-hole drilling. In this case, two to five blows of an impact hammer would be used to confirm that piles are set into bedrock (impact proofing), for an expected maximum time of 3 minutes of impact hammering per pile. When the impact hammer is employed for proofing, a pile cap or cushion will be placed between the impact hammer and the pile.

The proposed action will require an estimated 7 days total of vibratory extraction and installation, including down-hole drilling. Note that this is an estimate of the number of days when an activity may occur at some point during the day. The number and type of piles and estimated total hours of pile installation and extraction is detailed below (Table 2).

Table 2. Pilings number, type, and estimated number of hours required for driving and extraction.

Pile Type, Location, Method	#of Piles	Vibratory Hammer		Down-hole Drill		Impact Hammer	
		# of Piles	Hours	# of Piles	Hours	# of Piles	Hours
12-inch Timber Creosote Existing Abutment Remain in Place	2	0	0	0	0	0	0
12-inch Untreated Existing Float Extraction, Out-of-Water	2	2	0.67	0	0	0	0
12-inch steel Existing Float Extraction, In-Water	19	19	6.33	0	0	0	0
24-inch steel Replacement Float Installation, In-Water	12	12	2	12	48	12	0.6
Total Hours Out-of-Water		**--**	**0.67**	**--**	**0**	**--**	**0**
Total Hours In-Water		**--**	**8.33**	**--**	**48**	**--**	**0.6**

2.4.2 Timeline

Construction is expected to take 2.5 months beginning in January 2017 and ending in March 2017. The majority of in-water work associated with removal and installation of the float is expected to occur over a 12-day period, however this construction window may not occur on consecutive days. The 2.5-month long construction duration accounts for the time required to mobilize materials and resources, remove and replace piles, remove the existing float, and install the new float, abutment, gangway, electrical components, and other safety features. The 2.5-month long construction duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that could occur if marine mammals come within shutdown zones associated with the project area.

2.5 Proposed Mitigation Measures

Mitigation measures will be implemented to minimize effects to listed species and designated critical habitat. Mitigation measures for the project include marine mammal monitoring, the implementation of monitoring zones, clearing the monitoring zones, soft starts, shut down procedures, and the use of pile caps during impact pile-driving. Details on mitigation measures are found in Section 6.0 Impact Avoidance and Minimization Measures.

3 Description of the Species and their Habitat

ESA-listed species under the jurisdiction of NMFS with potential to occur in the action area are the wDPS of Steller sea lions and the Mexico DPS and WNP DPS of humpback whales. These species and their habitat are described below.

3.1 Steller Sea Lion

3.1.1 Distribution

Steller sea lions' habitat extends around the North Pacific Ocean rim from northern Japan, the Kuril Islands and Okhotsk Sea, through the Aleutian Islands and Bering Sea, along Alaska's southern coast, and south to California (NMFS 2008). They range north to the Bering Strait, with significant numbers at haulouts on St. Lawrence Island in the spring and fall (Kenyon and Rice 1961, Sheffield and Jemison 2010; Figure 9).

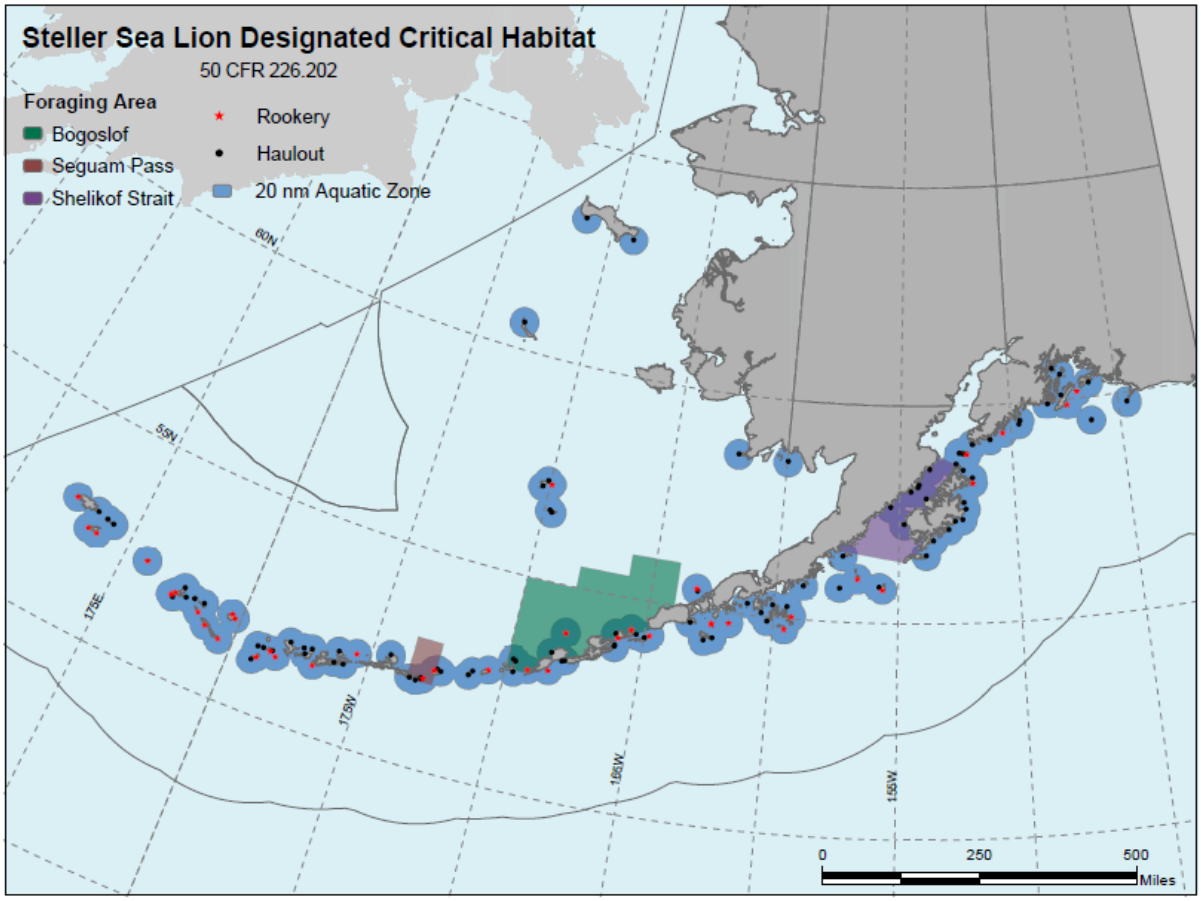

Figure 9. Map of designated critical habitat for the Steller sea lion.
From: 50 CFR 226.202

Land sites used by Steller sea lions are referred to as haulouts and rookeries (Section 3.2.1). Haulouts are used by all age classes of both genders, when sea lions move on and offshore for feeding excursions; however, they are not used for reproductive purposes. Sea lions may make semi-permanent or

permanent one-way movements from one site to another (Chumbley et al. 1997, Burkanov and Loughlin 2005). Round trip migrations of greater than 6,500 kilometer (km) by individual Steller sea lions have been documented (Jemison et al. 2013). Federally designated haulouts near the action area include Long Island and Cape Chiniak, approximately 7 km (4 nautical mile [nm]) and 24 km (13 nm), from the action area, respectively (Figure 10).

Steller sea lions frequently occur in Kodiak Harbor and the action area. Many individual sea lions have become habituated to human activity in the Kodiak harbor/port area and utilize an artificial haulout float called Dog Bay Float located in St. Herman Harbor, approximately 1,400 m (4,600 ft; Google Earth 2016) from the existing Transient Float (Figure 2). The float, originally a section from an old floating breakwater, was relocated to Dog Bay in 2000 to serve as a dedicated sea lion haulout (FHWA and DOT&PF 2015). It serves its purpose of reducing sea lion-human conflicts in Kodiak's docks and harbors by providing an undisturbed haulout location and reducing the numbers of sea lions that haul out on vessel moorage floats. Dog Bay float is not considered a federally designated haulout and is not Steller sea lion critical habitat (NMFS 2015).

3.1.2 Population Status

Two distinct population segments (DPS) of Steller sea lions exist in Alaska including the eastern DPS (eDPS) and the wDPS. The eDPS consists of sea lions breeding to the east of Cape Suckling, Alaska (144°W longitude), and the wDPS consists those animals breeding to the west of Cape Suckling (144°W longitude; NMFS 2013). However, large movements by individual Steller sea lions on either side of the 144°W longitude demarcation are not uncommon, and wDPS individuals are expected to occur in Southeast Alaska north of Sumner Strait (Jemison et al. 2013, NMFS 2013). Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late-May to early-July; Jemison et al. 2013, Allen and Angliss 2014). Most Steller sea lions in the action area are expected to be from the wDPS (Jemison et al. 2013), and therefore, this BA focuses the wDPS of Steller sea lions.

NMFS listed the Steller sea lion as a threatened species under the ESA in 1990 following declines of 63% on certain rookeries since 1985, and declines of 82% since 1960 (NMFS 2012). In 1997, NMFS reclassified the Steller sea lion into the two current DPSs based on genetic studies and phylogeographical analyses from across the sea lion's range. It was at that time that NMFS designated the wDPS as endangered (May 5, 1997; 62 FR 24345). A number of protective measures were implemented to aid recovery (NMFS 2012), and between the 1970s and 2002, the eDPS Steller sea lion population increased on average by 3.1% per year (Pitcher et al. 2007), which is one factor that led to NMFS's decision to delist the eDPS (November 4, 2013; 78 FR 66140).

The 2014 comprehensive estimate (pups and non-pups) for the wDPS abundance in Alaska is 52,209 sea lions based on aerial surveys of non-pups conducted in June and July 2008-2011, and aerial and ground-based pup counts conducted in June and July 2009-2011 (Allen and Angliss 2014). The wDPS declined in abundance by about 70% between the late 1970s and 1990, with evidence that the decline had begun even earlier. Factors potentially contributing to this decline include: 1) incidental take in fisheries, 2) legal and illegal shooting, 3) predation, 4) contaminants, 5) disease, and 6) climate change (NMFS 2008). Although Steller sea lion abundance continues to decline in the western Aleutians, numbers are thought to be increasing in the eastern part of the wDPS range (DeMaster 2011), including in the action area.

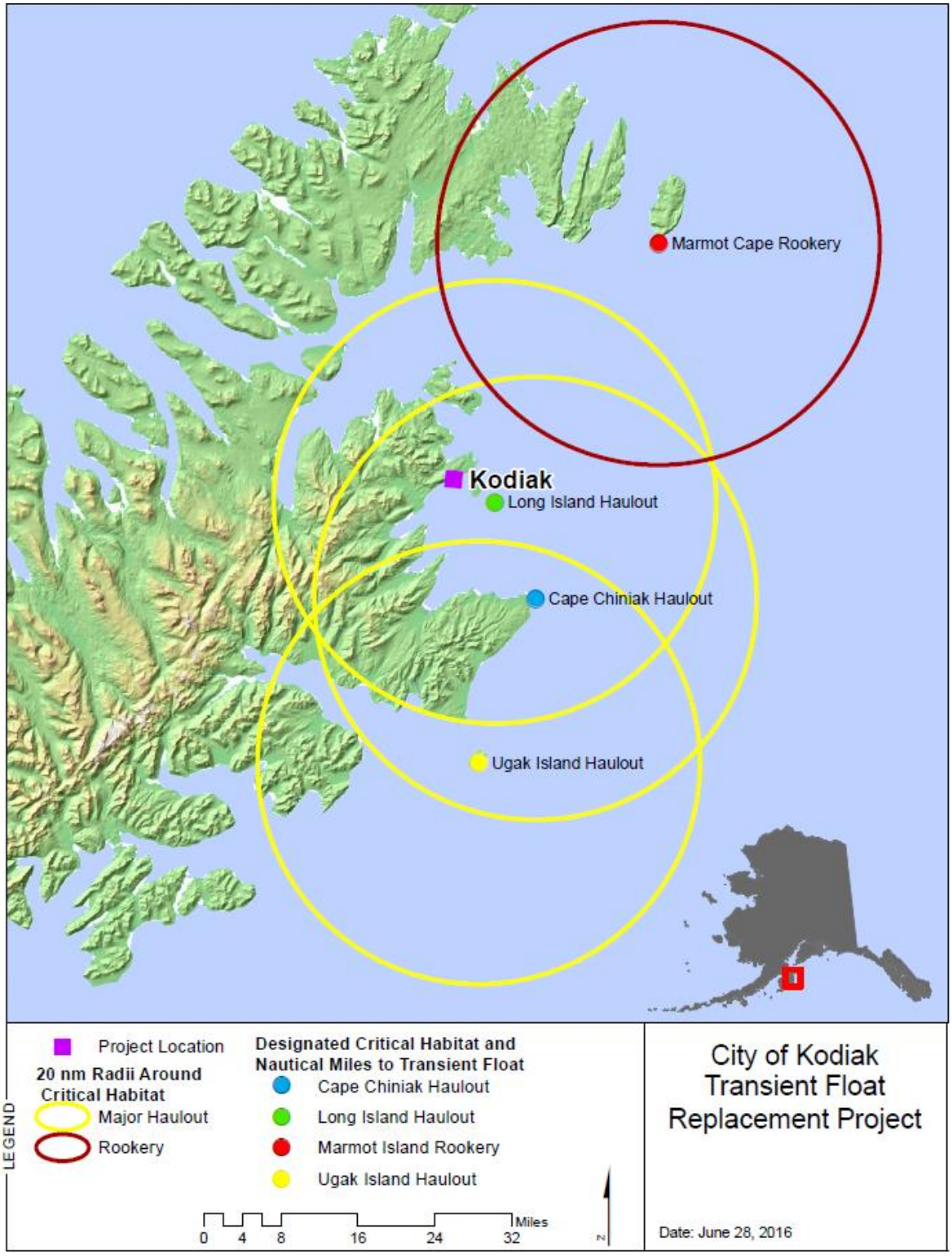

Figure 10. Steller sea lion designated critical habitat overlapping the action area.
Two federally designated haulouts, Long Island and Cape Chiniak, overlap with the action area. No federally designated rookeries overlap with the action area. Ugak Island haulout does not overlap with the action area and is shown for reference.

Aerial surveys of Steller sea lion habitat are conducted annually. Annual counts from the aerial surveys on the two overlapping haulouts to the action area, Cape Chiniak and Long Island, and the closest rookery, Marmot Island, average 261, 804, and 57 individuals respectively (Table 3).

Table 3. Annual counts of Steller sea lions from the two federally designated haulouts and one rookery nearest the action area on Kodiak Island.

Location	Year								
	2004[a]	2006[a]	2007[a]	2008[a]	2009[a]	2010[a]	2011[a]	2013[b]	2015[b]
Marmot Island rookery	703	686	551	644	749	576	829	1050	1450
Cape Chiniak haulout	87		241	130	117	110	234	193	975
Long Island haulout	32			59	39	0		146	64

[a] DeMaster 2011. Counts of adult and juvenile (non-pup) from high resolution vertical aerial photographs.
[b] Fritz et al. 2016. Counts of adult and juvenile (non-pup) from aerial and ship-based surveys.

Counts of sea lions hauled out on the Dog Bay Float provide an index of the number of Steller sea lions in the action area. Because this float is not considered an official haulout by NMFS, few standardized surveys to count sea lions have been conducted. Surveys from 2004 through 2006 indicated peak winter (October-April) counts ranging from 27 to 33 animals (Wynne et al. 2011). Counts from February 2015 during a site visit by biologists working on the Kodiak Ferry Terminal Improvements Project, ranged from approximately 28 to 45 sea lions on the float. During this visit, age classes of sea lions included juveniles, subadults, and adults, including about five mature bulls (FHWA and DOT&PF 2015).

Aerial surveys from 2004 through 2006 indicated peak winter (October–April) counts at the Dog Bay Float ranging from 27 to 33 animals (Wynn et al. 2011). More recent counts completed between November 2015 and June 2016 by protected observers (PSOs) working on the Kodiak Ferry Terminal and Dock Improvements Project ranged from approximately 6 to 114 Steller sea lions (ABR 2016). More than 100 Steller sea lions were counted on the Dog Bay Float at times in spring 2015, although the mean number was much smaller (ABR 2016). Together, this information may indicate a maximum population of about 120 Steller sea lions that use the Kodiak harbor area. According to ABR (2016), however, maximal weekly counts of sea lions at the float were only loosely correlated with weekly average-hourly rates of sea lion observations within the construction area.

During a February 2015 site visit, biologists working on the Kodiak Ferry Terminal and Dock Improvements Project observed 0 to approximately 25 sea lions at one time adjacent to Pier 1, which corresponds to a portion of the action area. Approximately 22 of those sea lions were subadults that were foraging on schooling fishes in the area and were not interacting with the fishing vessels offloading at the seafood processing dock at the time. A stern trawler offloading at the adjacent seafood processing plant during this period was attended by three mature bull sea lions, which constantly swam back and forth behind the stern watching for an opportunity to gain access. This particular trawler slid a vertical steel plate into position forward of the stern ramp, preventing sea lions from boarding the vessel (FHWA and DOT&PF 2015).

In 2015 and 2016, marine mammals were counted in Near Island Channel as mitigation for the Kodiak Ferry Terminal and Dock Improvements Project located at Pier 1. Data collected for this effort is the best information on numbers of marine mammals expected in much of the action area. PSOs monitored a total of 110 days between November 2015 and June 2016. Construction (and take of marine

mammals) occurred on 67 days. During PSO monitoring, 3,587 sea lions were observed and 1,281 sea lions were taken under an IHA issued for the project (ABR 2016).

3.1.3 Breeding Habitat

Breeding range of the Steller sea lion extends along the northern edge of the North Pacific Ocean from the Kuril Islands, Japan, through the Aleutian Islands and Southeast Alaska, south to California (Loughlin et al. 1984). Most adult Steller sea lions use rookeries for pupping, nursing, and mating during the reproductive season which generally occurs from late May to early July (Pitcher and Calkins 1981, Gisiner 1985), and exhibit high site fidelity (Sandegren 1970). During the breeding season some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (Raum-Suryan et al. 2002, Call and Loughlin 2005). At the end of the reproductive season, some females may move with their pups to other haulout sites and males may migrate to distant foraging locations (Spalding 1964, Pitcher and Calkins 1981). Marmot Island, the closest federally designated rookery approximately 55.6 km (30 nm) northeast of the Transient float, and does not overlap with the action area.

3.1.4 Foraging Habitat

Sea lions leave haulouts for feeding excursions. The foraging strategy of Steller sea lions is strongly influenced by seasonality of sea lion reproductive activities on rookeries, and the ephemeral nature of many prey species. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher 1981, Calkins and Goodwin 1988, NMFS 2008), and occasionally other marine mammals and birds (Pitcher and Fay 1982, NMFS 2008). Shelikof Strait, located on the west side of Kodiak Island, is the closest designated foraging area to the action area (Section 3.2.1).

Abundant and predictable sources of food for sea lions in the Kodiak area include fishing boats, tenders, and the many seafood processing facilities that accept transfers of fish from offloading vessels. Sea lions have become accustomed to depredating fishing gear and raiding fishing vessels during fishing and offloading, and they follow potential sources of food around the harbors and docks (FHWA and DOT&PF 2015).

The number of sea lions in the waters in the action area varies depending on the season and presence of commercial fishing vessels unloading their catch at the seafood processing dock near the existing Transient Float. During a February 2015 site visit, biologists working on the Kodiak Ferry Terminal Improvements Project observed 0 to approximately 25 sea lions at one time adjacent to Pier 1 (FHWA and DOT&PF 2015). Approximately 22 of those sea lions were subadults that were foraging on schooling fishes in the area and were not interacting with the fishing vessels offloading at the seafood processing dock at the time. A stern trawler offloading at the adjacent seafood processing plant during this period was attended by three mature bull sea lions, which constantly swam back and forth behind the stern watching for an opportunity to gain access. This particular trawler slid a vertical steel plate into position forward of the stern ramp, preventing sea lions from boarding the vessel (FHWA and DOT&PF 2015).

Adult female Steller sea lions in a more natural situation do not generally eat every day, but tend to forage every 1-2 days and return to haulouts to rest between foraging trips (Merrick and Loughlin 1997, Rehberg et al. 2009). The foraging habits of sea lions using the Dog Bay Float and Kodiak harbor/port area are not well known, but it is reasonable to assume that given the abundance of readily available food, not every sea lion in the area visits the adjacent seafood processing plant every day. Based on

numbers at the Dog Bay Float and sea lion behavior, it is estimated that about 40 unique individual sea lions likely pass through Near Island Channel each day (FHWA and DOT&PF 2015).

3.1.5 Hearing Abilities

Steller sea lions hearing sensitivity is similar to that of other otariids. Steller sea lions aerial hearing ability ranges from approximately 0.25-30 kilohertz (kHz); however, their hearing is most sensitive to noise from 5-14.1 kHz (Muslow and Reichmuth 2010). Underwater, Steller sea lion best hearing ranges from 1-16 kHz, with higher hearing thresholds, indicating poor sensitivity, below 1 kHz and above 16 kHz (Kastelein et al. 2005). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Loud anthropogenic sounds can interfere with Steller sea lion auditory capabilities.

3.2 Steller Sea Lion Critical Habitat

3.2.1 Critical Habitat

NMFS designated critical habitat for the Steller sea lion on August 27, 1993 (58 FR 45269). At the time of the designation, the term “Primary Constituent Elements” was not used to determine critical habitat, but rather, critical habitat was based on “essential habitat” or “essential features.” Essential habitat used to determine critical habitat for Steller sea lions are the physical and biological habitat features that support reproduction, foraging, rest, and refuge including terrestrial, air and aquatic zones (58 FR 45269). Critical habitat includes a terrestrial zone that extends 0.9 km (3,000 ft) landward from each major rookery and major haulout, and an air zone that extends 0.9 km (3,000 ft) above the terrestrial zone of each major rookery and major haulout. For each major rookery and haulout located west of 144° W. longitude (i.e., the action area), critical habitat includes an aquatic zone (or buffer) that extends 37 km (20 nm) seaward in all directions. Critical habitat also includes three large offshore foraging areas: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area (Figure 9; 58 FR 45269).

3.3 Humpback Whale

3.3.1 Distribution

Humpback whales occur throughout the North Pacific Ocean, migrating from winter breeding and calving areas, such as Mexico and Hawaii, to summer feeding areas, such as California and Alaska. Humpback whales from the Hawaii DPS, Mexico DPS, and WNP DPS occur in the Gulf of Alaska, primarily in offshore waters.

Humpback whales in the Gulf of Alaska are most likely to be from the de-listed Hawaii DPS (89.0% probability) (Wade et al. 2016). The threatened Mexico DPS whales occur in the Gulf of Alaska with a 10.5% probability of occurrence. Humpback whales from the endangered WNP DPS are uncommon in waters off Alaska; the stock has have been documented along the coast in the central Gulf of Alaska between Yakutat and the Alaska Peninsula with a low probability of occurrence (0.5%).

Given their widespread range and their opportunistic foraging strategies, humpback whales may be in the vicinity during the proposed project activities. It is expected that most of the humpback in the area will be from the Hawaii DPS; however, some may be from the Mexico DPS.

3.3.2 Population Status

The humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as threatened or endangered. NMFS recently conducted a global status review of humpback whales and changed the status of humpback whales under the ESA (81 FR 62018). The Hawaii DPS, which includes the majority of whales found in Kodiak waters, is no longer listed under the ESA, and the DPS is considered not at risk. The Mexico DPS, which also includes whales found in the Gulf of Alaska, is now listed as threatened. The WNP DPS, which includes a very small percentage of the whales found in the Gulf of Alaska, continues to be listed as endangered.

Humpback whales faced large population declines due to commercial whaling operations of the early twentieth century. Barlow (2003) estimated the population of humpback whales at approximately 1,200 animals in 1966. The population grew to between 6,000 and 8,000 by the mid-1990s in the North Pacific.

Using fluke identification photographs from 2004 through 2006, Barlow et al. (2011) estimate that the current abundance of humpback whales in the North Pacific is 21,063 animals. 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. The abundance estimate for humpback whales in the entire Gulf of Alaska is estimated to be between 1,755 and 2,487 animals primarily from the Hawaii DPS, with some from the Mexico DPS , and very few from the WNP DPS Photo-identification studies have estimated 300-500 humpback whales in Kodiak waters (Wade et al. 2016).

Current threats to humpback whales in Alaska include vessel strikes, and entanglement (NMFS 2016c).

3.3.3 Breeding and Foraging Habitat

Nearly all humpback whale populations undertake seasonal migrations between their tropical and sub-tropical winter calving and breeding grounds and high-latitude summer feeding grounds (Calambokidis et al. 2008).
The Hawaii DPS consists of humpback whales that breed within the main Hawaiian Islands. Whales from this breeding population have been observed in most known feeding grounds in the North Pacific, but about half of the whales from population migrate to Southeast Alaska and Northern British Columbia. They also commonly utilize northern British Columbia, northern Gulf of Alaska, and Bering Sea feeding grounds (Bettridge et al. 2015).

The Mexican DPS consists of whales that breed along the Pacific coast of mainland Mexico, the Baja California Peninsula and the Revillagigedos Islands. The Mexican DPS feeds across a broad geographic range from California to the Aleutian Islands, with concentrations in California-Oregon, northern Washington – southern British Columbia, northern and western Gulf of Alaska and Bering Sea feeding grounds (Bettridge et al. 2015).

Large aggregations of these humpback whales spend the summer and fall in the nearshore areas of Southeast Alaska, Prince William Sound, and the Kodiak Archipelago. The waters surrounding the Kodiak Archipelago support feeding populations of humpback whales (Wynne and Witteveen 2005, Witteveen et al. 2007). Humpback whales occur year-round in this area, with the highest abundances occurring between May and October. In the Kodiak archipelago, known prey include euphausiids (*Thysanoessa*

spinifera); walleye pollock; Pacific sand lance, herring (*Clupea pallasii*), eulachon (*Thaleichthys pacificus*), and capelin (Witteveen et al. 2012).

Though humpback whales are routinely observed in the Kodiak archipelago (Witteveen et al. 2007), they are not common in the action area. In correspondence for the Kodiak Ferry Terminal Improvements Project at Pier 1, NMFS (2013a) stated:

> Humpback whales are generally found in and around the nearshore areas of Kodiak Island. Groups of humpback whales are occasionally observed in the Narrow Cape and Ugak Island area, south of Kodiak, in spring, summer, and fall. Humpback whales are not expected to be present in the Near Island Channel because this water body between the main island of Kodiak and Near Island is very narrow and supports heavy boat traffic during summer.

Much of the action area for the Kodiak Ferry Terminal Improvements Project was monitored for over 110 days between November 2015 and June 2016 for the presence of marine mammals. During that monitoring effort one humpback whale was observed. The humpback whale passed through Near Island channel in March 2016.

3.3.4 Hearing Abilities

Detailed information regarding the hearing abilities of humpback whales is generally lacking; however, hearing sensitivities have been estimated based on behavioral responses to sounds at various frequencies, favored vocalization frequencies, body size, ambient noise levels at favored frequencies, and cochlear morphometry (NMFS 2013a). Generally, humpback whales are sensitive to low-frequency noise (NMFS 2014). Southall et al. (2007) categorized humpback whales in the low frequency cetacean functional hearing group, with an estimated auditory bandwidth of 7 Hertz (Hz) to 22 kHz.

3.3.5 Critical Habitat

Critical habitat has not been designated for the humpback whale.

4 Environmental Baseline

The Environmental Baseline is an analysis of the effects of past and ongoing anthropogenic and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. For this BA, the environmental baseline includes past and present impacts of all state, federal, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions that are contemporaneous with the consultation in process (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.

4.1 Physical Environment

Kodiak Island is a large island located in the Gulf of Alaska. The City of Kodiak is located in the northeast corner the Island. Near Island Channel is located adjacent to the City of Kodiak and separates downtown Kodiak from Near Island. The channel is located within Chiniak Bay.

Near Island Channel is approximately 200 m (656 ft) wide (Google Earth 2016) and 15 m (50 ft) deep near the Transient Float. In the project footprint, the shoreline along the Transient Float is heavily armored with riprap (Figure 5) and impervious surfaces directly about the shoreline adjacent to the float. The water near the project area is generally clear and the bottom substrate appears sandy with little silt (FHWA and DOT&PF 2015).

The Transient Float is located within Near Island Channel in a busy industrial area. Channel Side Services' seafood packing facility is located approximately 25 m (82 ft) east of the float and Petro Marine Services floating fuel dock is located approximately 20 m west of the float. Tridient Seafood's shore-based seafood processing plant is located approximately 200 m (656 ft) to the southwest (Figure 2). When in operation, Trident's plant receives numerous commercial fishing vessels daily for offloading and processing of catch.

The channel experiences a high volume of marine traffic and is along the flight path of the Kodiak Airport. West of the Transient Float, two harbors, St. Herman Harbor and St. Paul Harbor, provide protected moorage for 650 vessels up to 46 meters (150 feet) in length; and three deep-water piers provide moorage for large vessels, including the two Alaska Marine Highway System ferries, cruise ships, fuel barges, commercial fishing vessels, and cargo vessels (Figure 2). Numerous privately owned docks are also located within the City of Kodiak that are operated by freight companies, fuel companies, seafood processors, construction contractors, the U.S. Coast Guard, charter operators, and others.

4.2 Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated within the project area for the Alaska stocks of Pacific salmon (chum salmon (*Oncorhynchus keta*), pink salmon (*O. gorbuscha*), coho salmon (*O. kisutch*), sockeye salmon (*O.* nerka), and Chinook salmon (*O. tshawytscha)*), walleye pollock (*Theragra chalcogramma*); Pacific cod (*Gadus macrocephalus*), yellowfin sole (*Limanda aspera*), arrowtooth flounder (*Atheresthes stomias*), rock sole (*Lepidopsetta* spp.), flathead sole (*Hippoglossoides elassodon*), sculpins (*Cottidae* spp.), skates (*Rajidae* spp.), and squid (*Teuthoidea*) (NMFS 2016b).

There are no anadromous fish streams in the project area (ADF&G 2016).

4.3 Climate Change

Since the 1950s the atmosphere and oceans have warmed, snow and sea ice have diminished, sea level has risen, and concentrations of greenhouse gases have increased. The time period 1983-2012 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 increased atmospheric carbon dioxide and climate change include ocean acidification, expanded oligotrophic gyres, shift in temperature, 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 or 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 (NRC 2012). 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 (NRC 2013).

4.4 Oceanographic Dynamics and Physical Processes

Climate and other physical forcing can impact ecosystem functions through oceanic, atmospheric, and terrestrial processes, such as changes in ocean temperature, chemistry, currents, storminess, and freshwater runoff. Physical forcing changes may occur on interannual (El Niño and La Niña), decadal regime shifts, or longer (global climate change) timescales. These changes influence the distribution and abundance of marine mammals, salmon, and their prey species (NMFS 2015).

Climatic shifts in the Gulf of Alaska in the twentieth century are often correlated with significant changes in species distribution and abundance, which can affect fisheries and industry and other species that depend on fish (Overland and Wang 2007, Hollowed et al. 2013). Fish species have expanded their ranges north in the Gulf of Alaska in response to warming conditions (Mueter et al. 2009). Ecosystem modeling of the relative effects of fishing, climate conditions, and predator-prey interactions on species in different trophic levels has not led to clear determination of the relative impacts of drivers on species abundance. No single forcing mechanism (fishing history, climate conditions, or predator-prey interactions) explains all species dynamics simultaneously, suggesting that there is no single primary driver of the ecosystem (Gaichas et al. 2011).

4.5 Human Impacts to the Steller Sea Lion in the Action Area

Ongoing human activities in the action area that impact wDPS Steller sea lions include marine vessel activity, pollution, noise (e.g., aircraft, vessel, pile-driving, dredging, etc.), and coastal zone development.

4.5.1 Marine Vessel Activity in the Action Area

Ferries, fishing vessels and tenders, barges, tugboats, and other commercial and recreational vessels use the nearby channel to access harbors, fuel docks, processing plants, and other commercial facilities (NMFS 2015). During peak fishing seasons, vessels raft up three and four deep to offload catch at the shore-based fish processor just south of Pier 1.

Although risk of ship strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the Recovery Plan for this species states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated (e.g., near rookeries or haulouts; NMFS 2008).

Noise produced by marine vessel activity may affect Steller sea lions. Vessel noise is discussed in Section 4.5.3.

4.5.2 Pollution in the Action Area

A number of intentional and accidental discharges of contaminants pollute the marine waters of Alaska annually. Intentional sources of pollution discharge include wastewater of various treatment levels, storm water runoff, and vessel discharges. Domestic, some municipal, and industrial wastewater discharges in Alaska are managed and permitted (Alaska Pollutant Discharge Elimination System) by the State of Alaska Department of Environmental Conservation (ADEC).

The action area is not listed by ADEC as an Impair Water Body (ADEC 2010). Within the action area, there are three ADEC-permitted seafood processing discharge locations (Global Seafoods Kodiak Plant, Trident Seafood Kodiak Plant, and Trident Seafoods Kodiak AFS Plant) (ADEC 2016a). Kodiak St. Herman Harbor Boatlift Facility operates under a ADEC Multi-Sector General Permit for storm water discharges within the action area. There are no other active water quality permits in the action area at this time (ADEC 2016b). In general, storm water runoff from downtown Kodiak roads has the potential to carry pollutants into the action area.

4.5.3 Existing Noise Levels in the Action Area

The Transient Float project area is subject to many forms of anthropogenic noise. Noise is produced by marine vessels, marine fueling facilities, cargo loading and offloading operations, shore-based processing plants, maintenance dredging, aircraft, construction, automobiles, and other sources. These noise sources produce varying noise levels and frequency ranges.

Specifically, the project area is frequented by fishing vessels and tenders; the M/V *Tustumena* and other ferries; barges and tugboats; and commercial and recreational vessels. These vessels use the channel to access harbors and city docks, fuel docks, processing plants where fish catches are offloaded, and other commercial facilities. Just south of the Transient Float, the Petro Marine fuel dock services a wide range of vessels; Pier 1 provides docking for large vessels; and the seafood processing dock offloads fish by

vacuum hose straight into the processing plant from the vessels' holds. The channel is also a primary route for local vessel traffic to access Gulf of Alaska waters and is in the flight path of the Kodiak airport.

In the 2013 LOC issued for the nearby Pier 1 Project, NMFS (2013a) states:

> Baseline sound level in the Kodiak harbor/port area is relatively high. Two boat harbors occur in Near Island Channel housing a number of commercial and recreational marine vessels. The channel is also the main conduit for local vessel traffic, and for accessing the outside Gulf of Alaska waters. The channel is frequently traversed by ferries, barges, tug boats, commercial vessels and tenders, recreational vessels, and charter fishing operations. This type of heavy use is known to elevate the background levels of noise in the marine environment. In 2001 an acoustical study associated with the Port of Anchorage project in Cook Inlet measured sound levels of 149 decibels from a tug pushing a barge. Similar activities and sounds levels are expected to occur in the port of Kodiak, which will mask the sounds of pile driving, extraction, and drilling. Marine mammals transiting this area are routinely exposed to sounds louder than 120 decibels, and continue to use this area; therefore, there does not appear to be evidence that they are harassed by these sounds, or they have become habituated to the noise.

Ambient noise levels were measured at Pier 3, approximately 2,000 m southwest of the Transient Float, in February 2015. Noise levels measured at 125 dB re 1 µPa or greater (PND 2015a), exceeding the NMFS acoustic threshold of concern for continuous noise (120 dB re 1 µPa).

Ambient underwater sound was measures in Near Island Channel, approximately 100 m southwest and 900 m northeast of the Transient Float, in March 2016 (Figure 12). Measurements recorded highly variable sound pressure levels, ranging from approximately 80 to 140 dB re 1 µPa. Peaks ranging from approximately 130 to 140 dB re 1 µPa were produced by vessels passing close to acoustic recorders (Warner and Austin 2016).

4.5.4 Coastal Zone Development

Coastal zone development results in both the loss and alteration of nearshore marine mammal habitat and changes in habitat quality due to in-water construction, vessel traffic, noise, and pollution. Increased development may prevent marine mammals from reaching or using important feeding, breeding, and resting areas.

The City of Kodiak shoreline in the action area is highly developed. Pile-driving and other sounds associated with replacement of the existing Transient Float are a common source of marine in-water noise that is a potential acoustic stressor for marine mammals in Alaska.

4.6 Human Impacts to Humpback Whales in the Action Area

According to the NMFS Alaska Regional Office webpage, threats to humpback whales in Alaska include vessel collisions and whale entanglements (NMFS 2016c).

4.6.1 Vessel Collision

Marine vessels are common in the action. Ferries, fishing vessels and tenders, barges, tugboats, and other commercial and recreational vessels use the action area to access harbors, fuel docks, processing plants, and other commercial facilities (NMFS 2015).

Available information suggests that ship strikes of humpback whales are increasing in Alaska (Gabriele et al. 2007). Neilson et al. (2012) summarized 108 reported whale-vessel collisions in Alaska from 1978–2011. Most strikes (86%) involved humpback whales. Small vessel strikes were most common (<15 m, 60%), but medium (15–79 m, 27%) and large (≥80 m, 13%) vessels also struck humpback whales. Most strikes (91%) occurred in May through September, and there were no reports from December or January. The majority of strikes (76%) were reported in southeastern Alaska, where the number of humpback whale collisions increased 5.8% annually from 1978 to 2011. No vessel strikes of humpback whales have been recorded in or near the action area (Neilson et al. 2012).

4.6.2 Entanglement

Marine mammal entanglement, or by-catch, is a documented source of injury and mortality to cetaceans, including humpback whales. The sources of these entanglements are extensive and diverse. Actively-fished gear, marine debris, abandoned fishing gear, and non-fishery-related gear, and other gear types have been involved in marine animal entanglements. The International Whaling Commission recently listed by-catch as a primary concern. Entanglement is considered one of the primary causes of anthropogenic mortality in humpback whales (NMFS 2016d).

Reports of Central North Pacific humpback whale mortality and serious injury caused by entanglement from gillnet gear, shrimp pot gear, crab gear, longline gear, pot gear, and set net gear occurred between 2007 and 2011. Mean annual mortality from these sources was 6.9 (Allen and Angliss 2014).

5 Effects of Action

"Effects of the action" means the direct and indirect effects of an action on the 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). The effects from noise associated with pile-driving, pile removal, and drilling on the wDPS Steller sea lions, Steller sea lion critical habitat, and Mexico and WNP DPSs of humpback whales are discussed below.

5.1 Direct Effects

Direct effects defined under the ESA are immediate effects caused by the proposed action and occurring concurrently with the proposed action. Direct effects from the proposed action include noise associated with the demolition and construction of the dock and support vessels. Direct impacts such as physical destruction or alteration of habitat are not anticipated to occur from the Kodiak Transient Float Replacement Project because the project footprint will decrease in size and is previously disturbed by the existing float.

5.1.1 Noise

Some of the in-water sound source levels from pile-driving installation and removal in the proposed action are capable of injuring marine mammals at short distances. Activities, such as pile-driving installation and removal, will generate noise loud enough to harm and harass Steller sea lions and humpback whales. Noise has the potential to disrupt essential behaviors, resulting in highly variable impacts on individuals, groups, or populations. Acoustic disturbance can harass marine mammals and cause them to alter their behavior and move away from preferred habitat (Baker and Herman 1989, Parks et al. 2007, NMFS 2015), potentially resulting in increased energy expenditure and elevated stress to individuals. Mitigation measures to reduce impacts on Steller sea lions and humpback whales are discussed in Section 6.0.

5.1.1.1 NMFS Acoustic Criteria

Under the MMPA, NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."

On August 4, 2016, NMFS released final *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing—Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts (Technical Guidance or Guidance)* (NMFS 2016d). This guidance provides updated received levels, or acoustic thresholds, above which individual marine mammals under NMFS' jurisdiction are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources.

Updates include a protocol for deriving Permanent Threshold Shift (PTS) and Temporary Threshold Shifts (TTS) onset levels for impulsive (*e.g.,* impact pile drivers) and non-impulsive (*e.g.,* vibratory pile drivers) sound sources and the formation of marine mammal hearing groups (low-, mid-, and high-frequency cetaceans and otariid and phocid pinnipeds in water) and associated auditory weighting functions.

Acoustic thresholds are presented using the dual metrics of cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (PK) for impulsive sounds and the SEL_{cum} metric for non-impulsive sounds (NMFS 2016d). The new guidance only determined PTS and TTS (or Level A take, injury) for marine mammal hearing groups and Level B take zones are not affected. Table 4 details in-water acoustic criteria for exposure of Steller sea lions and humpback whales to PTS and TSS Onset Acoustic Thresholds (Level A Harassment).

Table 4. Summary of General In-water Acoustic Criteria for In-water Exposure of Steller Sea Lion and Humpback Whales to PTS and TSS Onset Acoustic Thresholds (Level A Injury) from Continuous and Impulse Sound Sources.

Species (Frequency Range)	**PTS Onset Acoustic Thresholds SEL_{cum} Thresholds**		
	Pile-driving (Impulsive)	**Vibratory Pile-driving (Continuous)**	**Down-hole Drilling (Continuous)**
Humpback Whales (Low-Frequency Cetaceans; 7 Hz to 35 kHz)	183 dB	199 dB	199 dB
Steller Sea Lions (Otariid Pinnipeds; (60Hz to 39 kHz)	203 dB	219 dB	219 dB

From: NMFS 2016d

Assumes accumulation period of 24 hours.

[1]Down-hole drilling was not included in NMFS 2016d, but is assumed to be the same as vibratory pile driving.

Table 5 summarizes long established in-water acoustic criteria for in-water exposure of Steller sea lions and humpback whales to disturbance thresholds (Level B Harassment) from continuous and impulse sound sources.

Table 5. Summary of In-water Acoustic Criteria for In-water Exposure of Steller Sea Lion and Humpback Whales to Disturbance Thresholds (Level B Harassment) from Continuous and Impulse Sound Sources.

	In-Water Noise Thresholds	
Species (Frequency Range)	**Disturbance Threshold**	
	Pile-driving (Impulsive)	**Vibratory Pile-driving/ Down-hole Drilling** (Continuous)
Humpback Whales	160 dB rms	120 dB rms
Steller Sea Lions	160 dB rms	120 dB rms

5.1.1.2 In-water Noise

NMFS's *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* was used for determining Level A Harassment Zones for injury. The following assumptions were assumed and input into the NMFS model:

- For impact driving, an average of 14 strikes per pile and 6 piles per day; a weighting factor 2; and a sound level 205.9 dB
- For vibratory driving, 0.69 hours per day of driving; a weighting factor of 2.5; and sound level of 183.8 dB

- For down-hole drilling, 4.08 hours per day of drilling; a weighting factor 2; and a sound level of SL 192.5 dB
- For monitoring purposes, the distances are rounded to the nearest 10 or 100, or 1,000 m, and in general, are more conservative estimates PTS Isopleth to threshold (m) were rounded

The area of impacts of the proposed action encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne noises generated by pile driving and down-hole drilling. The Level A harassment zones are outlined in Table 6 and shown in Figure 11. The distances were developed following the protocol for deriving PTS from the recently released *Technical Guidance* (NMFS 2016d).

Table 6. Proposed In-water Sound Exposure Levels and Disturbance Zones (m) for Level A Harassment for Humpback Whales and Steller Sea Lions for the Kodiak Transient Float Replacement Project.

	PTS Isopleth to threshold (m) Hearing Group	
Source	**Humpback Whales**	**Steller Sea Lions**
Impact	700	30
Vibratory	20	10
Down-hole Drilling	300	10

From McCue 2016, injury zones calculated assuming:

- Impact driving=14 strikes per pile (average) and 6 piles per day; weighting factor 2; SL 205.9
- Vibratory driving=0.69 hours per day; weighting factor 2.5; SL 183.8
- Down-hole drilling=4.08 hours per day; weighting factor 2; SL 192.5
- PTS Isopleth to threshold (m) rounded to the nearest 10, 100, or 1,000 m

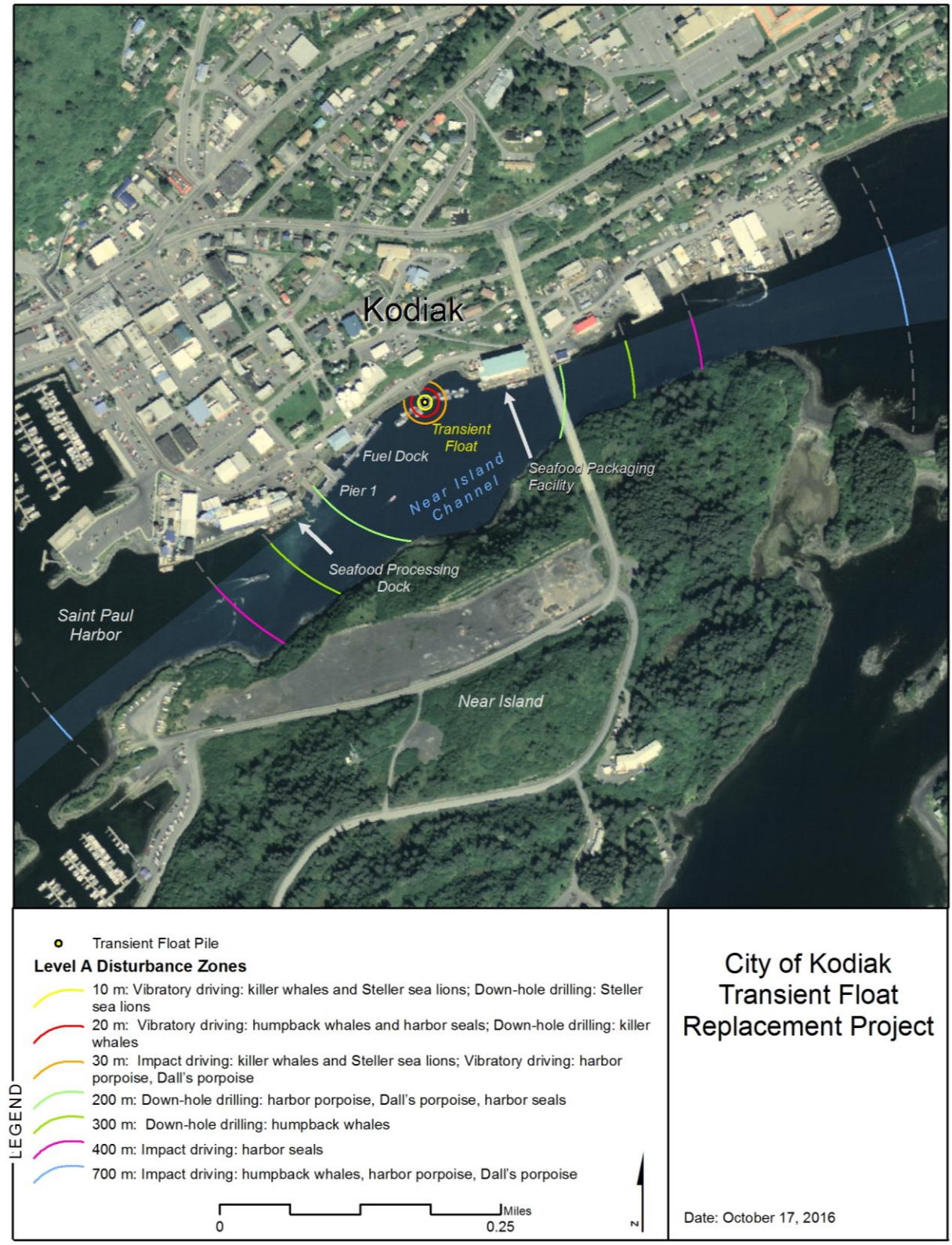

Figure 11. Level A Harassment zones for all marine mammals, including humpback whales and Steller sea lions, for the Kodiak Transient Float Replacement Project.

JASCO Applied Sciences (JASCO) conducted acoustic monitoring for Pier 1 near the proposed Kodiak Transient Float Replacement Project in March 2016 (Warner and Austin 2016a, Warner and Austin 2016b) which is used for determining Level B take. Received source levels from impact and vibratory pile driving and down-hole drilling were measured, and acoustic threshold distances were calculated using the received source levels obtained from acoustic monitoring (Figure 12).

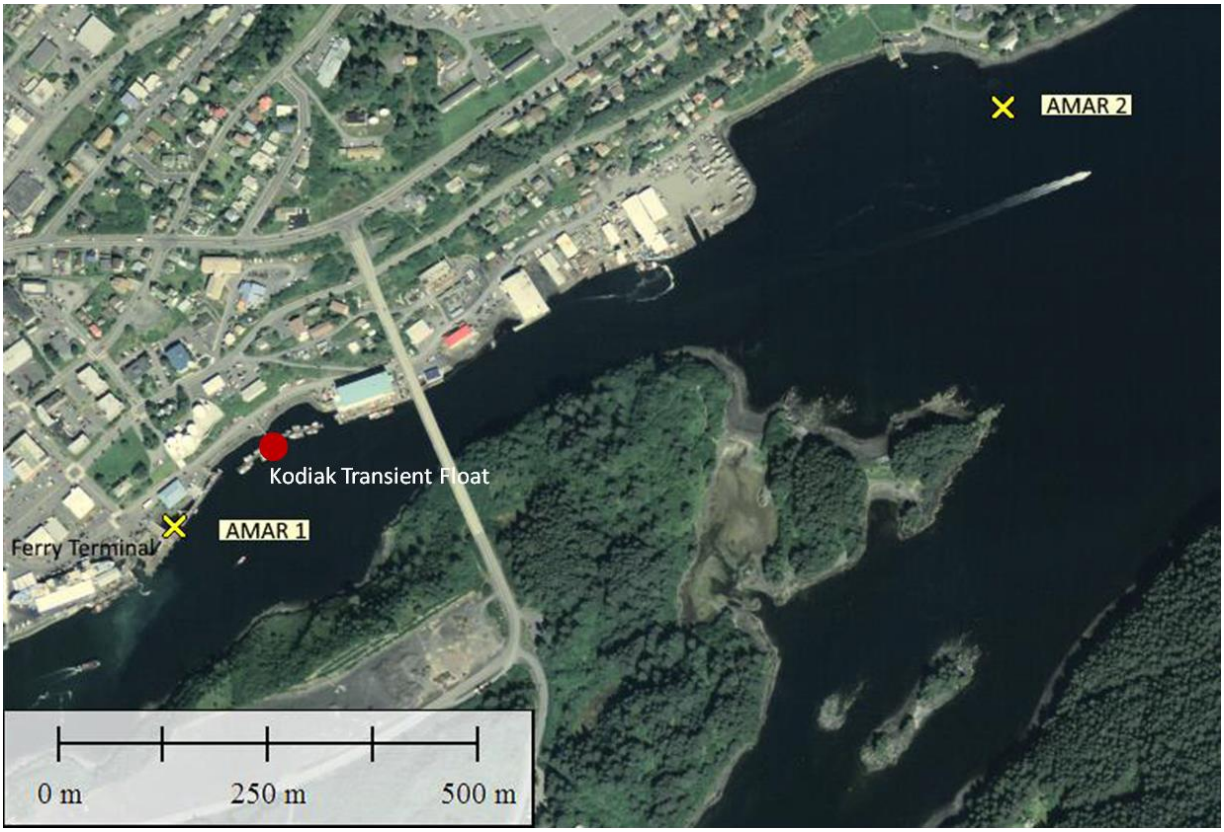

Figure 12. Pier 1 pile driving acoustic recorder locations.
JASCO's AMAR (acoustic recorders; yellow "x") deployment locations during acoustic monitoring for Pier 1 in Kodiak, Alaska (Warner and Austin 2016a). Kodiak Transient Float (red dot) is adjacent to the Pier 1 Ferry Terminal. (Figure adapted from Warner and Austin 2016a.)

The threshold distances measured and calculated by JASCO for Pier 1 will be implemented for the proposed Kodiak Transient Float Replacement Project Level B Harassment Zones because: 1) Pier 1 is 100 m away from the proposed project; 2) similar construction equipment will be used on the proposed project (e.g., pile driving hammers); and 3) the same piles (24-inch steel piles) will be used for the proposed project. For monitoring purposes, the distances are rounded to the nearest 10, 100, or 1,000 m, and in general, are more conservative estimates (Table 7 and Figure 13).

Table 7. Proposed In-water Disturbance Zones (m) for Level B Harassment for Humpback Whales and Steller Sea Lions for the Kodiak Transient Float Replacement Project.

Source	Exposure Threshold Distances (m)[1]	
	Level B Harassment (Impulsive) 160 dB	**Level B Harassment (Continuous) 120 dB**
Impact Pile driving	200	--
Vibratory Pile driving	--	900
Down-Hole Drilling	--	7,000

[1]For monitoring purposes, the distances were rounded to the nearest 10, 100, or 1,000 m, which are more conservative estimates.

The action area for Kodiak Transient Float Replacement Project will effectively be truncated where land forms block underwater sound transmission at a closer distance; transmission of underwater noise will extend beyond the length of Near Channel; however, the distance will likely be limited by interaction with surrounding piers and docks, shallow water shoals, or land interactions with the water (Figure 13; FHWA and DOT&PF 2015).

Figure 13. Distances to the 160 (impulsive) and 120 dB (continuous) in-water thresholds (m; Level B harassment zones)

5.1.1.3 In-air Noise

During the installation of piles, the project could increase airborne noise levels, resulting in disturbance to pinnipeds at the surface of the water or hauled out in the harbor. Distances for in-air noise have not changed with the new NMFS acoustic guidance (NMFS 2016c); therefore, to determine the distances at which airborne noise could result in disturbance, a formula for calculating the spherical spreading loss (Equation 1) was used, where *TL* is the transmission loss (in dB) and *r* is the distance from the source to the receiver. Spherical spreading results in a 6 dB decrease in sound pressure level per doubling of distance (PND 2015).

$$TL = 20 \log r \qquad \text{(Equation 1)}$$

Where:

TL = Transmission loss (dB)

r = Distance from the source to the receiver

Equation 1, along with representative source levels were used to determine in-air threshold distances (FHWA and DOT&PF 2015, PND 2015). Magnoni et al. (2014) found that unweighted in-air measurements during impact installation of 24-inch steel piles ranged from 97 to 98 dB rms at 15 m (49 ft). The source level for impact driving 24-inch steel piles is therefore assumed to be 98 dB rms at 15 m (49 feet; Table 8). No unweighted in-air data are available for vibratory installation of 24-inch steel piles; however, in-air measurements during vibratory installation of 30-inch steel piles averaged 96.5 dB rms at 15 m (49 ft; Laughlin 2010). Vibratory installation of 24-inch steel piles will therefore be conservatively estimated to generate 96.5 dB rms at 15 m (49 ft; Table 8). No unweighted in-air data are available for down-hole drilling to secure 24-inch piles into bedrock. Sound will be substantially muted because the drill will be located within and below the pile shaft and drilling/hammering will begin at least 3 to 9 m (10 to 30 ft) below the marine floor. Airborne sound for down-hole drilling will be considered a continuous noise source, and therefore, will be estimated to be the same as from vibratory hammering (96.5 dB rms at 15 m [49 ft]; Table 8). Calculated acoustic threshold distances are listed in Table 9 (FHWA and DOT&PF 2015). For monitoring purposes, the distances will be rounded to the nearest 10 (Figure 14).

(Note that any takes from in-air exposure would be included in takes from underwater exposure. Animals can only be taken once per day; therefore, it would be double counting to include takes for both underwater and in-air on the same day.)

Table 8. Estimates for in-air sound levels (dB) that will be generated during pile-driving and removal during Kodiak Transient Float Replacement Project.

Source	Sound Level dB rms (24-inch steel piles)
Impact pile-driving	98[1]
Vibratory pile-driving	96.5[2]
Down-hole drilling	96.5[2]

[1]Magnoni et al. 2014

[2]Laughlin 2010

Table 9. In-air proposed Level B harassment exposure threshold distances (m) for Steller sea lions for the Kodiak Transient Float Replacement Project. At this time, no thresholds have been established for in-air Level A harassment.

Source	Level B Harassment Zones Exposure Threshold Distances (m)[1]
	100 dB Steller Sea Lions
Impact pile-driving	10
Vibratory pile-driving	10
Down-hole drilling	10

[1]Distances were rounded to the nearest 10 m

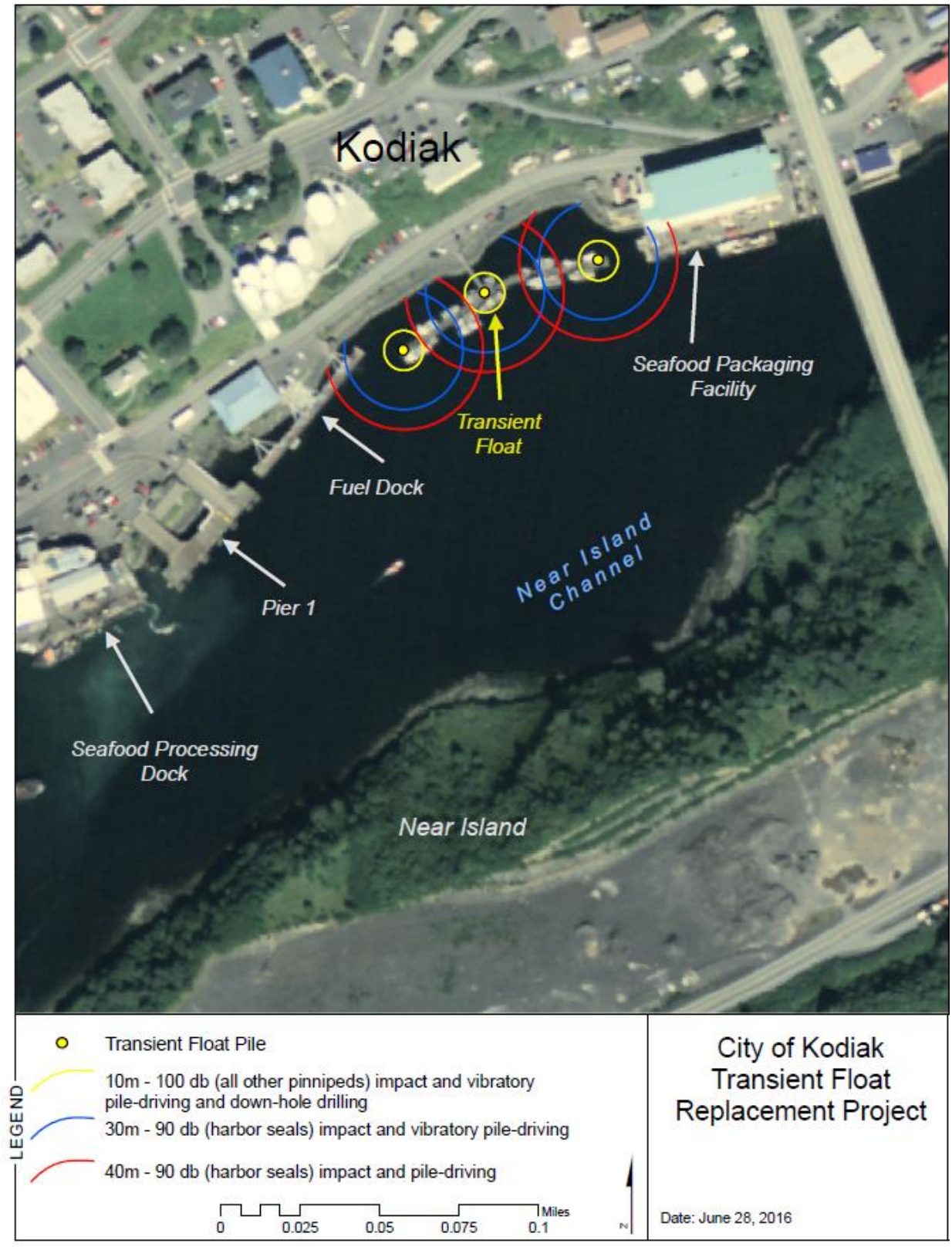

Figure 14. Distances to the 90 (harbor seals) and 100 dB (all other pinnipeds) in-air thresholds (m; Level B harassment zones).

5.1.1.4 Noise Impacts

Hearing loss, Discomfort, or Injury

If a received sound level is high enough, the sound may cause discomfort or tissue damage to auditory or other systems. An animal may experience temporary loss of hearing, partial, or full hearing loss. Marine mammals exposed to high received sound levels may experience non-auditory physiological effect such as increased stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage. Permanent, partial or full hearing loss may occur if marine mammals are exposed to underwater sounds exceeding the injury threshold of 180 or 190 dB rms for cetaceans and pinnipeds, respectively. Mitigation measures to reduce impacts on Steller sea lions and humpback whales are discussed in Section 6.0.

Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak and Schusterman 1999, Schlundt et al. 2000, Finneran et al. 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary (TTS), in which case the animal's hearing threshold would 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. 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. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury, but TTS does not (Southall et al. 2007). TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter et al. 1965). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends (Southall et al. 2007). Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound.

When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges. This permanent change following intense noise exposure results from damage or death of inner or outer cochlear hair cells (Southall et al. 2007). It is often followed by retrograde neuronal losses and persistent chemical and metabolic cochlear abnormalities (Saunders et al. 1991, Ward 2007). There is no specific evidence that exposure to pulses of sound can cause PTS in any marine mammal. However, given the possibility that mammals close to a sound source can incur TTS, it is possible that some individuals might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS. California sea lions experienced TTS-onset from underwater non-pulsed sound at 174 dB re 1 µpa (Kastak et al. 2005), but also did not show TTS-onset from pulsed sound at 183 dB re 1 µpa (Finneran et al. 2003). It is not clear exactly when Steller sea lions may experience TTS and PTS, but sound levels greater than 190 dB have been identified as the NMFS threshold of concern for harm/injury to the species.

Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox et al. 2006, Southall et al. 2007). Studies examining such

effects are limited. In general, little is known about the potential for pile-driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall et al. 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways.

Marine mammals in Near Island Channel area are exposed to a variety of vessel and industrial sounds and maintain a presence in the area. This suggests some level of habituation to anthropogenic sounds and activity. Steller sea lions are especially habituated in this location because of the presence of commercial fishing vessels and fish processing plants with available food resources. During monitoring completed for the Kodiak Ferry Terminal and Dock Improvements Project, Steller sea lions observed in the Level B harassment area were observed exhibited behaviors associated with disturbance (e.g., alert, fleeing, disoriented, or swimming away from the construction site). Five of the sightings appeared to be reacting directly to marine vessels or killer whales, rather than construction activity (ABR 2016). Humpback whales were not observed during pile driving activities.

Masking

Marine mammal auditory signals may be masked by increased noise levels or overlapping frequencies. The Kodiak Transient Float Project area is within an existing active harbor area and navigation channel, and therefore Steller sea lions in the action area have likely become habituated to increased noise levels.

Further, implementation of the proposed mitigation measures will reduce impacts on marine mammals (Section 6.0), with any minor masking occurring at close proximity to the sound source, if at all.

Behavioral Disturbance

Potential effects related to in-water pile-driving associated with the Kodiak Transient Float Project may include behavioral modifications (i.e., avoidance of an area, diving and surfacing, modified vocalization). Generally, animals return to their previous behavior within an hour or so of a disturbance (Porter 1997); however, they may abandon a site for longer periods depending on the duration of a disturbance activity (NMFS 2005).

Humpback whales that are exposed to elevated noise levels could exhibit temporary, short term changes in behavior and/or avoidance of the affected area. These behavioral changes may include: changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (Richardson *et al.,* 1995).

Steller sea lions that are exposed to elevated noise levels could exhibit behavioral changes such as increased swimming speed, increased surfacing time, or decreased foraging. Additional responses of Steller sea lions to pile-driving activity might include a reduction of acoustic activity, a reduction in the number of individuals in the area, and avoidance of the area. Of these, temporary avoidance of the noise-impacted area is anticipated to be the most likely response. Avoidance responses may be initially strong if an individual moves rapidly away from the source or weak if animal movement is only slightly deflected away from the source.

Noise from pile-driving could potentially displace individual Steller sea lions from the immediate proximity of pile-driving activity. However, individuals will likely return after completion of pile installation, as demonstrated by a variety of studies about temporary displacement of marine mammals by industrial activity (reviewed in Richardson et al. 1995).

Steller sea lions in the Kodiak Transient Float Project action area are exposed to a variety of vessel and industrial sounds (Section 4.1.3) and maintain a presence in the action area. This suggests some level of habituation to anthropogenic sounds and activity. Steller sea lions are especially habituated in this location because of the presence of commercial fishing vessels and fish processing plants with available food resources.

While Steller sea lions will likely perceive elevated underwater noise during pile installation activities, the days for pile-driving will not always be successive, but rather staggered over a 2.5-month period, depending on weather, construction and mechanical delays, marine mammal shutdowns, and other potential delays and logistical constraints. These temporal breaks between pile installation activities will provide Steller sea lions with the opportunity to recover from any noise impacts, were such impacts to occur.

Pinnipeds can be adversely affected by in-air noise when they are hauled out. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. However, the predicted distances to the in-air noise disturbance threshold for hauled-out pinnipeds (100 dB rms) will not extend more than 10 m (33 ft) from any type of pile being driven. Because there are no haulouts within this distance, and surrounding docks are elevated high above the surface of the water, and therefore inaccessible to Steller sea lions, no in-air disturbance to hauled-out individuals is anticipated as a result of the Kodiak Transient Float Replacement Project.

Airborne sound during impact pile-driving may be perceptible at the nearest known pinniped haulout, the Dog Bay Float (1,400 m [4,600 ft ft] from the Kodiak Transient Float Replacement Project); however, sound levels will be well below the NMFS-established disturbance level for hauled-out Steller sea lions, and impacts will be negligible. If Steller sea lions are hauled out on fishing vessels at the nearby seafood processing dock during the limited periods of impact pile proofing, they will be more than 150 m (492 ft) away, from Kodiak Transient Float Replacement Project. Though such individuals would likely perceive impact pile-driving noise, it is unlikely to distract them from foraging activities aboard the vessels.

5.1.2 Vessel Activity

Temporary increased vessel activity from the Kodiak Transient Float Replacement Project may increase in-water noise and the possibility of a ship strikes on Steller sea lions and humpback whales in the action area. Tug boats may be used in conjunction with barges to deliver materials to the Kodiak Transient Float Replacement Project site. Tug boats will follow well-established, frequently utilized navigation lanes in Kodiak harbor/port. When in operation, tugs may produce underwater sounds that exceed the continuous sound disturbance threshold for marine mammals (120 dB rms). Continuous sounds for tugs pulling barges have been reported to range from 145 to 182 dB rms re 1 µPa-m at 1 m (3.3 ft) from the source (Richardson et al. 1995, Kipple and Gabriele 2004, URS 2007).

Though ESA-listed marine mammals might be exposed to noises that exceed the 120 dB rms disturbance criterion during use of tug boats and barges, it is unlikely that any individual will exhibit substantial behavioral modification that will harass that individual. Marine mammals are currently exposed to such

sounds and continue to use the waters of Near Island Channel. This is particularly the case for Steller sea lions, which appear attracted to vessels as a food source. Given the transitory nature of tugs, any disturbance to a particular individual will be limited in space and time. The Kodiak harbor/port area, and the action area specifically, is frequently traversed by barges, tug boats, and commercial vessels and tenders, and navigation lanes are frequently subject to dredging, an activity that produces underwater noise. These ongoing uses and activities contribute to elevated background levels of noise in the action area. Such activities, which are commonly associated with the Kodiak Transient Float Replacement Project action area, add to the baseline, and influence ambient noise levels, masking sounds of project-related vessel use. Based on the reported in-water noise levels for similar tug operations (145 to 160 dB rms; URS 2007), tugs will not produce sounds that exceed 190 dB rms at 1 m (3.3 ft) from the source. Therefore, they do not represent an acoustic injury concern for pinnipeds.

Vessels transiting the marine environment have the potential to collide with, or strike, marine mammals (Laist et al. 2001, Jensen and Silber 2003). The probability of strike events depends on the frequency, speed, and route of the marine vessels, as well as distribution of marine mammals in the area. Vessel strikes are a main concern for humpback whales, however, because humpback whales are not common in the project area, the use of slow-moving tugs and barges associated with construction of the Kodiak Transient Float Replacement Project is not anticipated to adversely affect humpback whales.
Although risk of ship strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the Recovery Plan for this species states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated (e.g., near rookeries or haulouts) (NMFS 2008). The California sea lion, a similar species, has been observed with propeller strike injuries (Goldstein et al. 1999), indicating that individual Steller sea lions could be impacted as well. Due to the common presence of commercial and recreational vessels in the action area and that marine mammals appear to be habituated to some degree to such heavy vessel traffic, the use of slow-moving tugs and barges associated with construction of the Kodiak Transient Float Replacement Project is not anticipated to adversely affect Steller sea lions.

5.1.3 Turbidity/Sedimentation

During installation of piles, a temporary and localized increase in turbidity near the seafloor is possible in the immediate area surrounding each driven pile. Due to the general lack of high silt content in the sediments within the construction footprint (FHWA and DOT&PF 2015), such turbidity is unlikely to measurably affect humpback whales, Steller sea lions, or their prey, in the action area.

5.1.4 Pollution

During construction of the Kodiak Transient Float Replacement Project, there is potential for an oil or pollution spill from activities associated with the project; however, best management practices (BMPs) will be implemented during construction to prevent contaminants from entering the water column and any adverse affects on humpback whales and Steller sea lions. Plans will be in place and materials available for spill prevention and cleanup activities at the project to limit potential contamination.

5.1.5 Habitat Loss or Modification

Steller sea lions could experience a temporary loss of suitable habitat in the action area if elevated noise levels associated with in-water construction result in their displacement from the area. Displacement of Steller sea lions by noise will not be permanent and will not result long-term effects to the local population. Steller sea lions use the Dog Bay Float in St. Herman's Harbor, approximately 1,400 m (4,600 ft) from the Kodiak Transient Float. Disturbance and even temporary displacement from the Dog Bay

Float may occur; however, Dog Bay Float it is located beyond the 100 dB in-air acoustic threshold of 10 m for Steller sea lions, and therefore, noise is not anticipated to negatively affect Steller sea lions hauled out on Dog Bay Float. The loss of habitat due to the project footprint is not anticipated to occur during the Kodiak Transient Float Replacement Project because the float footprint will decrease in size by approximately 48 square meters (540 square feet) and is previously disturbed by the existing float (Figure 7).

5.1.6 Critical Habitat

This project is not expected to cause physical modifications to the two closest federally designated haulout sites Long Island and Cape Chiniak or the aquatic zones that overlap with the action area. Long Island and Cape Chiniak are located approximately 7 km (4 nm) and 24 km (13 nm), respectively, from the project footprint, and therefore, will not be physically modified by the project. Construction activities associated with the Kodiak Transient Float Replacement Project will result in temporary, minor degradation of the aquatic zone for Steller sea lion critical habitat due to increased underwater and airborne sound during pile removal and installation. Additionally, substantial modification to the aquatic zone is not anticipated to occur because the project footprint will decrease in size. Other potential temporary impacts include changes in prey species distribution and water quality (e.g., turbidity) during piling installation and removal. Proposed mitigation measures to avoid or minimize potential direct effects from project activities will be implemented (Section 6).

The action area is not within or near critical habitat for humpback whale.

5.2 Indirect Effects

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. Indirect effects from the proposed Kodiak Transient Float Replacement Project include impacts from noise on habitat

5.2.1 Effects of Noise on habitat

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

In general, impacts to marine mammal prey species are expected to be minor and temporary. The area likely impacted by the proposed project is relatively small compared to the available habitat around Kodiak Island. 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 disturbed area will still leave large areas of fish and Steller sea lion foraging habitat in the action area. Therefore, indirect effects on Steller sea lion prey during the proposed project are not expected to be substantial. Beneficial effects to prey species may include increased habitat resulting from the decrease in footprint of the float and from removal of a higher number of piles than the number to be re-installed (FHWA and DOT&PF 2015). Mitigation measures will be implemented to reduce impacts of noise on Steller sea lion habitat (Section 6.0).

5.3 Interrelated and Interdependent Activities

Interrelated actions are actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions that have no independent utility apart from the proposed action (50 CFR 402.02). No interrelated or interdependent actions are anticipated to occur because of the Kodiak Transient Float Replacement Project.

5.4 Cumulative Effects

Cumulative effects under the ESA are future State, city/county, or private activities that are reasonably certain to occur within the action area and do not include future federal actions that are located within the action area of the proposed project (50 CFR 402.02). Reasonably foreseeable future activities and their related effects to wDPS Steller sea lions and the Mexico DPS of humpback whalesin the action area would presumably involve activities within and immediately adjacent to Kodiak harbor/port. Any projects involving the placement of fill, dredging, or structures in the harbor would be subject to federal authorization from the USACE. Such authorizations would require consultation under the ESA on their effects to the listed species, and are therefore not addressed here as cumulative impacts.

Several private projects have been identified that are reasonably certain to occur in the action area, including construction of a new Petro Marine facility (in uplands) along the adjacent waterfront. In addition, the Kodiak Waterfront Master Plan identifies the need for upgrades of various piers and harbors (PND 2010). To date, the chronic noise of the Kodiak port apparently has not prevented Steller sea lions from using this area, as indicated by the frequent use of the St. Herman's Harbor float. Significant increases in the baseline activity and noise levels are not predicted within the action area in the foreseeable future (FHWA and DOT&PF 2015).

Commercial fishing operations in the action area will continue to provide a food source for Steller sea lions for the foreseeable future. These operations will continue to contribute to apparent habituation of Steller sea lions to food sources aboard fishing vessels and the associated underwater noise and marine vessel traffic of commercial fishing boats. Fisheries may also result in direct mortality or injury to Steller sea lions and humpback whales due to entanglement in fishing gear or competition for prey. Such effects would occur outside the action area but within the range of the wDPS Steller sea lions and the Mexico DPS humpback whales, and have been evaluated in other ESA section 7 consultations (FHWA and DOT&PF 2015, NMFS 2016c).

NMFS (2011) identified the following reasonably foreseeable non-federal activities that may result in cumulative effects to Steller sea lions in the Kodiak Island vicinity: (1) subsistence harvest by Alaska Natives; (2) State-managed commercial and sport fisheries; and (3) climate change. Relative to Steller sea lion subsistence harvest in the action area, NMFS (2011) expected that levels will remain low and effects insignificant in the vicinity of one major haulout site, Ugak Island. The Ugak Island haulout, and its associated aquatic zone, are outside the action area identified for this project (FHWA and DOT&PF 2015). Climate change is another factor that may affect wDPS Steller sea lions near Kodiak, which is described in more detail in Section 5 Environmental Baseline (NMFS 2015).

NMFS (2016c) identified the following reasonably foreseeable non-federal activities that may result in cumulative effects to humpback whales in the Gulf of Alaska: (1) vessel strikes; (2) entanglement. These activities are described in more detail in Section 5 Environmental Baseline.

6 Impact Avoidance and Minimization Measures

The project uses the most compact design practicable to minimize impacts. The replacement float will be located in nearly the same footprint and with the same alignment as the existing float; however, the replacement float will be approximately 14 m (45 ft) shorter than the existing float. The replacement float will require fewer piles than the existing float. A number of proposed mitigation measures or construction techniques will be employed to minimize effects to listed species. Proposed mitigation measures for the project include general construction mitigation measures, mitigation measures during pile removal and installation, and marine mammal monitoring and mitigation measures.

6.1 General Construction Mitigation Measures

- No dredging or blasting will be used for this project.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented. A contractor supplied Storm Water Pollution Prevention Plan will be in place during construction.
- Spill response equipment will be kept on-site during construction.
- Work in waters of the U.S. will be conducted in accordance with the terms and conditions of the USACE permit obtained for the project.

6.2 Pile Removal and Installation Mitigation Measures

- The replacement float uses a design that incorporates the smallest diameter piles practicable while still minimizing the overall number of piles. This design was selected to minimize noise impacts associated with larger piles.
- Noise associated with in-water pile-driving will be localized and short-term. In-water construction would last approximately 2.5 months; during that time vibratory pile-driving would occur for approximately 8 hours and down-hole drilling would occur for approximately 48 hours.
- To minimize construction noise levels as much as possible the contractor will first attempt to direct pull piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- Vibratory hammers and down-hole drilling methods will be used to install piles; the impact hammer will be used only to ensure the piles are secure (proofed) in bedrock.
- Before impact or vibratory pile-driving begins, the contractor will employ “soft start” procedures.
- In the rare case that impact hammers are used, pile caps or cushions will be employed for sound attenuation.

- As recommended by Alaska Department of Fish & Game, to minimize impacts to pink salmon fry and coho salmon smolt, the contractor will refrain from impact pile-driving from May 1 through June 30, within the 12-hour period beginning daily at the start of civil dawn. If impact pile-driving occurs from May 1 though June 30, it will occur in the evenings during daylight hours, after the 12-hour period that begins at civil dawn.

6.3 Marine Mammal Monitoring and Mitigation

Marine mammal monitoring and mitigation measures for the proposed project include marine mammal monitoring and reporting, implementation of proposed monitoring zones, clearing the monitoring zone, soft starts, and shut down procedures. Mitigation measures described below will decrease the likelihood that Steller sea lions will be exposed to SPLs that may result in injury or disturbance.

6.3.1 Marine Mammal Monitoring and Reporting

Monitoring and reporting the potential impacts from the project on marine mammals are discussed in Marine Mammal Monitoring Plan (Appendix A).

6.3.2 Mitigation Measures

6.3.2.1 Protected Species Observers

Qualified Protected Species Observers (PSOs) will be employed for marine mammal monitoring. PSOs will maintain verbal communication with the construction personnel to implement appropriate mitigation measures.

6.3.2.2 Proposed Monitoring Zones

The proposed Level A and Level B disturbance zones will be monitored 30 minutes before, during, and 30 minutes after all in-water construction activity. If a Steller sea lion or humpback whale is observed within the Level A or B zones, the sighting will be documented as a Level A or B exposure, depending on location of take. If the number of Steller sea lions or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA, the City will notify NMFS and seek further consultation.

6.3.2.3 Clearing the Monitoring Zone

Prior to the start of daily in-water construction activity, the PSO will clear the monitoring zones for a period of 30 minutes. Clearing the monitoring zone means a marine mammal has not been observed within the monitoring zones for that 30-minute period. If a marine mammal is observed within the monitoring zones, a soft-start cannot proceed until the marine mammal has left the monitoring zones or has not been observed for 30 minutes.

6.3.2.4 Soft Start Procedure

Soft start procedures will be used prior to pile removal and installation, to allow marine mammals to leave the area prior to exposure to maximum noise levels. For vibratory hammers, the soft-start technique will initiate noise from the hammer for 15 seconds at a reduced energy level, followed by 1-

minute waiting period and repeat the procedure two additional times[1]. For impact hammers, the soft-start technique will initiate three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.

6.3.2.5 Shut Down Procedures

In addition, shutdown zones for injury will be monitored. If Steller sea lions or humpback whales are observed approaching or within a shutdown zone, shut-down procedures will be implemented to prevent exposure. The shutdown zones are as follows:

- Steller sea lion: 30 m during impact pile driving
- Humpback whale: 200 m during all pile driving activities

The animal will be considered clear if:

- It has been observed leaving the Level A harassment zone; or
- It has not been seen in Level A harassment zone for 15 minutes.

6.3.2.6 Construction Mitigation

During in-water construction not involving pile-driving or drilling, to prevent injury to the listed species from the physical interaction with construction equipment, a shutdown zone of 10 m (33 ft) will be implemented. These activities include but are not limited to:

- Positioning of piles on the substrate via crane (i.e., “stabbing” the pile);
- Removal of piles from the water column or substrate via crane (i.e., “deadpull”).3

[1] The soft start or “ramp –up” procedure for vibratory driving is not a requirement of NMFS, it is a requirement of the U.S Fish and Wildlife Service’s Anchorage Fish and Wildlife Field Office to mitigate noise impacts on Northern sea otters and Steller’s eiders as outlined in their August 7, 2012 Observer Protocols.

7 Determination of Effect

We conclude that the proposed Kodiak Transient Float Replacement Project **is likely to adversely affect** the wDPS of Steller sea lions due to the noise associated with the pile-driving. Noise associated with Kodiak Transient Float Replacement Project may reach levels exposing Steller sea lions to Level A and B harassment under the MMPA, and therefore, cannot be considered having insignificant or discountable effects on the species. However, mitigation measures described in Section 6 will be implemented throughout the duration of the project to reduce Steller sea lion exposure to noise associated with the pile-driving. Mitigation measures include shore-based monitoring, safety radii, clearing the safety radii, soft-starts procedures, and shut-down procedures. The City is currently applying for an IHA for take of Steller sea lions.

The proposed Kodiak Transient Float Replacement Project **is not likely to adversely affect** the Steller sea lion critical habitat. Kodiak Transient Float Replacement Project overlaps with two of the federally designated haulouts, Long Island and Cape Chiniak, and their aquatic zones (distance). Therefore, the project will occur within designated critical habitat of Steller sea lions. However, due to the limited exposure of designated critical habitat to increased underwater noise associated with in-water construction, and the currently degraded nature of designated critical habitat in the action area (i.e., currently an active port and harbor), effects to critical habitat are anticipated to be insignificant. Any impacts to prey species are expected to be short-term and fish would likely return to their pre-disturbance behavior once in-water construction activity ceases. Additionally, mitigation measures will be implemented to reduce impacts on prey species (salmon fry).

The proposed Kodiak Transient Float Replacement Project **is likely to adversely affect** the Mexico DPS humpback whales due to the noise associated with the pile-driving. Noise associated with Kodiak Transient Float Replacement Project may reach levels exposing humpback whales to Level A and B harassment under the MMPA, and therefore, cannot be considered having insignificant or discountable effects on the species. However, mitigation measures described in Section 6 will be implemented throughout the duration of the project to reduce humpback whale exposure to noise associated with the pile-driving. Mitigation measures include shore-based monitoring, safety radii, clearing the safety radii, soft-starts procedures, and shut-down procedures. The City is currently applying for an IHA for take of humpback whales.

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Appendix A
Marine Mammal Monitoring and Mitigation Plan

Marine Mammal Monitoring and Mitigation Plan

City of Kodiak Transient Float Replacement Project
Kodiak, Alaska

October 2016

Prepared for:
City of Kodiak Port and Harbors
403 Marine Way
Kodiak, Alaska 99615

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

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Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
BA	Biological Assessment
City	City of Kodiak
dB	decibels
dB re 1 µPa	decibels referenced to one microPascal
FR	Federal Register
ESA	Endangered Species Act
IHA	Incidental Harassment Authorization
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer
rms	root mean square
SPL	sound pressure level
wDPS	western distinct population segment

1 INTRODUCTION

The City of Kodiak (City) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation and extraction for the proposed removal and replacement of the existing Transient Float in Kodiak, Alaska. The 4MP was prepared as an appendix to the request for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA), and in support of the Biological Assessment (BA) for formal Section 7 consultation with the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA). The 4MP for the Kodiak Transient Float Replacement project relies heavily on the 4MP created for the Kodiak Ferry Terminal and Dock Improvements Project (Pier 1) and is subject to change when the IHA and Biological Opinion are issued for this project.

The Kodiak Transient Float Replacement project will reconstruct an existing transient float, including the removal and installation of piles in the marine environment. The project has the potential to generate elevated levels of underwater and in-air noise that could exceed Level A (injury) and Level B (disturbance) harassment thresholds established by NMFS for marine mammals under the MMPA (70 Federal Register [FR] 1871-1875).

Level A harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment means any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering, but that does not have the potential to injure a marine mammal or marine mammal stock in the wild.

On August 4, 2016, NMFS released final *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing—Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts (Technical Guidance or Guidance)* (2016). This guidance provides updated received levels, or acoustic thresholds, above which individual marine mammals under NMFS' jurisdiction are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources.

Updates include a protocol for deriving Permanent Threshold Shift (PTS) and Temporary Threshold Shifts (TTS) onset levels for impulsive (*e.g.,* impact pile drivers) and non-impulsive (*e.g.,* vibratory pile drivers) sound sources and the formation of marine mammal hearing groups (low-, mid-, and high-frequency cetaceans and otariid and phocid pinnipeds in water) and associated auditory weighting functions. Acoustic thresholds are presented using the dual metrics of cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (PK) for impulsive sounds and the SEL_{cum} metric for non-impulsive sounds (NMFS 2016c). The new guidance only determined PTS and TTS (or Level A take, injury) for marine mammal hearing groups and Level B take zones are not affected.

NMFS defined levels of harassment for marine mammals under water as:

- **Level A Harassment – injury by continuous or impulse noise**: Under the new guidelines this varies by marine mammal hearing group (low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, phocid pinnipeds, and otariid pinnipeds)
- **Level B Harassment – harassment by impulse noise** (e.g., impact pile driving) is set at 160 dB re 1 µPa rms for all marine mammals
- **Level B Harassment – harassment by continuous noise** (e.g., vibratory pile driving and down-hole drilling) is set at 120 dB re 1 µPa rms (70 FR 1871-75) for all marine mammals

The City requested an IHA for the take of marine mammals protected under the MMPA including Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), and humpback whale *(Megaptera novaeangliae*) by Level A and B harassment and killer whale (*Orcinus orca*) by B harassment incidental to replacing the existing Transient Float. Fin whales (*Balaenoptera physalus*) generally inhabit more offshore habitats than the Near Island channel and are not expected to occur in the vicinity of the Kodiak Transient Float Replacement project area; no Level A or Level B takes were requested for these species, and pile removal or installation will cease to avoid take of these species.

The overall goal of this 4MP is to ensure compliance with the ESA and MMPA when the 4MP is implemented by the Protected Species Observers (PSO) at the project site. This 4MP has been developed to minimize and mitigate harassment to marine mammals during Kodiak Transient Float Replacement project construction activities, and to monitor and record the extent of harassment when it does occur. This 4MP also describes the methods that will be used to monitor and record the extent of Level A and Level B harassment. Please refer to the IHA application and BA prepared for the Kodiak Transient Float Replacement project for a more detailed discussion of the project and its potential effects on marine mammals, including additional details on mitigation methods that will be implemented during construction.

2 HARASSMENT THRESHOLDS

The area of impacts of the proposed action encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne noises generated by pile driving and down-hole drilling. The Level A harassment zones are outlined in Table 1 and shown in Figure 1. The distances were developed following the protocol for deriving PTS from NMFS's recently released *Technical Guidance*.

Table 1. Proposed In-water Sound Exposure Levels and Disturbance Zones (m) for Level A Harassment for all Marine Mammals for the Kodiak Transient Float Replacement Project.

	PTS Isopleth to threshold (m) Hearing Group				
Source	**Low-Frequency Cetaceans**	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid Pinnipeds**	**Otariid Pinnipeds**
Impact	700	30	700	400	30
Vibratory	20	10	30	20	10
Down-hole Drilling	300	20	200	200	10

Injury zones calculated assuming:

- Impact driving=14 strikes per pile (average) and 6 piles per day; weighting factor 2; SL 205.9
- Vibratory driving=0.69 hours per day; weighting factor 2.5; SL 183.8
- Down-hole drilling=4.08 hours per day; weighting factor 2; SL 192.5
- PTS Isopleth to threshold (m) rounded to the nearest 10, 100, or 1,000 m
-

From: NMFS. 2016c. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p.

Distances to the harassment thresholds, as defined by sound isopleths, vary by marine mammal type (cetacean vs. pinniped) and by the pile removal and installation tool. The Level B harassment isopleth will be 7,000 meters during down-hole drilling, 900 meters during vibratory pile driving, and 200 meters during impact pile driving. The Level B harassment isopleths for down-hole drilling, vibratory and impact pile driving were rounded to the nearest 100 or 1,000 meters for monitoring purposes for the Kodiak Transient Float Replacement project. The monitored Level B harassment zone for down-hole drilling will include the entire area that is ensonified within Near Island Channel, and then will extend along the channel to the northeast and southwest based on vectors from the sound source. Marine waters will not be monitored if they are located behind landmasses such as islands or headlands that have blocked transmission of sound, as it will be assumed that these areas will not be ensonified. See Table 2 and Figure 2.

Table 2. In-water proposed sound exposure threshold distances[1] (m) for Level B Harassment for all Marine Mammals the Kodiak Transient Float Replacement Project.

Source	Exposure Threshold Distances (m)[1]	
	Level B Harassment (Impulsive) 160 dB	Level B Harassment (Continuous) 120 dB
Impact Pile Driving	200	--
Vibratory Pile Driving	--	900
Down-Hole Drilling	--	7,000

[1]For monitoring purposes, the distances were rounded to the nearest 10, 100, or 1,000 m, which are more conservative estimates.

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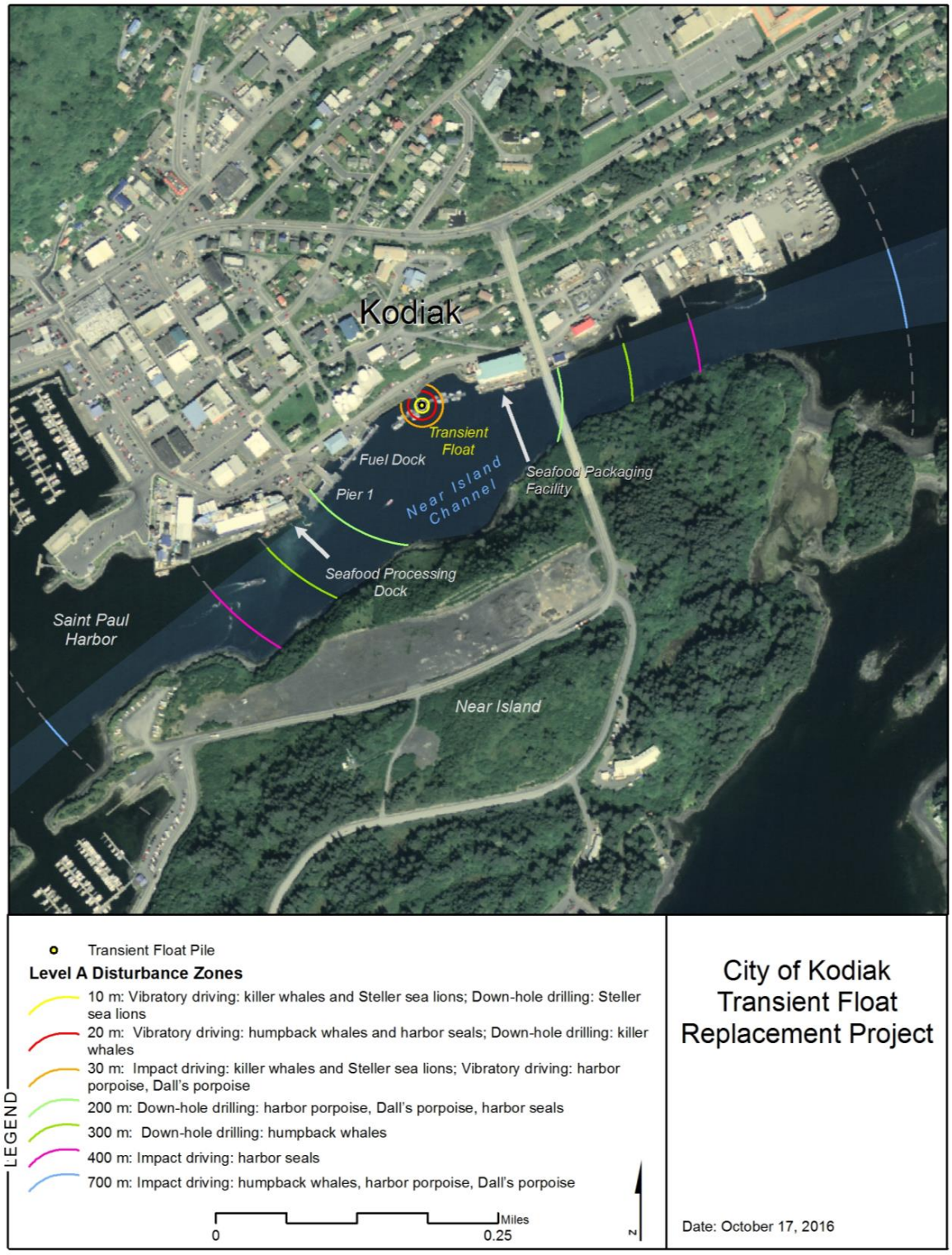

Figure 1. Level A Harassment zones for all marine mammals for the Kodiak Transient Float Replacement Project.

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Figure 2. Level B harassment zones. Distances to the 160 (impulsive) and 120 dB (continuous) in-water thresholds (m).

3 MARINE MAMMAL MONITORING

To minimize impacts of project activities on marine mammals, PSOs will be present at the Kodiak Transient Float Replacement project site during down-hole drilling, impact pile installation, and vibratory pile removal and installation. PSOs will search for, monitor, document, and track marine mammals around and within the Level A and Level B harassment zones (Figure 1 and Figure 2). It should be noted that the titles PSO, Marine Mammal Observer, and Wildlife Observer are intended to be synonymous for consultation, documentation, and construction purposes.

3.1 Monitoring Overview

Two PSO will begin observations of the appropriate harassment zones 30 minutes prior to the start of pile installation or extraction, and will continue to observe for 30 minutes after completion of pile installation or extraction. During monitoring, the PSO will scan the water every few minutes with high-quality binoculars, and will use the naked eye to scan during the remainder of the time. A high-powered spotting scope will also be available for scanning greater distances, so that any marine mammals swimming toward the harassment zones can be observed. A third PSO will be available to observe during alternate shifts of 4–6 hours each day to prevent fatigue.

The PSOs will be stationed during construction activities at the project site and at a location on the south side of the community of Kodiak, for example at the south end of Jackson Lane, Turner Lane, or where a clear line of sight can be established throughout the Level B harassment area. If it is determined that the Level B harassment area cannot be monitored effectively by two PSOs, another PSO will be added to monitor the area.

PSOs will have no other construction-related tasks or responsibilities while monitoring for marine mammals. Each PSO will be trained in marine mammal identification and behaviors, and provided with reference materials to ensure standardized and accurate observations and data collection.

Before construction commences, the PSO will meet with the Contractor and the point of contact with the City to determine the most appropriate observation platform or platforms for monitoring during pile removal and installation. Considerations will include:

- Height of the observation platform(s), to maximize field of view and distance
- Ability to see the harassment zones
- Safety of the PSO, construction crews, and other people present during construction
- Minimization of interference with construction activities

A clear authorization and communication system will be in place to ensure that PSOs and the construction crew understand their respective roles and responsibilities. If pile installation or extraction must be shutdown to avoid take, the PSO will contact a designated member of the construction crew. A "shutdown" is defined as a duration of 30 minutes or more when in-water noise from pile removal or installation does not occur. All communications with the construction crew will be documented in the environmental conditions and construction activities log (Section 3.3.2). Although it is the role of the PSOs to watch for marine mammals, the City's construction personnel will be trained and instructed to notify the PSOs immediately if they observe a marine mammal.

Specific aspects and protocols of marine mammal observations will also include:

- Monitoring distances will be measured with range finders.
- Distances to animals will be based on the best estimate of the PSOs, relative to known distances to objects in the vicinity of the PSO.
- Bearings to animals will be determined by using a compass.
- Pre-Activity Monitoring:
    - The Level A and Level B harassment zones will be monitored for 30 minutes prior to in-water pile removal or installation.
    - If a marine mammal is present within a particular shutdown zone (varies with species and pile driving technique; see below and Section 4.6), a soft-start will be delayed until the animal(s) leaves the shutdown zone. Activity will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the shutdown zone.
    - There is no Level A take authorized for killer whales. If a killer whale is present within the Level A harassment zone, a soft-start will be delayed until the animal(s) leaves the Level A harassment zone. Activity will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the Level A harassment zone.
    - If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, , or humpback whale is present in the Level A or B harassment zone or a killer whale is in the Level B harassment zone, a soft-start will begin and a Level B exposure will be documented.
    - If any marine mammal other than Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise, killer whales, or humpback whales are present in the Level A or Level B harassment zone, a soft-start will be delayed until the animal(s) leaves the zone. A soft-start will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the harassment zone.

- During-Activity Monitoring:
    - **Down-hole drilling**
        - Level A at 300 meters for humpback whale; 200 meters for harbor porpoise, Dall's porpoise, harbor seal; 20 meters killer whale; and 10 meters Steller sea lion.
            - Down-hole drilling will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then down-hole drilling will be stopped as these species approach to avoid additional take of these species.
            - Down-hole drilling will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.
        - Level B at 7,000 meters
            - Down-hole drilling will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure will be documented. If Level B take reaches the authorized limit, then down-hole drilling will be stopped as these species approach to avoid additional take of these species.
            - Down-hole drilling will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.
        - Down hole drilling will be stopped if a humpback whale approaches within 200 meters.
        - Down hole drilling will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
        - Down hole drilling will be stopped if a killer whale approaches within 30 meters.
    - **Vibratory pile driving**
        - Level A at 30 meters for harbor porpoise and Dall's porpoise; 20 meters for humpback whale and harbor seal; and 10 meters for killer whale and Steller sea lion.
            - Vibratory pile driving will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then

vibratory pile driving will be stopped as these species approach to avoid additional take of these species.

- Vibratory pile driving will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.

- Level B at 900 meters
  - Vibratory pile installation or removal will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure will be documented. If Level B take reaches the authorized limit, then vibratory pile installation will be stopped as these species approach to avoid additional take of these species.
  - Vibratory pile installation or removal will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.
- Vibratory pile installation or removal will be stopped if a humpback whale approaches within 200 meters.
- Vibratory pile installation or removal will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
- Vibratory pile installation or removal will be stopped if a killer whale approaches within 30 meters.

- **Impact pile driving**
  - Level A at 700 meters for humpback whale, harbor porpoise, and Dall's porpoise; 400 meters for harbor seal; 30 meters for killer whale and Steller sea lion.
    - Impact pile driving will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then vibratory pile driving will be stopped as these species approach to avoid additional take of these species.
    - Impact pile driving will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.
  - Level B at 200 meters
    - Impact pile installation will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure

will be documented. If Level B take reaches the authorized limit, then impact pile installation will be stopped as these species approach to avoid additional take of these species.

- Impact pile installation will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.

- Impact pile installation will be stopped if a humpback whale approaches within 200 meters.
- Impact pile installation will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
- Impact pile installation will be stopped if a killer whale, harbor seal, or Steller sea lion approaches within 30 meters.

- Post-Activity Monitoring
  - Monitoring of the Level A and Level B harassment zones will continue for 30 minutes following the completion of the activity.

3.2 Protected Species Observer Qualifications

At a minimum, all PSOs must be capable of spotting and identifying marine mammals and documenting applicable data during all types of weather, including rain, sleet, snow, and wind. All PSOs must also be comfortable with handling the authority to stop work when necessary. NMFS will approval PSOs following review of each proposed PSOs' curriculum vitae (CV).

Minimum qualifications will include:

- Visual acuity in both eyes (correction is permissible) sufficient to allow detection and identification of marine mammals at the water's surface. Use of binoculars may be necessary to correctly identify the target to species.
- Ability to work in cold, wet weather, including sleet, wind, snow, and rain.
- Ability to conduct field observations and collect data according to assigned protocols.
- Experience or training in the field identification of marine mammals, including the identification of behaviors.
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound

of marine mammals observed within a defined shutdown zone; and marine mammal behavior as detailed in Section 3.3.

3.3 Data Collection

3.3.1 Environmental Conditions and Construction Activity

The PSO will document environmental conditions, types of construction activities, types of nearby commercial activities, and any communications with the construction crew in the environmental conditions and construction activities log. Environmental conditions will be documented at the beginning and end of every monitoring period and every half hour, or as conditions change. Any nearby commercial activities that could influence marine mammal behavior will be documented at the time of a marine mammal sighting. These could include presence and number of vessels offloading at the seafood processing facility dock, the number and type of vessels sailing by, and the number and type of vessels refueling at the neighboring dock. Data collected will also include the PSOs' names; location of the observation station; time of observation; wave height; wind speed; amount and position of glare; weather conditions; and visibility (Table 3

Table).

The PSO will document the time of startup or ramping up as well as shutdowns (Section 4). The reason for stopping work, time of shutdown, and type of pile driving or other in-water work taking place will also be documented. Additionally, all communications between a PSO and the construction crew will be documented.

Data collected regarding environmental conditions, marine mammal sightings, and mitigation measures will be entered into a spreadsheet. Each data entry will be checked for quality assurance and quality control. Upon request, the data will be submitted to NMFS along with the final monitoring report.

3.3.2 Sightings

Each marine mammal sighting will be documented on a sighting form, which consists of a data sheet and map (Appendix A). Alternatively, data will be collected using a laptop, tablet or similar electronic device that is protected from wet weather. Regardless of the collection platform, data will consist of start and end times of each sighting; number of individuals; sex and age class, if possible; behavior and movement; location of sighting; distances from project activities to the sighting; type of in-water activity at the time of sighting; and whether and when project activities were stopped in response to the sighting.

Monitoring distances will be measured with range finders and marked with buoys as needed. To the extent practicable, the PSOs will record behavioral observations that may make it possible to determine if the same or different individuals are being “taken” as a result of project activities over the course of a single day. While monitoring and tracking a sighting, PSOs will also continue to sweep the water with binoculars and the naked eye to identify other marine mammals potentially entering the area. These data will be submitted to NMFS as part of the final monitoring report.

Table 3. Data attributes and definitions.

Data Attribute	Attribute Definition and Units Collected
Environmental Conditions	
Weather conditions	Dominant weather conditions, collected every 30 minutes: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wind speed	In knots
Wind direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Wave height	Calm, ripples (up to 4 inches), small wavelets (up to 8 inches), large wavelets (up to 2 feet), small waves (up to 3 feet), moderate waves (up to 6 feet), large waves (up to 9 feet)
Cloud coverage	Amount of cloud cover (0–100%)
Visibility	Maximum distance at which a marine mammal could be sighted
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, etc.)
Tide	Predicted hourly data information gathered from National Oceanic and Atmospheric Administration will be available on-site
Construction and Communication Activities	
Time of event	Time that construction activities and all communications between Wildlife Observers and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, and type of pile driving
Communication	Information communicated between PSOs and construction crew
Marine Mammal Sightings Data	
Time of initial and last sighting	Time the animals are initially and last sighted
Number of individuals	Minimum and maximum number of animals counted; record the count the PSO believes to be the most accurate
Sex and age, if possible	Generally, numbers of females with pups or calves
Initial and final heading	Direction animals are headed when initially and last sighted
In-water construction activities at the time of sighting	Type of construction activities occurring at time of sighting
Distance from marine mammal to construction activity	Distance from marine mammal to construction activities when initially sighted, closest approach to activities, and final sighting
Commercial activities at time of sighting	Description of nearby commercial activities occurring at time of sighting, such as presence and number of vessels offloading at seafood processing facility dock, number and type of vessels sailing by, number and type of vessels refueling at dock
Behavior	Behaviors observed, indicating the primary and secondary behaviors
Change in behavior	Changes in behavior; indicate and describe
Group composition	Orientation of animals within the group and the distance between animals

Adapted from Kodiak Ferry Terminal and Dock Project – Marine Mammal Monitoring and Mitigation Plan

4 MITIGATION MEASURES

The City proposes to employ mitigation measures to minimize the number of marine mammals potentially affected. Marine mammal monitoring and mitigation measures for the proposed project include marine mammal monitoring and reporting, implementation of proposed monitoring zones, clearing the monitoring zone, soft starts, and shut down procedures. Mitigation measures described below will decrease the likelihood that marine mammals will be exposed to SPLs that may result in injury or disturbance.

4.1 Protected Species Observers

Qualified PSOs will be employed for marine mammal monitoring (Section 3.2). PSOs will maintain verbal communication with the construction personnel to implement appropriate mitigation measures.

4.2 Proposed Monitoring Zones

Modeling results for Level A and Level B harassment zones discussed in Section 2.0 were used to develop monitoring zones for pile removal and installation (Tables 1 and 2).

The proposed Level A and Level B harassment zones will be monitored 30 minutes before, during, and 30 minutes after all in-water construction activity. If marine mammals are observed approaching or within the shutdown zones (varies with species and pile driving technique; Section 4.6), shut-down procedures will be implemented to prevent exposure. If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale is observed within the Level A or Level B zones or a killer whale is observed within the Level B zone, the sighting will be documented as a Level A or B exposure. If the number of Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise killer whales, or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA, the City will notify NMFS and seek further consultation. If any marine mammal species is encountered that is not authorized by the IHA and are likely to be exposed to sound pressure levels greater than or equal to the Level A or B harassment zones, City will shut down in-water activity to avoid exposure of those species and consult with NMFS.

4.3 Clearing the Monitoring Zone

Prior to the start of daily in-water construction activity day or when pile driving activities have been stopped for longer than a 30-minute period, the PSO will clear the monitoring zones for a period of 30 minutes. Clearing the monitoring zone means a marine mammal has not been observed within the monitoring zones for that 30-minute period. If a killer whale is within the Level A zone or if a fin whale or other species for which Level A or B take is not authorized is present within the Level A or B harassment zone, a soft start (Section 4.4) will not proceed until the marine mammal has left the monitoring zones or has not been observed for 30 minutes for

cetaceans and 15 minutes for pinnipeds. If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale is present within the Level B zone, a soft start will be authorized to begin and a Level B exposure will be recorded for each individual marine mammal. Monitoring of the Level A and Level B harassment zones will continue for 30 minutes following the completion of the activity.

4.4 Soft Start Procedure

Soft start procedures will be used prior to pile removal and installation at the start of the work day or when pile-driving activities have been stopped for longer than a 30-minute period, to allow marine mammals to leave the area prior to exposure to maximum noise levels. For vibratory hammers, the soft-start technique will initiate noise from the hammer for 15 seconds at a reduced energy level, followed by 1-minute waiting period and repeat the procedure two additional times. For impact hammers, the soft-start technique will initiate three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.

4.5 Shut Down Procedures

A shut down will occur when pile driving is suspended. Shut down procedures will be implemented if a marine mammal is observed in or approaching the shutdown zone (varies with species and pile driving technique; Section 4.6), if other marine mammal species for which Level B take is not authorized is present within the Level B harassment zone, or if the number of Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise, killer whales, or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA. Activity will cease until the observer is confident that the marine mammal is clear of the Level A or B harassment zones (depending on the species). The animal will be considered clear if:

- It has been observed leaving the Level A or B harassment zones (depending on the species); or
- A pinniped has not been observed within the harassment zone for 15 minutes;
- A cetacean has not been observed within the harassment zone for 30 minutes.

Clearing the monitoring zone and a soft start procedure will be implemented if the shut down duration is longer than 30 minutes.

4.6 Construction Mitigation

During in-water construction not involving pile driving or drilling, to prevent injury to the listed species from the physical interaction with construction equipment, a shutdown zones will be implemented. These zones include:

- 200 meters for humpback whales during all pile-driving activities
- 100 meters for harbor porpoise and Dall's porpoise during all pile-driving activities
- 30 meters for killer whales during all pile-driving activities
- 30 meters for Steller sea lion and harbor seals during impact pile driving

4.7 Environmental Conditions

Ongoing in-water pile removal or installation will be continued during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone, provided both the in-water noise-generating activity and marine mammal monitoring continues (acknowledging that monitoring will occur at a reduced level of effectiveness). A PSO will continue to monitor the visible portion of the Level B harassment zone throughout the duration of activities producing in-water noise. Pile removal or installation will not be initiated or a soft start from a "shutdown condition" when the complete Level B harassment zone is not visible for a continuous 30-minute pre-operational monitoring period (whether due to darkness, low light, high sea state, fog, ice, heavy rain, glare, or other conditions).

5 REPORTING

A draft report will be submitted to NMFS within 90 calendar days of the completion of marine mammal monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. To the extent practicable, the PSOs will record behavioral observations that may make it possible to determine if the same or different individuals are being "taken" as a result of project activities over the course of a single day.

In general, reporting will include:

a. Numbers of days of observations
b. Lengths of observation periods
c. Locations of observation stations and dates used
d. Numbers, species, dates, group sizes, and locations of marine mammals observed
e. Descriptions of work activities, categorized by type of work taking place while marine mammals were being observed
f. Distances to marine mammal sightings, including closest approach to construction activities
g. Descriptions of any observable marine mammal behavior in the Level A and Level B harassment zones
h. Actions performed to minimize impacts to marine mammals
i. Times of shutdown events including when work was stopped and resumed due to the presence of marine mammals or other reasons
j. Refined take estimates based on the numbers of Steller sea lions, harbor seals, harbor porpoises, and killer whales observed during the course of pile installation and removal activities
k. Descriptions of the type and duration of any noise-generating work occurring and ramp-up procedures used while marine mammals were being observed
l. Details of all shutdown events, and whether they were due to presence of marine mammals, inability to clear the hazard area due to low visibility, or other reasons
m. Tables, text, and maps to clarify observations

Full documentation of monitoring methods, an electronic copy of the data spreadsheet, and a summary of results will also be included in the report.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as serious injury or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), the *entity* would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Stranding Coordinator. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- 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 equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with the *entity* to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The *entity* would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that the *entity* discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in the next paragraph), the *entity* would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Stranding Coordinator. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with the *entity* to determine whether modifications in the activities are appropriate.

In the event that the *entity* discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the *entity* would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS West Coast Stranding Hotline and/or by email to the Alaska Stranding Coordinator, within 24 hours of the discovery. The *entity* would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Appendix A
Data Form

Marine Mammal Sighting Form

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

Date: **Observer(s):**

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

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

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

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

Project Activities and Harassment Zone

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

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

SHUT DOWN or **DELAYED** from _____ to _____ (time)

NO SHUT DOWN, *EXPLANATION REQUIRED*:

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

Additional Information (include more detailed information on behavior):

Draw locations on hardcopy map

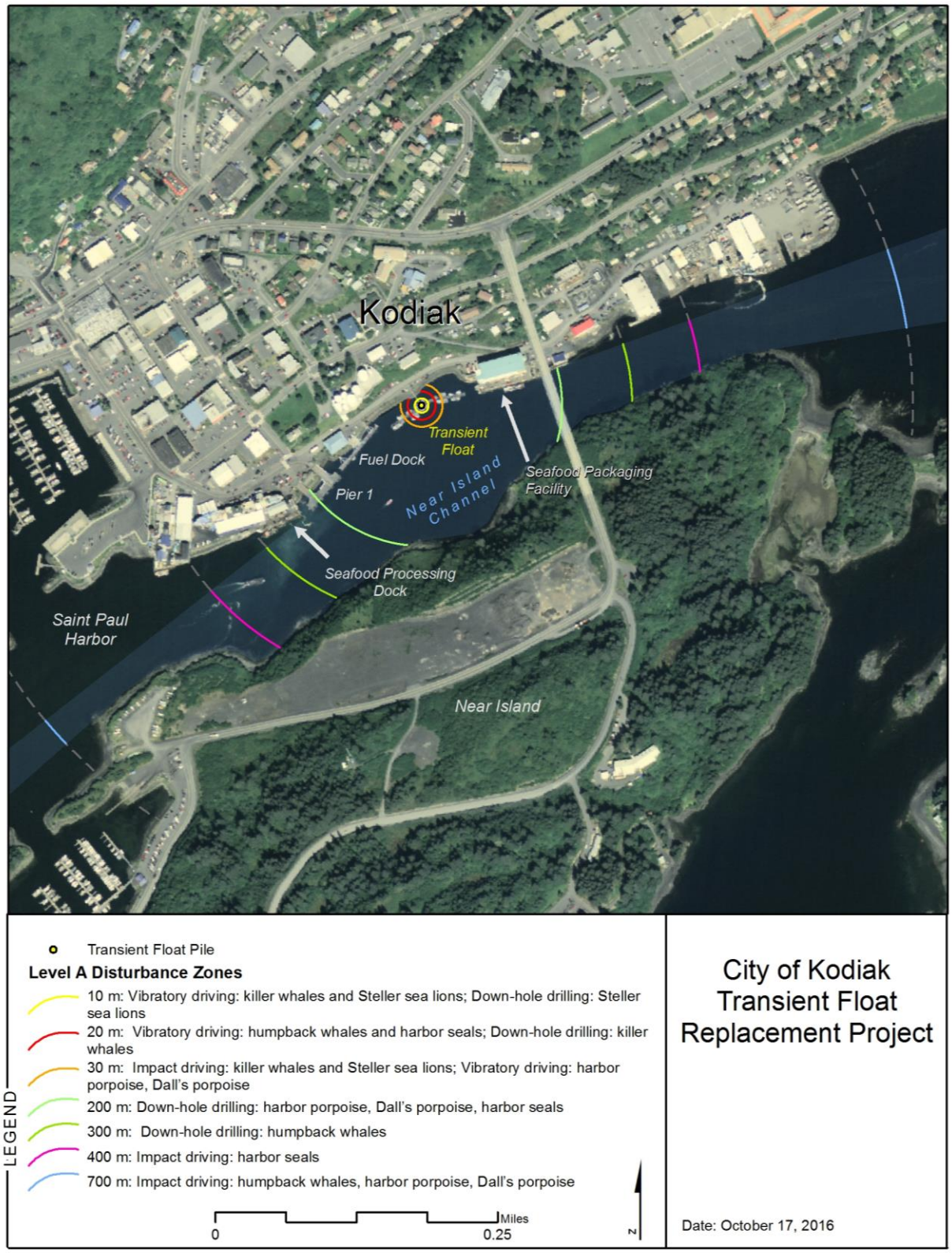
Daily Environmental Conditions, Construction, and Communication Activity Log

Page _____ of _____

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

Environmental Conditions (Recorded every 30 minutes or as conditions change)									Construction and Communication Activities *(Include all start up and shut-down activities and all communication to construction crew)*		
Time	Weather Conditions	Wind Speed	Wind Direction	Beaufort Sea State	Glare (%)	Visibility (m)	Cloud Cover (%)	Comments	Time	Type of Construction Activity *(Ramp up, Startup, shutdown, type of pile driving)*	Communication/Comments

Weather Conditions: (S) Sunny, (PC) Partly Cloudy, (L) Light Rain, (R) Steady Rain, (F) Fog, (OC)Overcast, (LS) Light Snow, (SN) Snow
Beaufort Scale: (0) Calm (1) ripples- up to 4 in (2) small wavelets- up to 8 in (3) large wavelets- up to 2 ft, (4) small waves- up to 3 ft (5) moderate waves- up to 6 ft (6) large waves- up to 9 ft


Kodiak
Transient Float
Fuel Dock
Pier 1
Near Island Channel
Seafood Packaging Facility
Seafood Processing Dock
Saint Paul Harbor
Near Island
LEGEND
Transient Float Pile
Level A Disturbance Zones
10 m: Vibratory driving: killer whales and Steller sea lions; Down-hole drilling: Steller sea lions
20 m: Vibratory driving: humpback whales and harbor seals; Down-hole drilling: killer whales
30 m: Impact driving: killer whales and Steller sea lions; Vibratory driving: harbor porpoise, Dall's porpoise
200 m: Down-hole drilling: harbor porpoise, Dall's porpoise, harbor seals
300 m: Down-hole drilling: humpback whales
400 m: Impact driving: harbor seals
700 m: Impact driving: humpback whales, harbor porpoise, Dall's porpoise
0
0.25
Miles
N
City of Kodiak Transient Float Replacement Project
Date: October 17, 2016


Kodiak
Near Is. Channel
Saint Paul Harbor
Inner Harbor
Transient Float
Round Is.
Gull Is.
Near Is.
Rocky Islet
Saint Herman Harbor
Woody Island
LEGEND
Transient Float
200m - 160 dB (impulsive) impact pile-driving
900m - 120 dB (continuous) vibratory pile-driving
7000m - 120 dB (continuous) down-hole drilling
0
0.5
1
1.5
2
Miles
N
City of Kodiak
Transient Float
Replacement Project
Date: June 30, 2016

Request for an Incidental Harassment Authorization

City of Kodiak Transient Float Replacement Project

Kodiak, Alaska

October 2016

Prepared for:
City of Kodiak Port and Harbors
403 Marine Way
Kodiak, Alaska 99615

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

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APPENDICES

Acronyms and Abbreviations

City	City of Kodiak
dB	decibels
dB re 1 µPa	decibels referenced to one microPascal
DPS	distinct population segment
eDPS	eastern distinct population segment
ESA	Endangered Species Act
ft	feet
Hz	hertz
IHA	Incidental Harassment Authorization
JASCO	JASCO Applied Sciences
kHz	kilohertz
km	kilometer
lbs	pounds
LOA	Letter of Authorization
m	meter
MMPA	Marine Mammal Protection Act
nm	nautical mile
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer
rms	root mean square
TS	threshold shift
TTS	temporary threshold shift
PTS	permanent threshold shift
SPL	sound pressure level
USACE	U.S. Army Corp of Engineers
wDPS	western distinct population segment

1 DESCRIPTION OF THE ACTIVITY

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

1.1 Introduction

The City of Kodiak (City) proposes to remove and replace its existing Transient Float located in Near Island Channel (Figure 1,Figure 2, and Figure 3). Replacement of the float requires in-water pile driving and down-hole drilling and is the subject of this Incidental Harassment Authorization (IHA) request.

The proposed project will occur in marine waters that support several marine mammal species. The Marine Mammal Protection Act of 1972 (MMPA) prohibits the taking of marine mammals; take is defined as to "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows for the issuance of an IHA, provided an activity results in negligible impacts on marine mammals and would not adversely affect subsistence use of these animals. Section 216.104 sets out 14 specific items that must be addressed in requests for rulemaking and renewal of regulations pursuant to Section 101(a)(5) of the MMPA.

The 14 items required by the MMPA are addressed in Sections 1 through 14 of this Application for an IHA. Some of these sections contain direct excerpts from the most current stock assessment reports developed by National Marine Fisheries Service (NMFS) and from the June 2015 IHA application prepared by HDR, Inc. for the Alaska Department of Transportation & Public Facilities' Kodiak Ferry Terminal and Dock Improvements Project at Pier 1 in Near Island Channel. (Pier 1 is located approximately 100 meters (m) (328 feet [ft]) southwest of the Transient Float.)

Project construction activities (such as pile driving and down-hole drilling) may result in the incidental taking by acoustical harassment of marine mammals protected under the MMPA. The City requests an IHA for the take of marine mammals protected under the MMPA including Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), and humpback whale *(Megaptera novaeangliae*) by Level A and B harassment and killer whale (*Orcinus orca*) by B harassment incidental to replacing the existing Transient Float. The City requests that the IHA be valid for 1 year from January 1, 2017 through December 31, 2017.

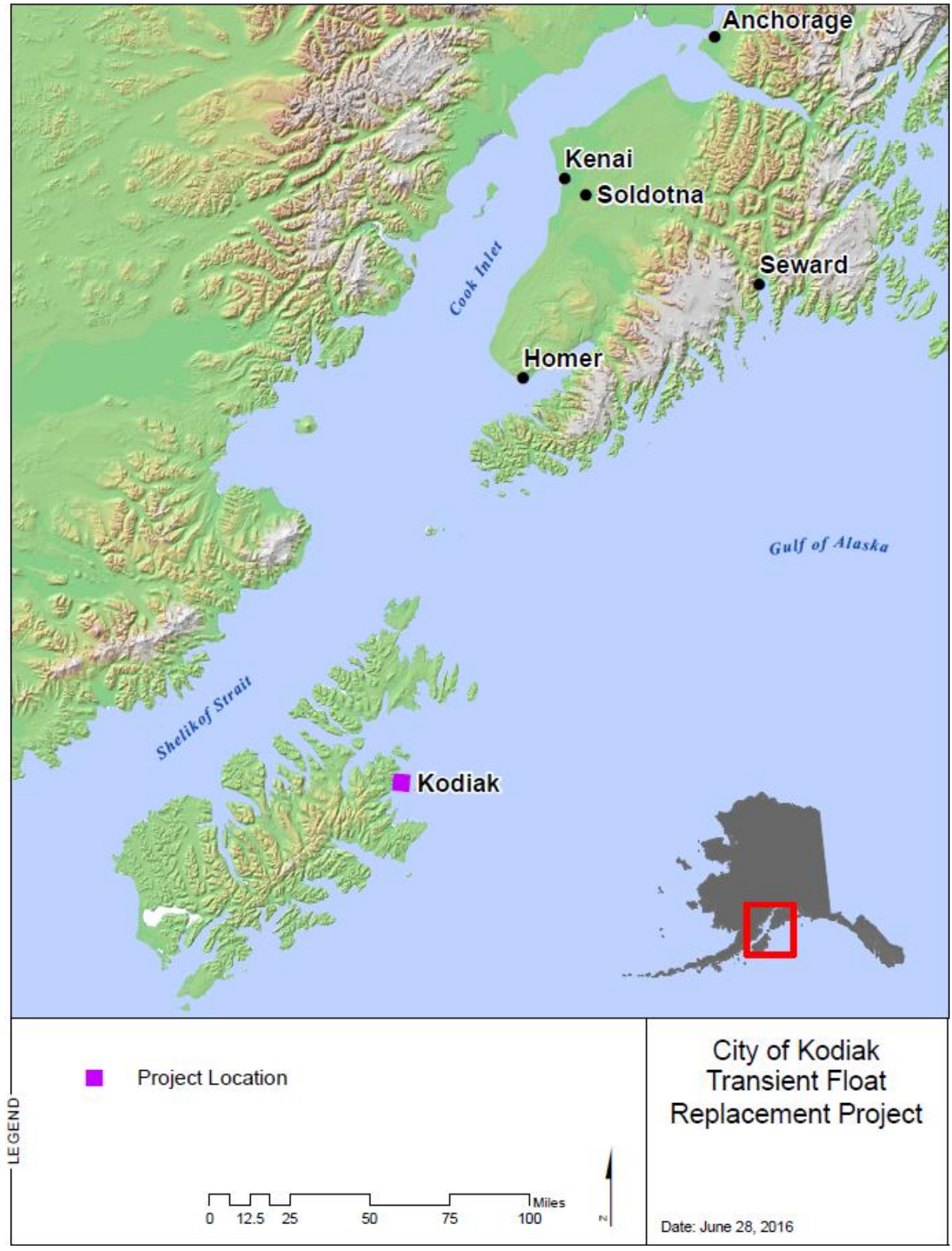

Figure 1. Map of the proposed project location.

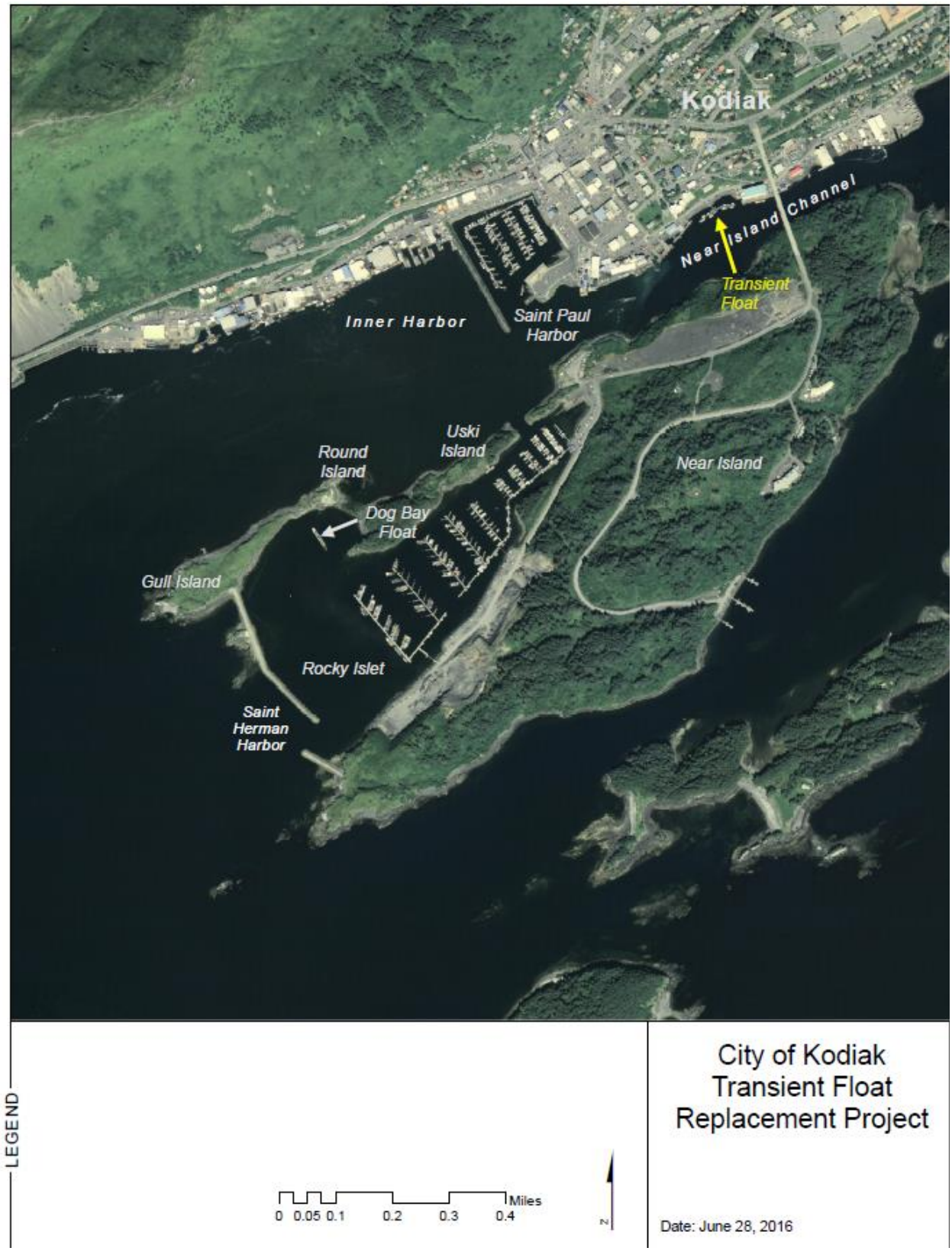

Figure 2. Proposed project location within Near Island Channel on Kodiak Island, Alaska.

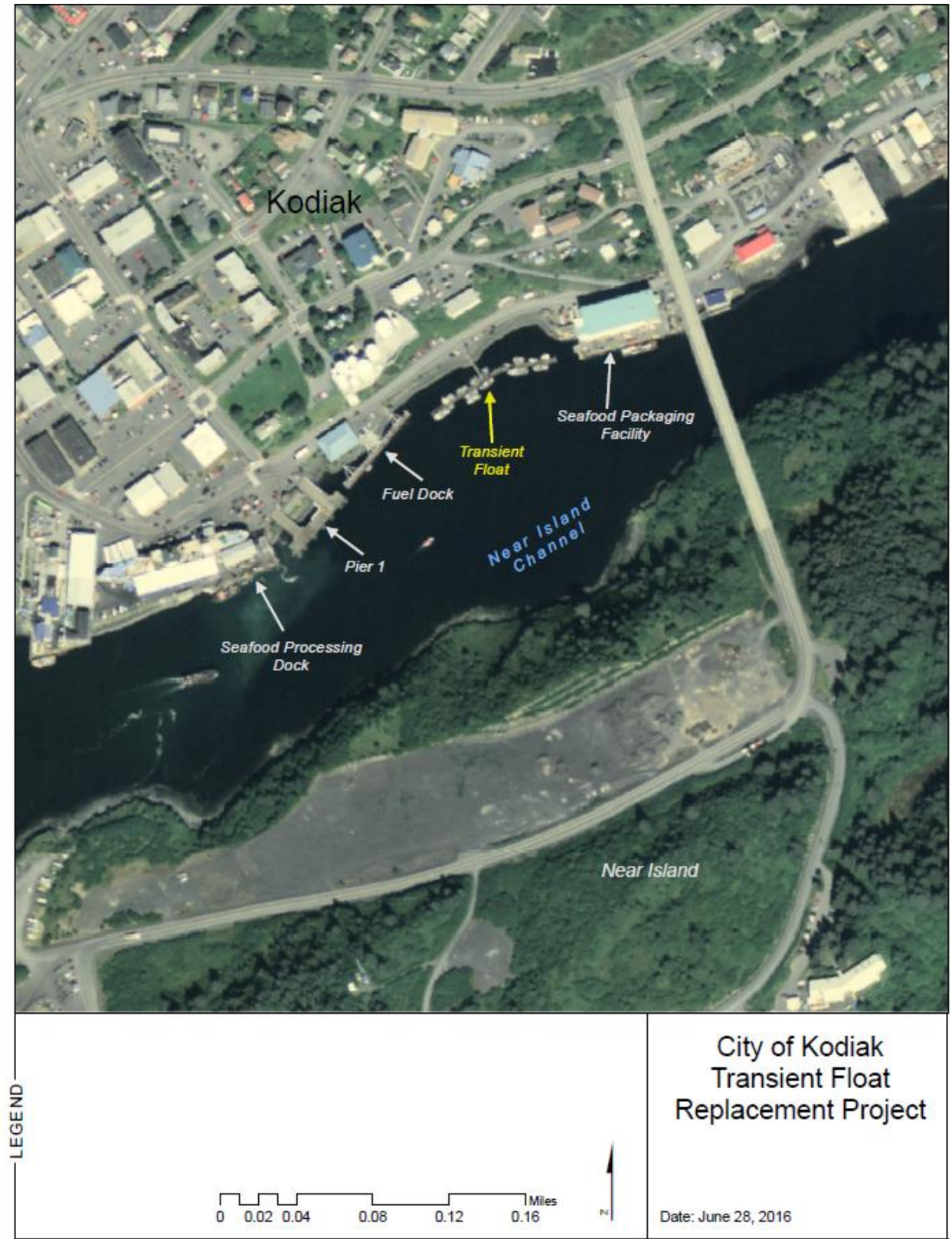

Figure 3. Proposed project location relative to nearby facilities.

1.2 Purpose and Need

The existing transient float currently provides moorage for vessels commuting from six villages and a diverse transient commercial fishing fleet from all over Alaska and the West Coast. The purpose of this project is to replace the float with one that meets modern standards for vessel mooring and public safety for the next 50 years. The existing float has structural issues due to failing walers, stringers, and bullrails. Due to these structural problems the float's capacity has been reduced. The existing float needs to be replaced due to its poor condition and reduced capacity.

1.3 Project Description and Activities

The City proposes to remove the existing timber float and steel gangway (Figure 4) and replace it in its entirety. The proposed action includes in-water construction, including the removal of the existing timber float and its associated timber and steel piles, and installation of the replacement float and steel piles. Detailed drawings are included in Appendix A. The replacement float and gangway will be located within the same operational footprint as the existing facility, however, the replacement float will be approximately 14 m shorter than the existing float (Figure 5 and Figure 6).

Figure 4. Photo of the existing transient float.
(Photo credit: City of Kodiak).

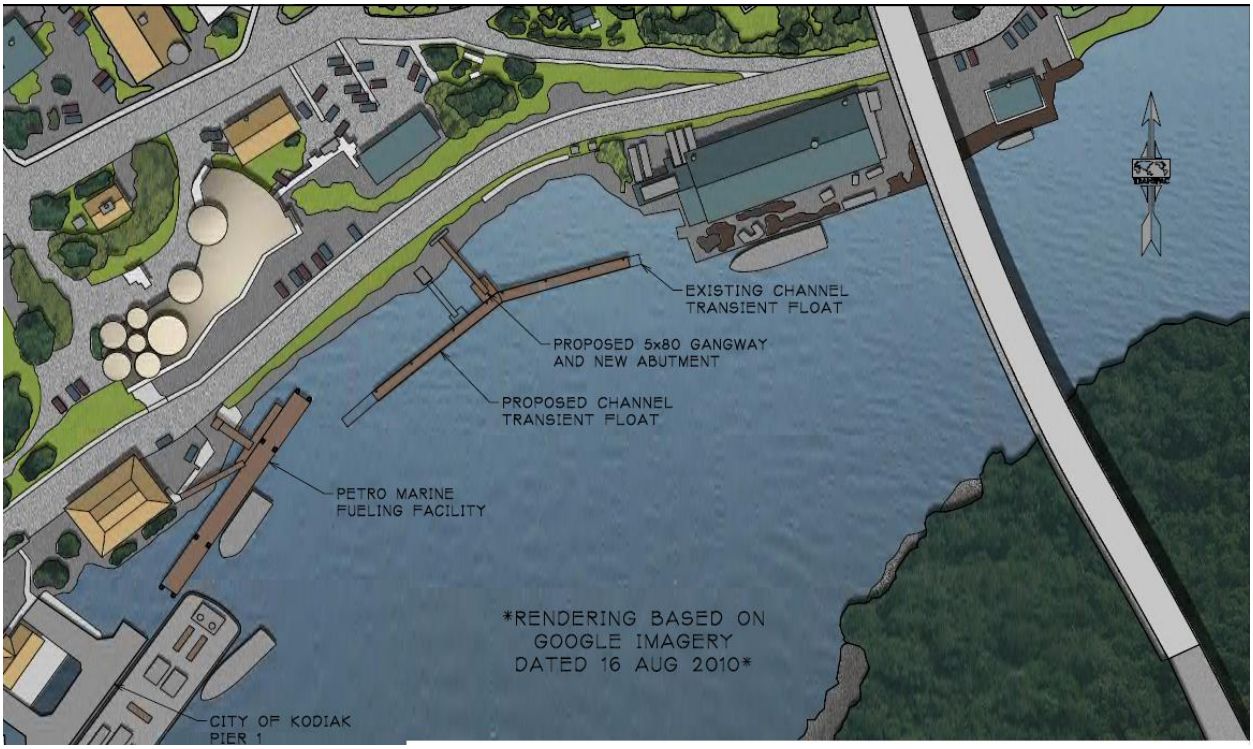

Figure 5. Rendering of existing and proposed transient float.

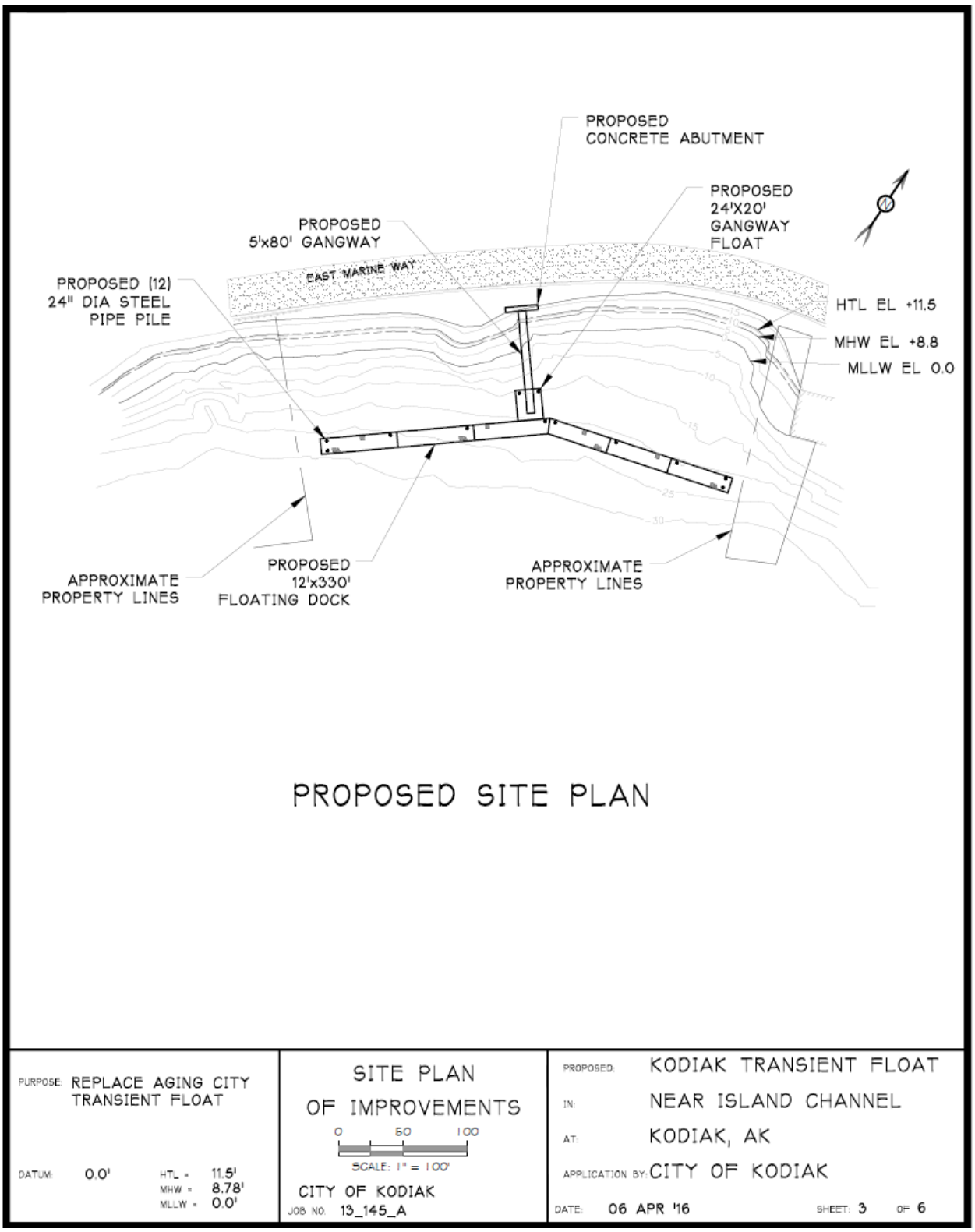

Figure 6. Proposed transient float site plan.

1.3.1 Project Activities

To remove and replace the transient float, the project will:

- Remove nineteen 12-inch diameter steel piles and two 12-inch wood piles associated with the existing float
- Install twelve 24-inch diameter steel piles to support the replacement float and gangway (Figure 6)
- Install a concrete gangway abutment in uplands (Figure 6)
- Install 50A/30 electrical service and 100A electrical service on the float
- Install illumination poles (12-ft tall), life rings, and fire extinguisher cabinets on the float

Contractors on previous dock projects in Alaska have typically driven piles using the following equipment. Some of these will be used for this project:

- Diesel Impact Hammer: Delmag D30/Max Energy 75,970 ft-pounds (lbs)
- Vibratory Hammers: ICE 44B/12,450 lbs static weight
- Down-hole Drilling: Holte Top Drive/ 42,000 – 70,000 ft-lbs

The proposed action will require an estimated 58 hours of vibratory extraction and installation, including down-hole drilling. The number and type of piles, method of installation and removal, and estimated total hours of pile installation and extraction is detailed in Table 1. No fill, dredging, or blasting is proposed as part of this project.

The exact means and methods for construction will be determined by the contractor. It is expected that materials and equipment will be transported to the project site by barge and road. While work is conducted in the water, anchored barges will be used to stage construction materials equipment. The existing piles, fixed pier, float and gangway will be removed and disposed of properly and the new float will be installed.

It is estimated that it will take 10 minutes of vibratory pile driving and 4 hours of down-hole drilling per pile for installation, and 20 minutes of vibratory pile driving per pile for extraction. For the installation of 12 piles, this is an estimated 2 hours of total time using active vibratory equipment and 48 hours of total time using down-hole drilling. For the in-water extraction of 19 piles, this is an estimated 6.33 hours of total time using active vibratory equipment. Two piles would remain in place, and two piles to be removed are above the high tide line. No temporary piles are associated with this project.

The 24-inch steel piles will be driven 3-4.6 m (10-15 ft) through sediment and drilled another 3 m (10 ft) into bedrock. The sequence for installing the 24-inch piles will begin with insertion through overlying sediment with a vibratory hammer for about 8 minutes per pile. Next, a hole will be drilled in the underlying bedrock by using a down-hole drill. A down-hole drill is a drill bit that drills through the sediment and a pulse mechanism that functions at the bottom of the hole, using a pulsing bit to break up the harder materials or rock to allow removal of the fragments and insertion of the pile. The head extends so that the drilling takes place below the pile. Drill cuttings are expelled from the top of the pile as dust or mud. It is estimated that

drilling piles through the layered bedrock will take about 4 hours per pile. Finally, the vibratory hammer will be used again to finish driving the piles into bedrock, for approximately 2 minutes per pile (Table 1).

Although impact pile driving is not expected for this project, the contractor may choose to impact proof the piles after down-hole drilling. In this case, two to five blows of an impact hammer would be used to confirm that piles are set into bedrock, for an expected maximum time of 3 minutes of impact hammering per pile. When the impact hammer is employed for proofing, a pile cap or cushion will be placed between the impact hammer and the pile.

Table 1. Estimated number of hours required for pile extraction and installation.

Pile Type, Location, Method	#of Piles	Vibratory Hammer		Down-hole Drill		Impact Hammer	
		# of Piles	Hours	# of Piles	Hours	# of Piles	Hours
12-inch Timber Creosote Existing Abutment Remain in Place	2	0	0	0	0	0	0
12-inch Untreated Wood Existing Float Extraction, Out-of-Water	2	2	0.67	0	0	0	0
12-inch Steel Existing Float Extraction, In-Water	19	19	6.33	0	0	0	0
24-inch Steel Replacement Float Installation, In-Water	12	12	2	12	48	12	0.6
Total Hours Out-of-Water		**--**	**0.67**	**--**	**0**	**--**	**0**
Total Hours In-Water		**--**	**8.33**	**--**	**48**	**--**	**0.6**

2 Dates, Duration, and Region of Activity

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

2.1 Dates and Duration of Activities

Construction is expected to take 2.5 months beginning in January 2017 and ending in March 2017. Pile installation and removal will take approximately 57 hours and is expected to take place over a period of 12 days (not necessarily consecutive days).

The 2.5-month long construction duration accounts for the time required to mobilize materials and resources, remove and replace piles, remove the existing float, and install the new float, abutment, gangway, electrical components, and other safety features. The 2.5-month long construction duration also accounts for potential delays in material deliveries, equipment maintenance, inclement weather, and shutdowns that could occur if marine mammals come within disturbance zones associated with the project area.

2.2 Geographical Setting

The proposed activities will occur at the Transient Float located in Near Island Channel in the City of Kodiak, Alaska. Near Island Channel separates downtown Kodiak from Near Island (City of Kodiak, Alaska; T27S, R19W, S32, Seward Meridian; USGS Quad Kodiak D-2; Latitude 57.788162° North, Longitude -152.400287° West; Figure 1). Near Island Channel is approximately 200 m (656 ft) wide (Google Earth 2010) and 15 m (50 ft) deep near the Transient Float. In the project footprint, the shoreline along the Transient Float is heavily armored with riprap (Figure 4) and impervious surfaces directly abut the shoreline adjacent to the float. The channel is located within Chiniak Bay which opens to the Gulf of Alaska.

2.2.1 Physical Environment

The proposed project is located in a busy industrial area (Figure 3). Channel Side Services' seafood packing facility is located approximately 25 m (82 ft) east of the float and Petro Marine Services floating fuel dock is located approximately 20 m (66 ft) west of the float. Pier 1, the Alaska Marine Highway Ferry dock, is located 100 m (328 ft) southwest of the float and Trident Seafood's shore-based seafood processing plant is located approximately 175 m (574 ft) to the southwest (Figure 3; Google Earth 2010). When in operation, Trident's plant receives numerous commercial fishing vessels daily for offloading and processing of catch.

2.2.2 Acoustical Environment

Baseline sound levels in the Kodiak area are relatively high (NMFS 2013). The project area is frequented by fishing vessels and tenders; the *MV Tustumena* and other ferries; barges and tugboats; and commercial and recreational vessels. These vessels use the channel to access harbors and city docks, fuel docks, seafood processing plants where fish catches are offloaded,

and other commercial facilities. Just south of the Transient Float, the Petro Marine fuel dock services a wide range of vessels; Pier 1 provides docking for large vessels; and the seafood processing dock offloads fish by vacuum hose to the processing plant from the vessels' holds. Near channel is also a primary route for local vessel traffic to access Gulf of Alaska waters and is in the flight path of the Kodiak Benny Benson State Airport.

Ambient underwater sound was measured in Near Island Channel, approximately 100 m southwest and 900 m northeast of the Transient Float, in March 2016 during construction of the Pier 1 Kodiak Ferry Terminal and Dock Improvements Project. Measurements recorded highly variable sound pressure levels (SPLs), ranging from approximately 80 to 140 decibels referenced to one microPascal (dB re 1 µPa). Peaks ranging from approximately 130 to 140 dB re 1 µPa were produced by vessels passing near acoustic recorders (Warner and Austin 2016).

3 Species and Numbers of Marine Mammals in the Activity Area

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

The marine waters near Kodiak Island support many species of marine mammals. The species listed by NMFS that may occur in the project vicinity are shown in Table 2, along with their stock or population, their occurrence in the project area, and their estimated abundance.

Steller sea lions are the most common marine mammals in the project area and are part of the Western Distinct Population Segment (wDPS) that is listed as endangered under the Endangered Species Act (ESA). Harbor seals, harbor porpoises, Dall's porpoise, killer whales, and humpback whales (including the Hawaii DPS, Mexico DPS, and Western North Pacific DPS) may also occur in the project area, but far less frequently and in lower abundance than Steller sea lions.

Fin whales *(Balaenoptera physalus)* and gray whales (*Eschrichtius robustus*) occur in the nearshore waters around Kodiak Island, but are not expected to be found near the project area because of the shallow depths, narrow channel, and high level of boat traffic. Because these whales are not expected near the project area and because construction of this project will occur in the winter when fin and gray whales have migrated south, exposure to the project is considered unlikely, and take is not requested for these species.

This IHA application is limited to Steller sea lions, harbor seals, harbor porpoises, Dall's porpoises, killer whales, and humpback whales and assesses the potential impacts of the project on these six species, which are discussed more fully in Section 4.

Table 2. Marine mammal species with ranges extending into the project area.

Species [a]	Stock	ESA Status	MMPA Status	Occurrence In/ Near Project Area	Seasonality	Abundance Estimate [b]
Steller Sea Lion (*Eumatopia jubatus*)	wDPS	Endangered	Strategic, depleted	Common	Year-round	49,497 [b]
Harbor Seal (*Phoca vitulina*)	South Kodiak	Not listed	Not Strategic, non-depleted	Common	Year-round	19,199 [b]
Harbor Porpoise (*Phocoena phocoena*)	Gulf of Alaska	Not listed	Strategic, non-depleted	Common	Year-round	31,046 [b]
Dall's Porpoise (*Phocoenoides dalli*)	Alaska	Not listed	Not Strategic, non-depleted	Rare	Year-round	83,400 [b]
Fin Whale (*Balaenoptera physalus*)	Northeast Pacific	Endangered	Strategic, depleted	Rare	Spring, Summer	N/A
Humpback Whale (*Megaptera novaeangliael*)	Hawaii DPS	Not listed	Strategic, deplated	Rare	Spring, Summer, Fall	11,398 [b]
	Mexico DPS	Threatened	Strategic, depleted	Rare	Spring, Summer, Fall	3,264[c]
	Western North Pacific DPS	Endangered	Strategic, depleted	Rare	Spring, Summer, Fall	N/A
Killer Whale (*Orcinus orca*)	Eastern North Pacific Alaska Resident	Not listed	Not Strategic, non-depleted	Common	Summer, Fall	2,347 [b]
	Eastern North Pacific Gulf of Alaska, Aleutian Islands, and Bering Sea Transient	Not listed	Not strategic, non-depleted	Common	Year-round	587 [b]

[a] Species list provide by NMFS Alaska (Greg Balogh [AK Protected Resources Division Field Office Supervisor] email to Kate Arduser, May 16, 2016)

[b] NMFS marine mammal stock assessment reports at: http://www.nmfs.noaa.gov/pr/sars/region.htm

[c] Wade et al. 2016

4 Affected Species Status and Distribution

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

4.1 Steller sea lion

4.1.1 Distribution and Status

Steller sea lion habitat extends along the North Pacific Rim from northern Japan to California, with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands (Muto et al. 2016). Two distinct population segments (DPS) of Steller sea lions exist in Alaska: the eastern DPS (eDPS) and the wDPS. The eDPS consists of sea lions breeding to the east of Cape Suckling, Alaska (144° West longitude), and the wDPS consists of those animals breeding to the west of Cape Suckling (NMFS 2013a). However, large movements by individual Steller sea lions on either side of the 144° West longitude demarcation are not uncommon, and wDPS individuals are expected to occur in Southeast Alaska north of Sumner Strait (Jemison et al. 2013, NMFS 2013a). Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the late-May to early-July breeding season (Jemison et al. 2013, Muto et al. 2016). Only the wDPS is considered in this application because the eDPS occurs outside the geographic area under consideration.

Currently, the wDPS of Steller sea lion is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA. The eDPS is not listed under the ESA but is considered depleted under the MMPA and is classified as a strategic stock.

NMFS listed the Steller sea lion as a threatened species under the ESA in 1990 following declines of 63% on certain rookeries since 1985, and declines of 82% since 1960 (NMFS 2012). In 1997, NMFS reclassified the Steller sea lion into the two current DPSs based on genetic studies and phylogeographical analyses from across the species' range. It was at that time that NMFS designated the wDPS as endangered (May 5, 1997; 62 FR 24345). A number of protective measures were implemented to aid recovery for both DPSs (NMFS 2012), and between the 1970s and 2002, the eDPS Steller sea lion population increased on average by 3.1% per year (Pitcher et al. 2007), which is one factor that led to NMFS's decision to delist the eDPS (November 4, 2013; 78 FR 66140).

The wDPS declined in abundance by about 70% between the late 1970s and 1990, with evidence that the decline had begun even earlier. Factors potentially contributing to this decline include: 1) incidental take in fisheries; 2) legal and illegal shooting; 3) predation; 4) contaminants; 5) disease; and 6) climate change (NMFS 2008).

The current estimate (pups and non-pups) for the wDPS abundance in Alaska is 49,497 sea lions (Muto et al. 2016). Although Steller sea lion abundance continues to decline in the western

Aleutians, numbers are thought to be increasing in the eastern part of the wDPS range (DeMaster 2011), including in the project area.

4.1.2 Critical Habitat

NMFS designated critical habitat for the Steller sea lion on August 27, 1993 (August 27, 1993; 58 FR 45269). Essential features used to determine critical habitat for Steller sea lions are the physical and biological habitat features that support reproduction, foraging, rest, and refuge including terrestrial, air and aquatic zones (58 FR 45269). Critical habitat includes a terrestrial zone that extends 0.9 kilometers (km) (3,000 ft) landward from each major rookery and major haulout, and an air zone that extends 0.9 km (3,000 ft) above the terrestrial zone of each major rookery and major haulout. For each major rookery and haulout located west of 144° West longitude (i.e., the project area), critical habitat includes an aquatic zone (or buffer) that extends 37 km (20 nautical miles [nm]) seaward in all directions. Critical habitat also includes three large offshore foraging areas: The Shelikof Strait area, the Bogoslof area, and the Seguam Pass area (Figure 7; 58 FR 45269).

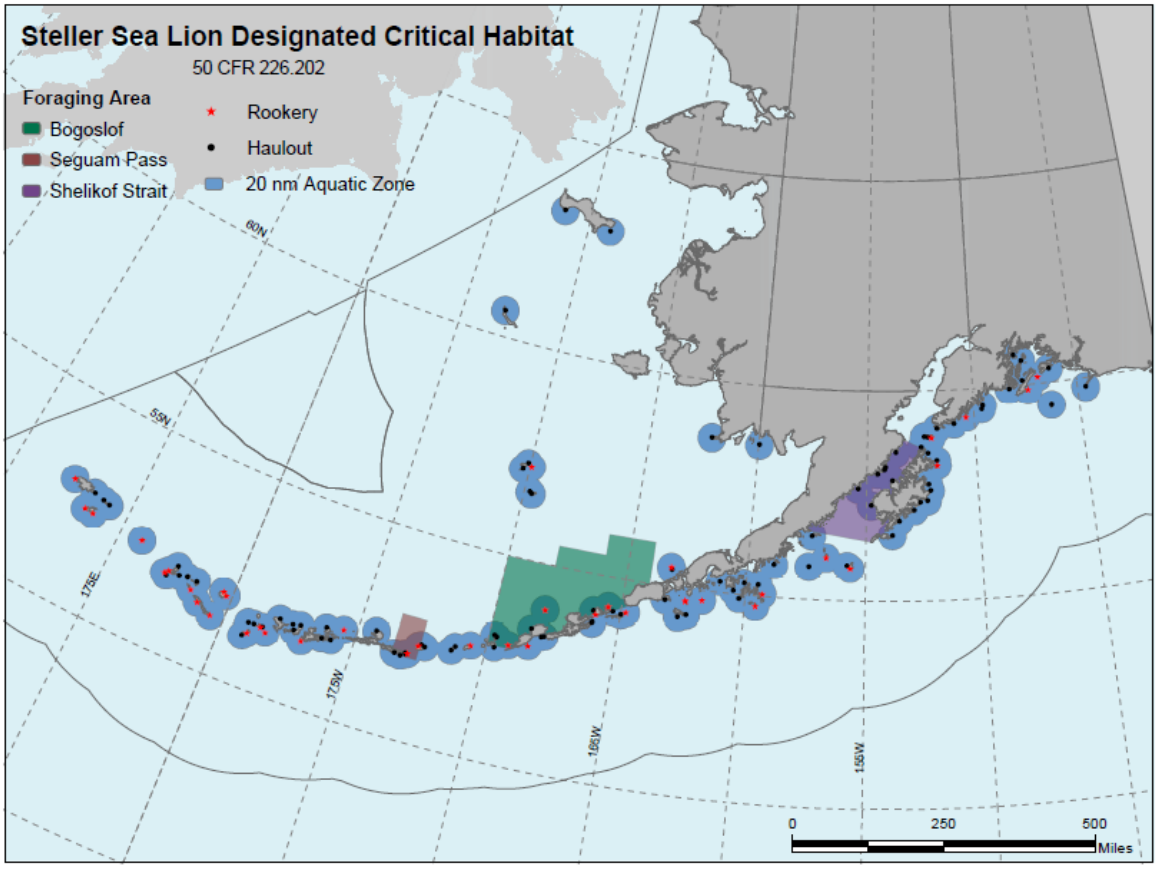

Figure 7. Map of designated critical habitat for the Steller sea lion. (50 CFR 226.202).

The project area is located within critical habitat for the Steller sea lion as two haulouts overlap the project area: Long Island and Cape Chiniak. These haulouts are approximately 7 km (4 nm)

and 24 km (13 nm), from the Transient Float, respectively (Figure 8). The closest rookery is located on Marmot Island, approximately 46 km (28 nm) from the Transient Float.

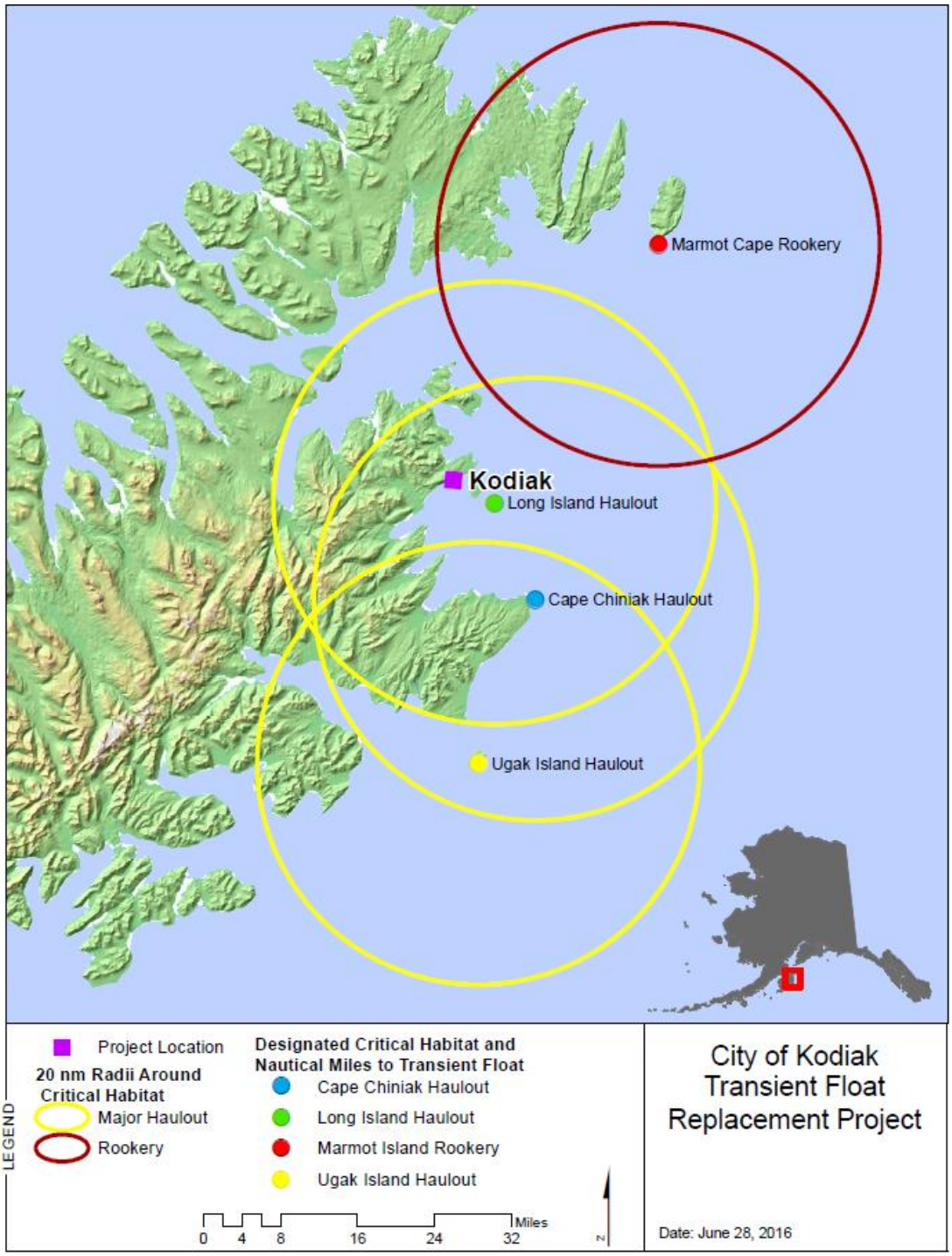

Figure 8. Steller sea lion designated critical habitat overlapping the project area.

4.1.3 Presence in Project Area

Steller sea lions are very common in the project area. Many individual sea lions have become habituated to human activity in the Kodiak harbor area and utilize a man-made haulout float called Dog Bay Float located in St. Herman Harbor, about 1,400 m (4,600 ft; Google Earth 2010) from the Transient Float. The number of sea lions in the project area varies depending on the season and presence of commercial fishing vessels unloading their catch at the seafood processing dock southwest of the existing Transient Float.

Counts of Steller sea lions near and in the project vicinity have been done at the Cape Chiniak and Long Island haulouts, the Marmot Island rookery, the Dog Bay Float, and in Near Island Channel. Annual counts from aerial surveys on the two haulout areas overlapping the project area, Cape Chiniak and Long Island, and the closest rookery, Marmot Island, average 656, 119, and 33 individuals, respectively (Table 3).

Table 3. Annual counts of Steller sea lions from the two federally designated haulouts and one rookery nearest the project area.

Location	Designation	Approximate Distance in km (nm) from the Project Area	Year		
			2008	2009	2010
Marmot Island	Rookery	46 (28)	644	749	576
Cape Chiniak	Haulout	24 (13)	130	117	110
Long Island	Haulout	7 (4)	59	39	0

Annual Count Source: DeMaster 2011 (as cited in FHWA and DOT&PF 2015)

The Dog Bay Float is not considered an official haulout by NMFS, thus few standardized sea lion surveys have been conducted there. Surveys from 2004 through 2006 indicated peak winter (October-April) counts ranging from 27 to 33 animals (Wynne et al. 2011). Counts from February 2015 ranged from approximately 28 to 45 animals. Age classes of sea lions included juveniles, subadults, and adults, including about five mature bulls (FHWA and DOT&PF 2015). More than 100 sea lions were counted on the Dog Bay Float at times in spring 2015, although the mean number was much smaller (FHWA and DOT&PF 2015). Counts of sea lions hauled out on the Dog Bay Float provide an index of the number of Steller sea lions in the harbor area. Aerial surveys from 2004 through 2006 indicated peak winter (October–April) counts at the Dog Bay Float ranging from 27 to 33 animals (Wynn et al. 2011). More recent counts completed between November 2015 and June 2016 by protected observers (PSOs) working on the Kodiak Ferry Terminal and Dock Improvements Project ranged from approximately 6 to 114 Steller sea lions (ABR 2016). More than 100 Steller sea lions were counted on the Dog Bay Float at times in spring 2015, although the mean number was much smaller (ABR 2016). Together, this information may indicate a maximum population of about 120 Steller sea lions that use the Kodiak harbor area. According to ABR (2016), however, maximal weekly counts of sea lions at the float were only loosely correlated with weekly average-hourly rates of sea lion observations within the construction area.

During a February 2015 site visit, biologists working on the Kodiak Ferry Terminal and Dock Improvements Project observed 0 to approximately 25 sea lions at one time adjacent to Pier 1. Approximately 22 of those sea lions were subadults that were foraging on schooling fishes in the area and were not interacting with the fishing vessels offloading at the seafood processing dock at the time. A stern trawler offloading at the adjacent seafood processing plant during this period was attended by three mature bull sea lions, which constantly swam back and forth behind the stern watching for an opportunity to gain access. This particular trawler slid a vertical steel plate into position forward of the stern ramp, preventing sea lions from boarding the vessel (FHWA and DOT&PF 2015).

In 2015 and 2016, marine mammals were counted in Near Island Channel as mitigation for the Kodiak Ferry Terminal and Dock Improvements Project located at Pier 1. Data collected for this effort is the best information on numbers of marine mammals expected in the project area. PSOs monitored a total of 110 days between November 2015 and June 2016. Construction (and take of marine mammals) occurred on 67 days. During PSO monitoring, 3,587 sea lions were observed and 1,281 sea lions were taken under an IHA issued for the project (ABR 2016). Total marine mammal counts for the 110 days and the 67 construction days are shown in Table 4.

Table 4. Marine Mammal Counts in Near Island Channel.

Species	Number of Individuals Observed	
	110 days	67 days (construction days/takes)
Stellar sea lion	3,587	1,281
Harbor seal	13	3
Harbor porpoise	6	3
Killer whale	19	15
Humpback whale	1	0

Source: ABR 2016

Based on numbers of Steller sea lions recorded within the channel over 110 day of monitoring during the Kodiak Ferry Terminal and Dock Improvements Project, it is estimated that about 33 unique individual Steller sea lions likely pass through Near Island Channel each day (ABR 2016).

4.1.4 Breeding Habitat

Breeding range of the Steller sea lion extends along the northern edge of the North Pacific Ocean from the Kuril Islands, Japan, through the Aleutian Islands and Southeast Alaska, south to California (Loughlin et al. 1984). Most adult Steller sea lions use rookeries for pupping, nursing, and mating during the reproductive season which generally occurs from late May to early July (Pitcher and Calkins 1981, Gisiner 1985), and exhibit high site fidelity (Sandegren 1970). During the breeding season some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (Raum-Suryan et al. 2002, Call and Loughlin 2005). At the end of the reproductive season, some females may move with their pups to other haulout sites,

and males may migrate to distant foraging locations (Spalding 1964, Pitcher and Calkins 1981). Marmot Island is the closest federally-designated rookery to the project area (Figure 8).

4.1.5 Foraging Habitat

Sea lions leave haulouts for feeding excursions. The foraging strategy of Steller sea lions is strongly influenced by seasonality of sea lion reproductive activities on rookeries, and the ephemeral nature of many prey species. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher and Calkins 1981, Calkins and Goodwin 1988, NMFS 2008) and occasionally other marine mammals and birds (Pitcher and Fay 1982, NMFS 2008). Shelikof Strait, located on the west side of Kodiak Island, is the closest designated foraging area to the project area.

Abundant and predictable sources of food for sea lions in the Kodiak harbor area include fishing boats, tenders, and the many seafood processing facilities that accept transfers of fish from offloading vessels. Sea lions have become accustomed to depredating fishing gear and raiding fishing vessels during fishing and offloading, and they follow potential sources of food around the harbors and docks (FHWA and DOT&PF 2015).

4.1.6 Acoustics

Steller sea lions hearing sensitivity is similar to that of other otariids. Steller sea lions' aerial hearing ability ranges from approximately 0.25-30 kilohertz (kHz); however, their hearing is most sensitive to noise from 5-14.1 kHz (Muslow and Reichmuth 2010). Underwater, Steller sea lions' best hearing ranges from 1-16 kHz, with higher hearing thresholds, indicating poor sensitivity, below 1 kHz and above 16 kHz (Kastelein et al. 2005). The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. Loud anthropogenic sounds can interfere with Steller sea lion auditory capabilities. Figure 9 and Figure 10 are in-air and in-water audiograms for the California sea lion, respectively (Nedwell et al. 2004).

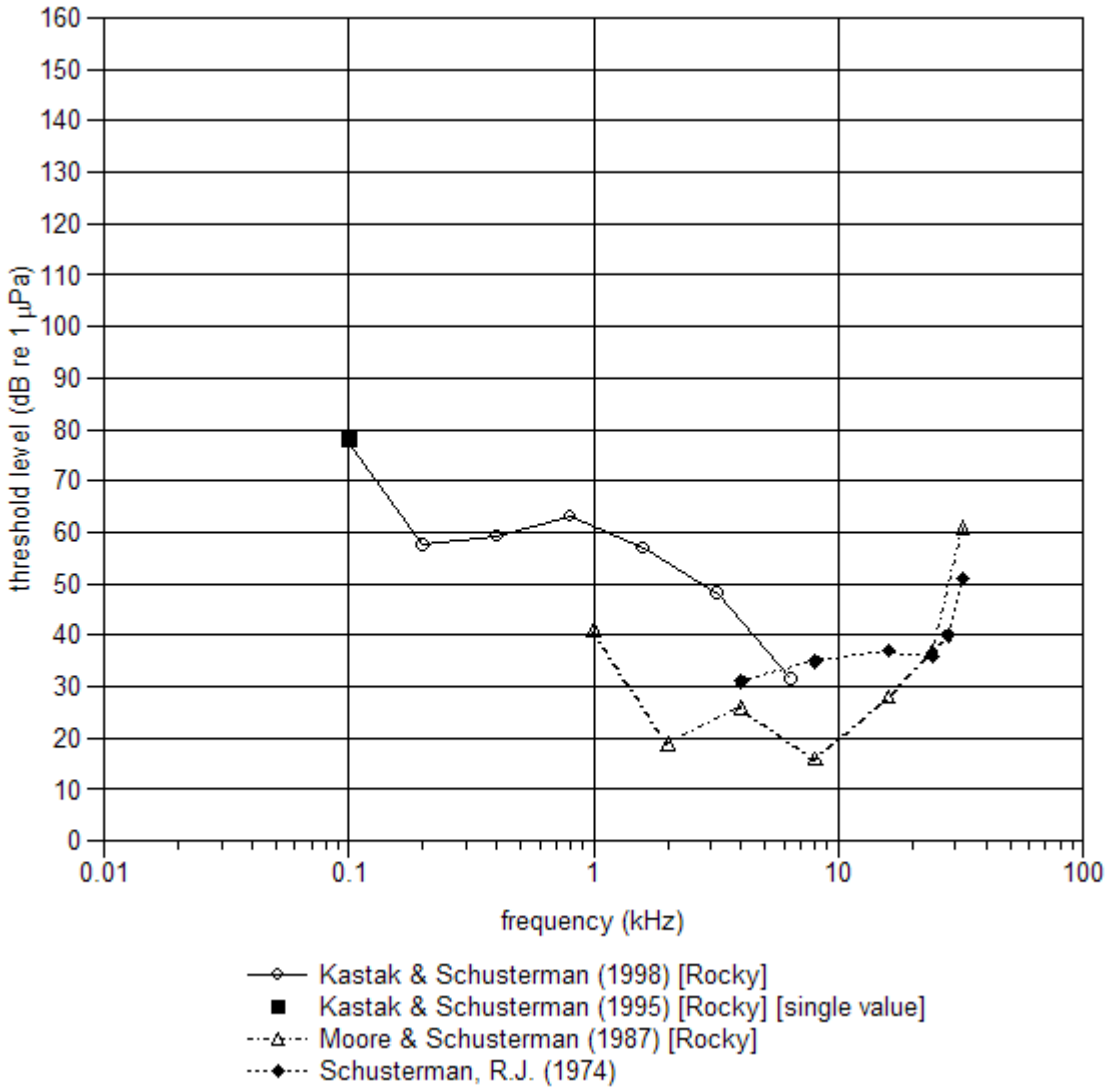

Figure 9. California sea lion in-air audiogram
(taken from Nedwell et al. 2004).

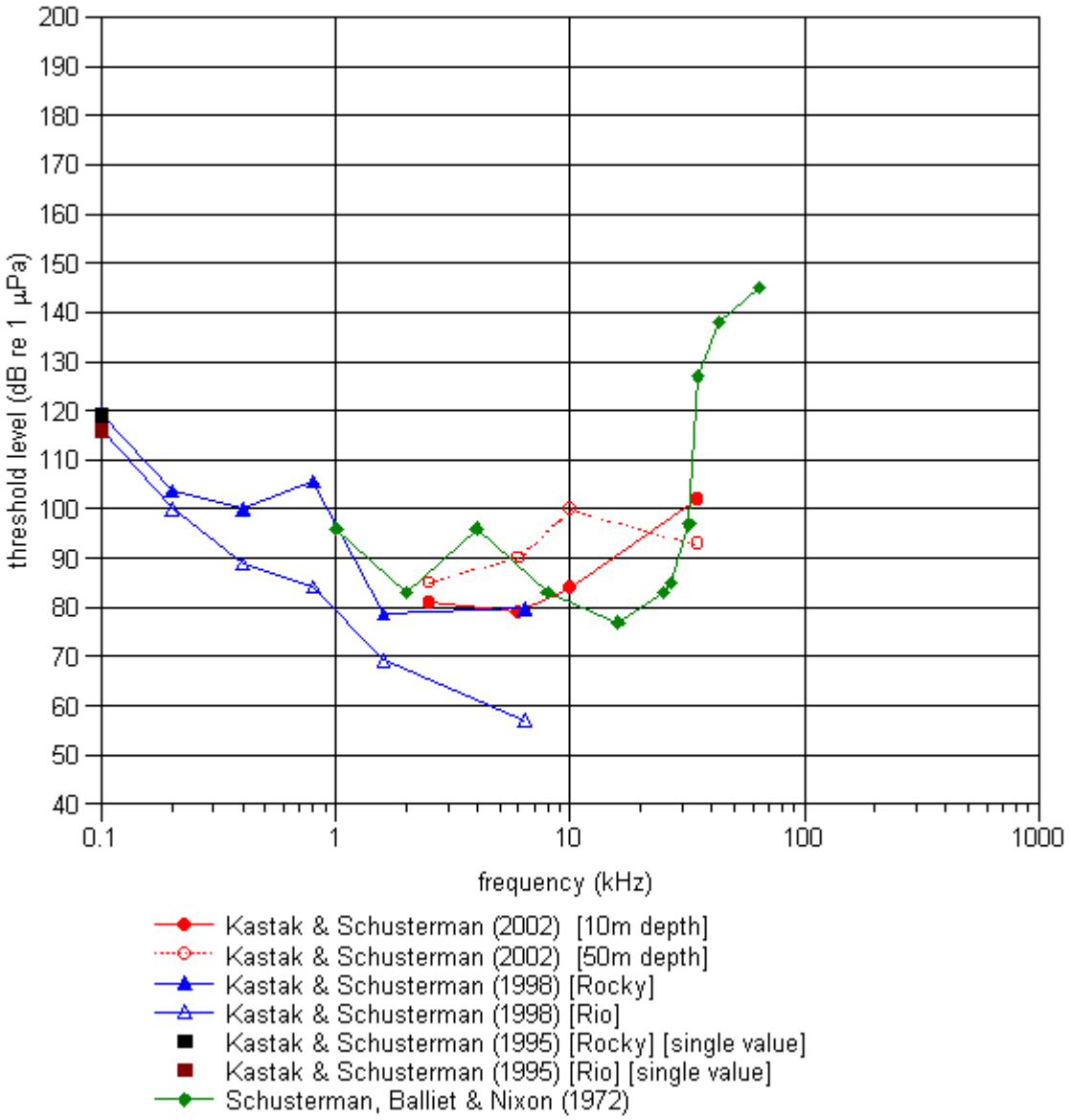

Figure 10. California sea lion in-water audiogram
(taken from Nedwell et al. 2004).

4.2 Harbor Seal

4.2.1 Status and Distribution

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. Distribution of the South Kodiak stock ranges from Middle Cape on the west coast of Kodiak Island southwest to Chirikof Island and east along the south coast of Kodiak Island to Spruce Island, including the Trinity Islands, Tugidak Island, Sitkinak Island, Sundstrom Island, Aiaktalik Island, Geese Islands, Two Headed Island, Sitkalidak Island, Ugak Island, and

Long Island (Muto et al. 2016). In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). Only the South Kodiak stock is considered in this application because other stocks occur outside the geographic area under consideration.

Harbor seals are listed neither as depleted under the MMPA nor as threatened or endangered under the ESA. The status of all 12 stocks of harbor seals identified in Alaska relative to their Optimum Sustainable Population size is unknown. The South Kodiak stock of harbor seals is not classified as strategic.

The current statewide abundance estimate for Alaskan harbor seals is 205,090 based on aerial survey data collected between 1998 and 2011. The abundance estimate for the South Kodiak stock is 19,199, with a minimum estimate of 17,479 (Muto et al. 2016). Harbor seals have declined dramatically in some parts of their range over the past few decades, while in other parts their numbers have increased or remained stable over similar time periods.

A significant portion of the harbor seal population within the South Kodiak stock is located at and around Tugidak Island off the southwest of Kodiak Island. Sharp declines in the number of seals present on Tugidak were observed between 1976 and 1998. Although the number of seals on Tugidak Island has stabilized and shows some evidence of increase since the decline, the population in 2000 remained reduced by 80 percent compared to the levels in the 1970s (Jemison et al. 2006). The current population trend for this stock is decreasing (Muto et al. 2016).

Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Allen and Angliss 2014). They are non-migratory; their local movements are associated with tides, weather, season, food availability, and reproduction, as well as sex and age class (Allen and Angliss 2014, Boveng et al. 2012, Lowry et al. 2001, Swain et al. 1996).

4.2.2 Presence in Project Area

Although the number of harbor seals on eastern Kodiak haulouts has been increasing steadily since the early 1990s, sightings are not common in the project area (FHWA & DOT&PF 2015). Thirteen (13) harbor seals were observed during monitoring of Near Island Channel for Kodiak Ferry Terminal and Dock Improvements Project over 110 days between November 2015 through June 2016. All of the observations were of single individuals (ABR 2016).

4.2.3 Life History

Harbor seals forage on fish and invertebrates (Orr et al. 2004), including capelin (*Mallotus villosus*), eulachon (*Thaleichthys pacificus)*, Pacific cod (*Gadus macrocephalus*), walleye pollock (*Theragra chalcogramma)*, flatfish (e.g. flounder and sole), shrimp (e.g., spot shrimp [*Pandalus platyceros]*, coonstripe shrimp [*P hypsinotis],* Northern shrimp [*P. borealis],* and sidestripe shrimp *[Pandalopsis dispar])*, octopus (likely giant Pacific octopus [*Enteroctopus dofleini*]), and squid (Wynne et al. 2011). They are opportunistic feeders that forage in marine, estuarine, and,

occasionally, freshwater habitat, adjusting their foraging behavior to take advantage of prey that is locally and seasonally abundant (Baird 2001, Bjørge 2002; *as cited in* Payne and Selzer 1989). Depending on prey availability, research has demonstrated that harbor seals conduct both shallow and deep dives during hunting (Tollit et al. 1997).

Harbor seals mate around the same time that the previous year's pups are weaned. The gestation period is approximately 10.5 months. Pups are born in Alaska over a 10-week period between May and July. Pups nurse for about 4 weeks and begin to catch solid foods toward the end of the nursing period (Burns 2009).

4.2.4 Acoustics

Harbor seals respond to underwater sounds from approximately 1 to 180 kHz, with the functional high-frequency limit around 60 kHz and peak sensitivity at about 32 kHz (Kastak and Schusterman 1995). Hearing ability in the air is greatly reduced (by 25 to 30 decibels [dB]); harbor seals respond to sounds from 1 to 22.5 kHz, with a peak sensitivity of 12 kHz (Kastak and Schusterman 1995). Figure 11 and Figure 12 are in-air and in-water audiograms for the harbor seal, respectively (Nedwell et al. 2004).

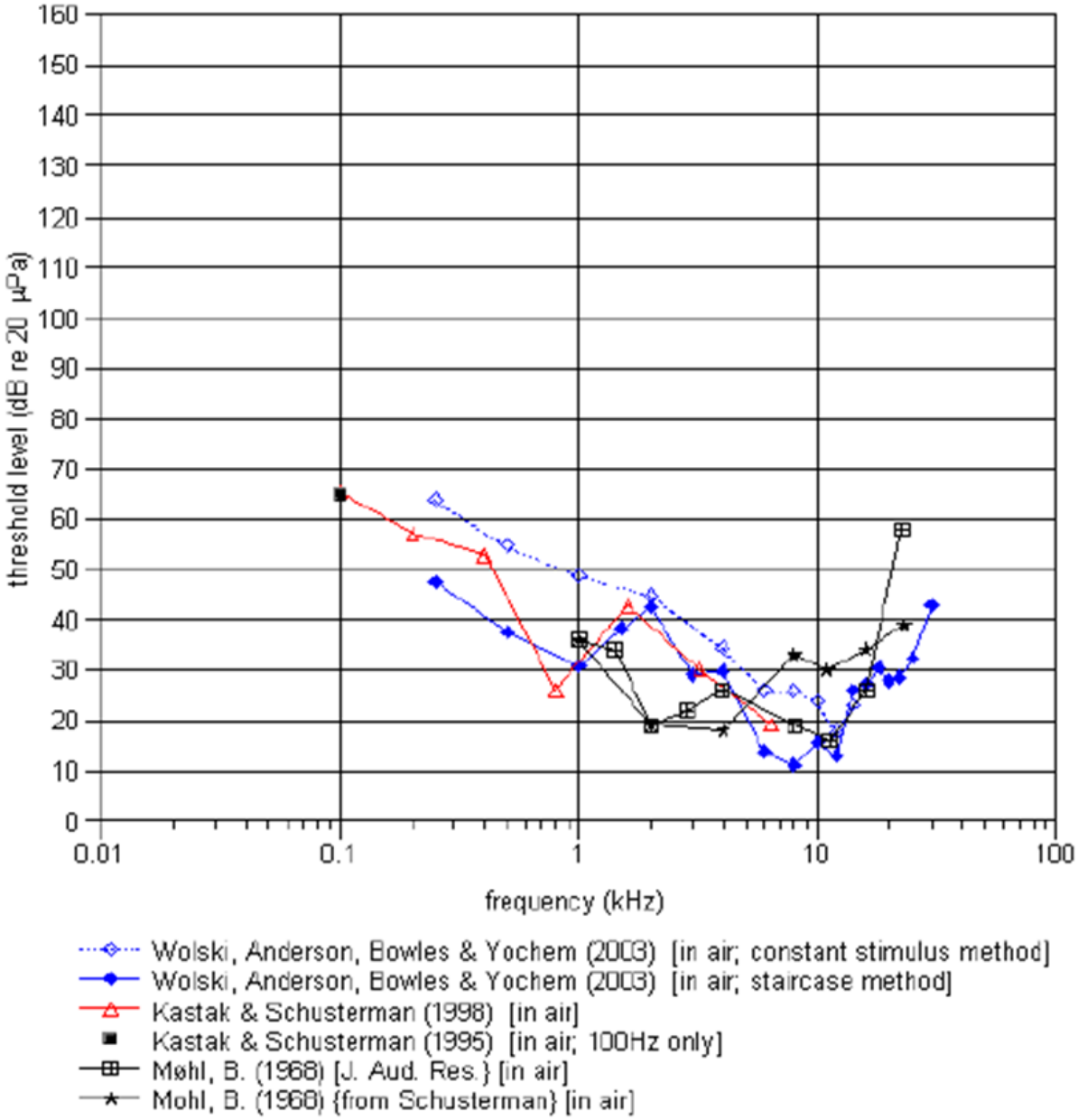

Figure 11. Harbor seal in-air audiogram
(taken from Nedwell et al. 2004).

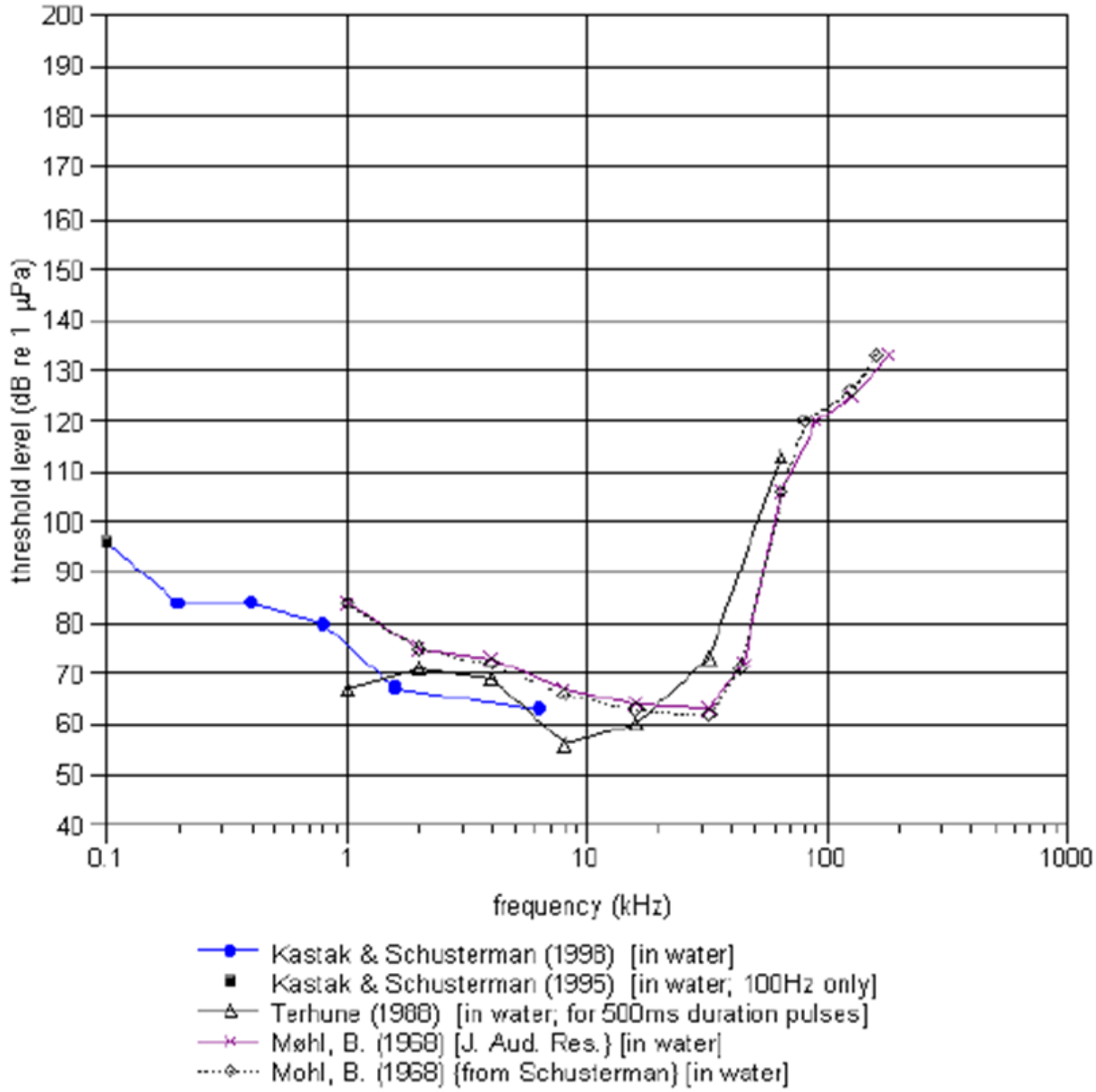

Figure 12. Harbor seal in-water audiogram
(taken from Nedwell et al. 2004).

4.3 Harbor Porpoise

4.3.1 Status and Distribution

In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. Harbor porpoises frequent primarily coastal waters in the Gulf of Alaska and Southeast Alaska (Dahlheim et al. 2000), and occur most frequently in waters less than 100 m (328 ft) deep (Hobbs and Waite 2010). The Gulf of Alaska stock ranges from Cape Suckling to Unimak Pass.

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

Harbor porpoises are neither designated as depleted under the MMPA nor listed as threatened or endangered under the ESA. Because the most recent abundance estimate is more than eight years old and information on incidental harbor porpoise mortality in commercial fisheries is not well understood, the Gulf of Alaska stock of harbor porpoise is classified as strategic. Population trends and status of this stock relative to optimum sustainable population size are currently unknown (Muto et al. 2016).

The Gulf of Alaska stock is currently estimated at 31,046 individuals (Muto et al. 2016). However, according to the most recent stock report, the 1998 survey resulting in an abundance estimate for the Gulf of Alaska harbor porpoise stock of 10,489 is probably more representative of the size of the Gulf of Alaska harbor porpoise stock (Muto et al. 2016). No reliable information is available to determine trends in abundance.

4.3.2 Presence in Project Area

Harbor porpoises commonly frequent nearshore waters, but are not common in the project area (FHWA & DOT&PF 2015). Six (6) harbor porpoise were observed during monitoring of Near Island Channel for Kodiak Ferry Terminal and Dock Improvements Project over 110 days between November 2015 through June 2016. All three sightings occurred in March 2016, and sightings were of individuals or pairs only (ABR 2016).

4.3.3 Life History

Harbor porpoises forage in waters less than 200 m (656 ft) to bottom depth on small pelagic schooling fish such as Pacific herring (*Clupea pallasii*), Pacific cod, walleye pollock, octopus, longfin smelt (*Spirinchus thaleichthys)*, and a variety of bottom-dwelling fish, occasionally feeding on squid and crustaceans (Bjørge and Tolley 2009, Wynne et al. 2011).

Calving occurs from May to August; however, this can vary by region. Harbor porpoises mate approximately 1.5 months after calving, with a gestation period of 10.5 months. Calves begin to forage on solid food within a few months of birth and are weaned before they are a year old (Bjørge and Tolley 2009).

4.3.4 Acoustics

The harbor porpoise has the highest upper-frequency limit of all odontocetes investigated. Kastelein et al. (2002) found that the range of best hearing was from 16 to 140 kHz, with a reduced sensitivity around 64 kHz. Maximum sensitivity (about 33 dB re 1 µPa) occurred between 100 and 140 kHz. This maximum sensitivity range corresponds with the peak

frequency of echolocation pulses produced by harbor porpoises (120–130 kHz). Figure 13 is an in-air audiogram for the harbor porpoise (Nedwell et al. 2004).

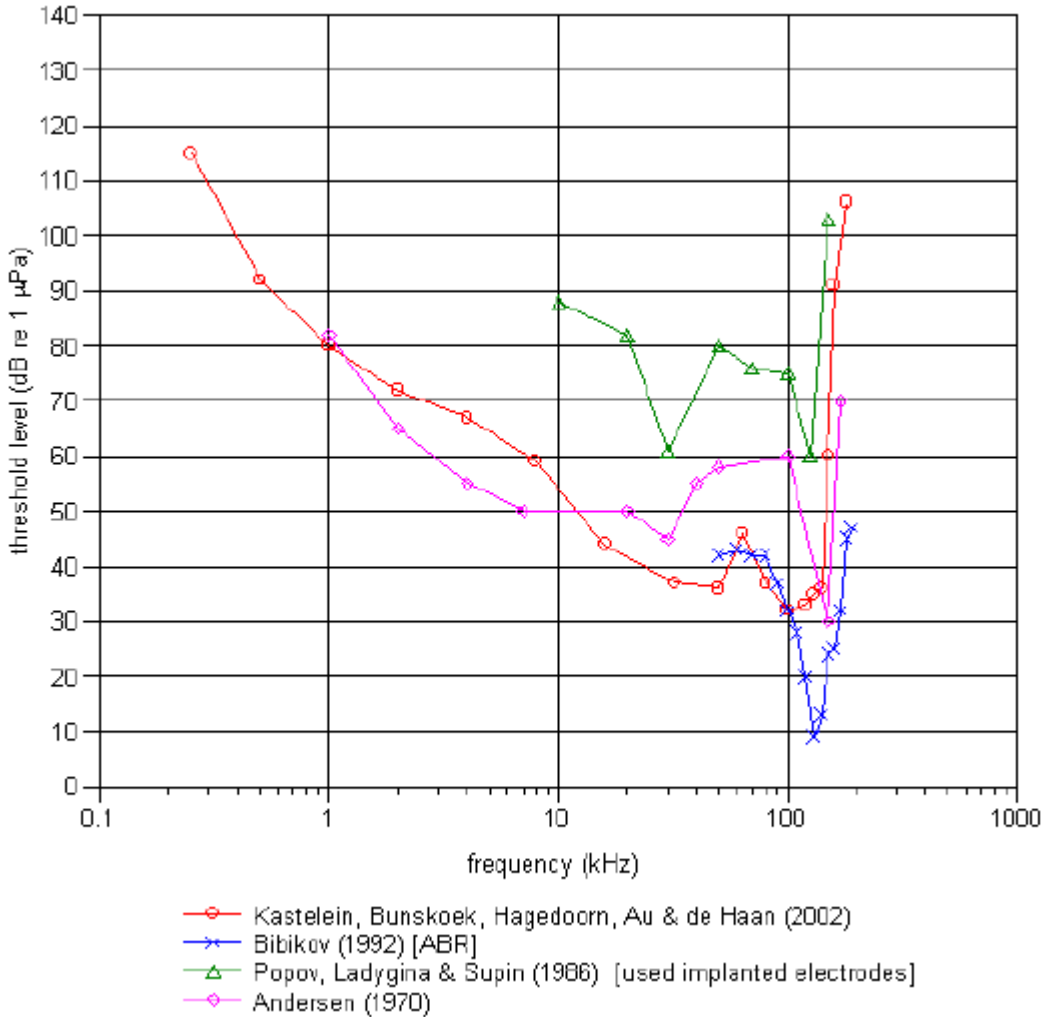

Figure 13. Harbor porpoise in-water audiogram
(taken from Nedwell et al. 2004).

4.4 Dall's Porpoise

4.4.1 Status and Distribution

Dall's porpoises occur throughout the North Pacific Ocean and in the adjacent Bering Sea, Sea of Japan, and Okhotsk Sea. In the eastern North Pacific, they occur from Baja California to the Bering Sea; in the central North Pacific; and in the western North Pacific from central Japan to the Okhotsk Sea. In the Bering Sea, they occur in higher abundance near the shelf break.

Dall's porpoises inhabiting U.S. waters have been divided into two stocks: The California/Oregon/Washington Stock and the Alaska Stock. There are insufficient data available on current population trends for both stocks; however, Dall's porpoises are considered

reasonably abundant. According to the most recent estimates from 2005 and 2008 summer/autumn vessel-based line transect surveys, there are 42,000 animals in the California/Oregon/Washington Stock (Carretta et al. 2015). In the western North Pacific, there are an estimated 100,000 off of Japan and several hundreds of thousands of Dall's porpoises in the Okhotsk Sea (Shirihai and Jarrett 2006).

Surveys for Alaska Stock are greater than 21 years old, consequently there is no reliable abundance data for this stock of Dall's porpoise. Previous studies from the 1980-1990s estimated their abundance between 417,000 and 83,400. Further, no reliable information is available to determine trends in abundance (Allen and Angliss 2014).

Dall's porpoises are neither designated as depleted under the MMPA nor listed as threatened or endangered under the ESA. The Alaska Stock of this species is not classified as strategic. Population trends and status of this stock relative to optimum sustainable population size are currently unknown (Allen and Angliss 2014).

4.4.2 Presence in Project Area

Dall's porpoises are seen infrequently around Kodiak Island. They have been recorded with low numbers in reports for incidental take and interactions associated with the Kodiak Island salmon set gillnet fishery in 2002 and 2005 (Manly 2007). There are some personal, unscientific reports of Dall's porpoise near Kodiak Island on the Internet; however, formal reports of Dall's porpoise near the project area are limited.

Dall's porpoises are rarely sighted in the project area and are expected to be encountered only rarely. No Dall's porpoises were sighted during monitoring of Near Island Channel during construction at Kodiak Ferry Terminal and Dock Improvements Project over 110 days from November 2015 through June 2016 (ABR 2016); however, the monitoring area was limited compared to the area proposed for this project.

4.4.3 Life History

Dall's porpoises become sexually mature at 3.5-8 years of age and give birth to a single calf after 10-12 months, usually between June and September. The calves are generally 1 m long. Calves are typically nursed by their mother for less than one year (NMFS 2016a). Calves and their mothers live separate from main porpoise groups for a period of time. Lactation lasts two to four months and Dall's porpoise usually have calves every three years (ADF&G 2016). These cetaceans can live up to 22 years, but their lifespan is generally 15 to 20 years.

These porpoises are usually found in groups averaging between 2 to 20 individuals, but have been occasionally seen in larger, loosely associated groups in the hundreds or even thousands of animals.

Dall's porpoises eat a wide variety of prey. They feed on small schooling fish (e.g., anchovies, herring, and hake), mid- and deep water fish (e.g., myctophids and smelts), cephalopods (e.g.,

squid and octopus), and occasionally crabs and shrimp. Feeding usually occurs at night when their prey species vertically migrate toward the surface. Dall's porpoises are capable of diving up to 500 m in order to reach their prey.

4.4.4 Acoustics

Only one high-frequency species (harbor porpoise) has been extensively studied; therefore, little use understood about Dall's porpoises' sensitivity range (Southall et al. 2007). Dall's porpoise hearing sensitivity is thought to be similar to that of other high-frequency cetacean including harbor porpoise. (See Section 4.3.4.)

4.5 Killer Whale

4.5.1 Status and Distribution

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

Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the Pacific U.S. Exclusive Economic Zone, seven of which occur in Alaska: the Alaska Resident stock; the Northern Resident stock; the Southern Resident stock; the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock; the AT1 Transient stock; the West Coast transient stock, occurring from California through southeastern Alaska; and the Offshore stock (Muto et al. 2016). Only the Alaska Resident stock and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock are considered in this application because other stocks occur outside the geographic area under consideration.

Neither the Alaska resident stock nor the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock of killer whales is designated as depleted under the MMPA or listed as threatened or endangered under the ESA. Neither stock is classified as strategic (Muto et al. 2016).

The Alaska resident stock occurs from southeastern Alaska to the Aleutian Islands and Bering Sea. Although the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock occupies a range that includes all of the U.S. Exclusive Economic Zone in Alaska, few individuals have been seen in southeastern Alaska. The transient stock occurs primarily from Prince William Sound through the Aleutian Islands and Bering Sea.

The Alaska Resident stock of killer whales is currently estimated at 2,347 individuals, and the estimate of the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock is 587 individuals (Muto et al. 2016). The Gulf of Alaska component of the transient stock is estimated to include 136 of the 587 individuals. The abundance estimate for the Alaska resident stock is likely underestimated because researchers continue to encounter new whales in the Gulf of Alaska

and western Alaskan waters. At present, reliable data on trends in population abundance for both stocks are unavailable (Muto et al. 2016).

4.5.2 Presence in Project Area

Transient killer whales are seen periodically, but not commonly, in waters of Kodiak Harbor, with photo-documentation since at least 1993. One pod, a long-term stable social unit known to visit Kodiak Harbor, includes an adult female and adult male that have distinctive dorsal fins that make repeated recognition possible. This, as well as their easy visibility from shore, has led to their "popularity" in Kodiak, where their presence is often announced on public radio. The Kodiak killer whales appear to specialize in preying on Steller sea lions commonly found near Kodiak's processing plants, fishing vessels, and docks. This pod kills and consumes at least four to six Steller sea lions per year from the Kodiak harbor area, primarily from February through May (FHWA and DOT&PF 2015).

Resident killer whales are rarely sighted in the project area and are expected to be encountered rarely. Transient killer whales are expected to be encountered in the project area occasionally. Nineteen (19) killer whales were observed during monitoring of Near Island Channel for Kodiak Ferry Terminal and Dock Improvements Project over 110 days between November 2015 through June 2016 (ABR 2016). Killer whales were observed on three different days in March and one day in May. In March, pod sizes were four, five, and three individuals, and in May, a single pod included seven individuals. During 3 visits, the pods stayed for less than 5 minutes; however, in March, one pod stayed for about 5.5 hours. For the purposes of this IHA application and based on the known range and behavior of the Alaska resident stock and the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stocks, it is reasonable to estimate that 7 individual whales (a small pod of transients) may enter the project area twice a month from January through May.

4.5.3 Life History

Distinct ecotypes of killer whales include transients that hunt and feed primarily on marine mammals and residents that forage primarily on fish. Transient killer whales feed primarily on harbor seals, Dall's porpoises, harbor porpoises, and sea lions. Resident killer whale populations in the eastern North Pacific feed mainly on salmonids, showing a strong preference for Chinook salmon (*Oncorhynchus tshawytscha*) (NMFS 2016b).

Transient whales are often found in long-term stable social units (pods) of fewer than 10 whales, smaller than resident social groups. Resident-type killer whales occur in larger pods of whales that are seen in association with one another more than 50 percent of the time (NMFS 2016b). The pods represent collections of matrilines (a "mother line"), which is their fundamental social unit.

Killer whales of different populations have distinct calls and whistles. In resident killer whales of the eastern North Pacific, each pod possesses a unique repertoire of discrete calls that are learned and culturally transmitted among individuals. These calls are used to maintain group cohesion.

4.5.4 Acoustics

The hearing of killer whales is well developed. Szymanski et al. (1999) found that they responded to tones between 1 and 120 kHz, with the most sensitive range between 18 and 42 kHz. Their greatest sensitivity was at 20 kHz, which is lower than many other odontocetes, but it matches peak spectral energy reported for killer whale echolocation clicks. Figure 14 is an in-water audiogram for the killer whale (Nedwell et al. 2004).

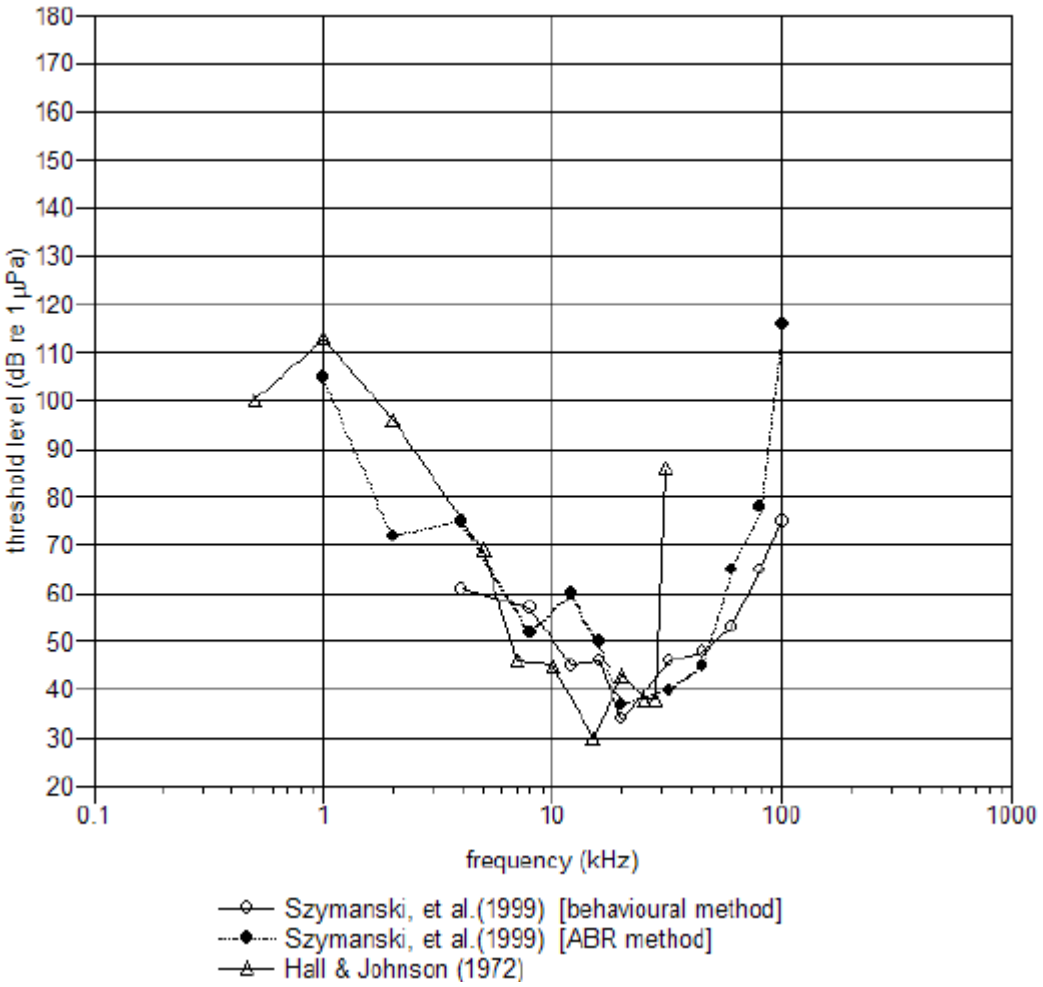

Figure 14. Killer whale in-water audiogram
(taken from Nedwell et al. 2004).

4.6 Humpback Whale

4.6.1 Status and Distribution

Humpback whales occur throughout the North Pacific Ocean, migrating from winter breeding and calving areas, such as Mexico and Hawaii, to summer feeding areas, such as California and Alaska. Humpback whales from the Hawaii DPS, Mexico DPS, and Western North Pacific DPS all occur in the Gulf of Alaska.

Humpback whales faced large population declines due to commercial whaling operations of the early twentieth century. Barlow (2003) estimated the population of humpback whales at approximately 1,200 animals in 1966. The population grew to between 6,000 and 8,000 by the mid-1990s in the North Pacific.

The humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973, and certain population segments of humpback whales continued to be listed as threatened or endangered. NMFS recently conducted a global status review of humpback whales and changed the status of humpback whales under the ESA (81 FR 62018). The Hawaii DPS, which includes the majority of whales found in Kodiak waters, is no longer listed under the ESA, and the DPS is considered not at risk. The Mexico DPS, which also includes whales found in the Gulf of Alaska, is now listed as threatened. The Western North Pacific DPS, which includes a very small percentage of the whales found in the Gulf of Alaska, continues to be listed as endangered.

Using fluke identification photographs from 2004 through 2006, Barlow et al. (2011) estimate that the current abundance of humpback whales in the North Pacific is 21,063 animals. 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. The abundance estimate for humpback whales in the entire Gulf of Alaska is estimated to be between 1,755 and 2,487 animals which includes whales from the Hawaii DPS (89%), the Mexico DPS (10.5%), and the Western North Pacific DPS (0.5%). Photo-identification studies have estimated 300-500 humpback whales in Kodiak waters (Wade et al. 2016).

4.6.2 Presence in Project Area

Though humpback whales are routinely observed in the Kodiak archipelago (Witteveen et al. 2007), they are not common in the action area. In correspondence for the Kodiak Ferry Terminal Improvements Project at Pier 1, NMFS (2013a) stated:

> Humpback whales are generally found in and around the nearshore areas of Kodiak Island. Groups of humpback whales are occasionally observed in the Narrow Cape and Ugak Island area, south of Kodiak, in spring, summer, and fall. Humpback whales are not expected to be present in the Near Island Channel because this water body between the main island of Kodiak and Near Island is very narrow and supports heavy boat traffic during summer.

Monitoring of Near Island Channel during construction for the Kodiak Ferry Terminal and Dock Improvements Project recorded one (1) humpback whale transiting through Near Island Channel in mid-March (ABR 2016). For the purposes of this IHA application, it is reasonable to estimate that six whales may enter the project area through the duration of this project. Most of the humpback whales expected in the project area are the Hawaii DPS, which are not listed under the ESA. Only one Mexico DPS (threatened) is expected in the project area during

construction and the Western North Pacific DPS (endangered) is not expected in the project area (Wade et al. 2016).

4.6.3 Life History

Nearly all humpback whale populations undertake seasonal migrations between their tropical and sub-tropical winter calving and breeding grounds and high-latitude summer feeding grounds (Calambokidis et al. 1998).

The Hawaii DPS breeds within the main Hawaiian Islands. Whales from this breeding population have been observed in most known feeding grounds in the North Pacific, but about half of the whales from population migrate to Southeast Alaska and Northern British Columbia. They also commonly utilize northern British Columbia, northern Gulf of Alaska, and Bering Sea feeding grounds (Bettridge et al. 2015).

The Mexican DPS breeds along the Pacific coast of mainland Mexico, the Baja California Peninsula, and the Revillagigedos Islands. The Mexican DPS feeds across a broad geographic range from California to the Aleutian Islands, with concentrations in California-Oregon, northern Washington – southern British Columbia, northern and western Gulf of Alaska, and Bering Sea feeding grounds (Bettridge et al. 2015).

Large aggregations of humpback whales spend the summer and fall in the nearshore areas of Southeast Alaska, Prince William Sound, and the Kodiak Archipelago. The waters surrounding the Kodiak Archipelago support feeding populations of humpback whales (Wynne and Witteveen 2005, Witteveen et al. 2007). Humpback whales occur year-round in this area, with the highest abundances occurring between May and October. In the Kodiak archipelago, known humpback whale prey include euphausiids (*Thysanoessa spinifera*); walleye pollock; Pacific sand lance, herring (*Clupea pallasii*), eulachon (*Thaleichthys pacificus*), and capelin (Witteveen et al. 2012).

4.6.4 Acoustics

Detailed information regarding the hearing abilities of humpback whales is generally lacking; however, hearing sensitivities have been estimated based on behavioral responses to sounds at various frequencies, favored vocalization frequencies, body size, ambient noise levels at favored frequencies, and cochlear morphometry (NMFS 2013). Generally, humpback whales are sensitive to low-frequency noise (NMFS 2014). Southall et al. (2007) categorized humpback whales in the low frequency cetacean functional hearing group, with an estimated auditory bandwidth of 7 Hertz (Hz) to 22 kHz.

5 Type of Incidental Take Authorization Requested

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

The City requests the issuance of an IHA pursuant to Section 101(a)(5) of the MMPA for incidental take by Level A and B acoustical harassment of five species (Steller sea lions from the wDPS, harbor seals, harbor porpoises, Dall's porpoises, and humpback whales from the Hawaii DPS) and Level B acoustical harassment of two species (killer whales and the humpback whales from the Mexico DPS) that may occur in the Transient Float disturbance zone during the planned 2.5-month long construction period which is scheduled to begin January 1, 2017. The activities outlined in Section 1 have the potential to take marine mammals by exposure to in-air and in-water sound. Take will potentially result from noise associated with down-hole drilling, vibratory pile driving, and impact pile driving. It is anticipated that harbor seals, harbor porpoises, Dall's porpoise, and humpback whales from the Hawaii DPS will be subject to Level A and B harassment and killer whales and humpback whales from the Mexico DPS will be subject to Level B harassment and exposed to pile driving/down-hole drilling noise only briefly as they are transiting the area. Steller sea lions are expected to forage in the project vicinity and it is anticipated that they could be subject to Level A and B harassment and exposed to pile driving/down-hole drilling noise multiple times during the project.

The City requests an IHA for incidental take of marine mammals described within this application for 1 year, beginning on January 1, 2017 (or the issuance date, whichever is later). The City is not requesting a Letter of Authorization (LOA) at this time because the activities described herein are expected to be completed within 1 year from the date of authorization and are not expected to rise to the level of serious injury or mortality, which would require an LOA.

6 Take Estimates For Marine Mammals

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

This section summarizes potential incidental take of marine mammals during replacement of the Transient Float as described in Section 1 of this IHA. Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a disturbance zone during active pile removal and installation activities. As stated in Section 2, pile installation and removal is estimated to occur for a total of approximately 57 hours over the course of 12 days during 2017.

6.1 NMFS Acoustic Criteria

Under the MMPA, NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as "…any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering." On August 4, 2016, NMFS released final *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing—Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts (Technical Guidance or Guidance)* (NMFS 2016c). This guidance provides updated received levels, or acoustic thresholds, above which individual marine mammals under NMFS' jurisdiction are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources.

Updates include a protocol for deriving Permanent Threshold Shift (PTS) and Temporary Threshold Shifts (TTS) onset levels for impulsive (*e.g.,* impact pile drivers) and non-impulsive (*e.g.,* vibratory pile drivers) sound sources and the formation of marine mammal hearing groups (low-, mid-, and high-frequency cetaceans and otariid and phocid pinnipeds in water) and associated auditory weighting functions. Acoustic thresholds are presented using the dual metrics of cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (PK) for impulsive sounds and the SEL_{cum} metric for non-impulsive sounds (NMFS 2016c). The new guidance only determined PTS and TTS (or Level A take, injury) for marine mammal hearing groups and Level B take zones are not affected. Tables 5 and 6 detail in-water acoustic criteria for exposure of marine mammals to PTS Onset Acoustic Thresholds (Level A Harassment) and Disturbance Thresholds (Level B Harassment), respectively.

Table 5. Summary of General In-water Acoustic Criteria for In-water Exposure of Marine Mammals to PTS Onset Acoustic Thresholds (Level A Injury) from Continuous and Impulse Sound Sources.

Hearing Group (Frequency Range)	**PTS Onset Acoustic Thresholds SEL_{cum} Thresholds**		
	Pile driving (Impulsive)	**Vibratory Pile driving (Continuous)**	**Down-hole Drilling (Continuous)** [1]
Low-Frequency Cetaceans (7 Hz to 35 kHz)	183 dB	199 dB	199 dB
Mid-Frequency Cetaceans (150 Hz to 160 kHz)	185 dB	198 dB	198 dB
High-Frequency Cetaceans (275 Hz to 160 kHz)	155 dB	173 dB	173 dB
Phocid Pinnipeds (50 Hz to 86 kHz)	185 dB	201 dB	201 dB
Otariid Pinnipeds (60Hz to 39 kHz)	203 dB	219 dB	219 dB

From: NMFS 2016c

Assumes accumulation period of 24 hours.

[1]Down-hole drilling was not included in NMFS 2016c, but is assumed to be the same as vibratory pile driving.

Table 6. Summary of In-water Acoustic Criteria for In-water Exposure of Marine Mammals to Disturbance Thresholds (Level B Harassment) from Continuous and Impulse Sound Sources.

	In-Water Noise Thresholds	
Species (Frequency Range)	**Disturbance Threshold**	
	Pile driving (Impulsive)	**Vibratory Pile driving/ Down-hole Drilling** (Continuous)
Low-Frequency Cetaceans (7 Hz to 35 kHz)	160 dB rms	120 dB rms
Mid-Frequency Cetaceans (150 Hz to 160 kHz)	160 dB rms	120 dB rms
High-Frequency Cetaceans (275 Hz to 160 kHz)	160 dB rms	120 dB rms
Phocid Pinnipeds (50 Hz to 86 kHz)	160 dB rms	120 dB rms
Otariid Pinnipeds (60Hz to 39 kHz)	160 dB rms	120 dB rms

6.2 Estimated Extent of Activity

The area of impacts of the proposed action encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne noises generated by pile driving and down-hole drilling. The Level A harassment zones are outlined in Table 7 and shown in Figure 15. The distances were developed following the protocol for deriving PTS from the recently released *Technical Guidance* (NMFS 2016c).

Table 7. Proposed In-water Sound Exposure Levels and Disturbance Zones (m) for Level A Harassment for all Marine Mammals for the Kodiak Transient Float Replacement Project.

	PTS Isopleth to threshold (m) Hearing Group				
Source	**Low-Frequency Cetaceans**	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid Pinnipeds**	**Otariid Pinnipeds**
Impact	700	30	700	400	30
Vibratory	20	10	30	20	10
Down-hole Drilling	300	20	200	200	10

From McCue 2016, injury zones calculated assuming:

- Impact driving=14 strikes per pile (average) and 6 piles per day; weighting factor 2; SL 205.9
- Vibratory driving=0.69 hours per day; weighting factor 2.5; SL 183.8
- Down-hole drilling=4.08 hours per day; weighting factor 2; SL 192.5
- PTS Isopleth to threshold (m) rounded to the nearest 10, 100, or 1,000 m

Insert new fig here

Figure 15. Level A Harassment zones for all marine mammals for the Kodiak Transient Float Replacement Project.

Level B harassment zones are shown in Table 8 and Figures 16 and 17 and the calculations of the disturbances zones are described in Section 6.2.1 and 6.2.2. The Level B in-water disturbance zones will effectively be truncated where land forms block underwater sound transmission at a closer distance (continuous noise from down-hole drilling will not extend in a full 7,000 m radius from the transient float, instead the noise will be truncated by Woody Island to the east at approximately 3,900 m (12,795 ft) and by Uski Island to the west at approximately 1,300 m (4,265 ft) (Figure 15). Transmission of underwater noise will extend beyond the length of Near Channel; however, the distance will be limited by interaction with surrounding piers and docks, shallow water shoals, and land interactions with the water (Figure 16; FHWA and DOT&PF 2015).

Table 8. Proposed In-water Disturbance Zones (m) for Level B Harassment for all Marine Mammals for the Kodiak Transient Float Replacement Project.

Source	Exposure Threshold Distances (m)[1]	
	Level B Harassment (Impulsive) 160 dB	**Level B Harassment (Continuous) 120 dB**
Impact Pile driving	200	--
Vibratory Pile driving	--	900
Down-Hole Drilling	--	7,000

[1]For monitoring purposes, the distances were rounded to the nearest 10, 100, or 1,000 m, which are more conservative estimates.

Table 9. Proposed In-air Level B Harassment Zones (m) for the Kodiak Transient Float Replacement Project.

Source	Level B Harassment Zones Exposure Threshold Distances (m)[1]	
	90 dB (harbor seal)	**100 dB (all other pinnipeds)**
Impact pile driving	40	10
Vibratory pile driving	30	10
Down-hole drilling	30	10

[1]Distances were rounded to the nearest 10 m.

[2] At this time, no thresholds have been established for in-air Level A harassment.

Figure 16. Distances to the 160 (impulsive) and 120 dB (continuous) in-water thresholds (m; Level B harassment zones).

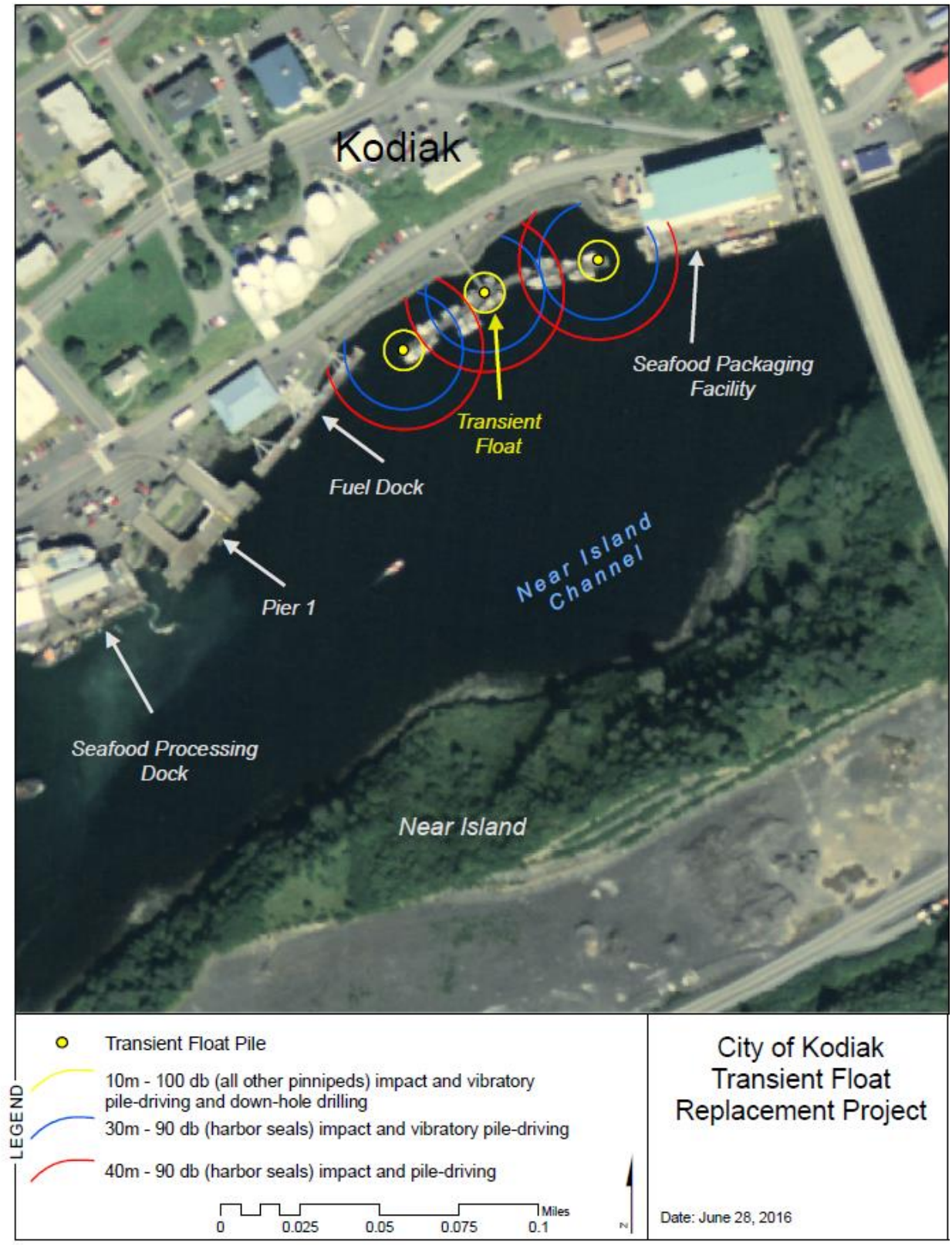

Figure 17. Distances to the 90 (harbor seals) and 100 dB (all other pinnipeds) in-air thresholds (m; Level B harassment zones).

6.2.1 Calculation of Disturbance Zones for In-water Noise

Although JASCO Applied Sciences (JASCO) conducted acoustic monitoring for Pier 1 approximately 100 m from the proposed Kodiak Transient Float Replacement Project in March 2016 (Warner and Austin 2016, Warner and Austin 2016a), NMFS's *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing* was used for determining Level A Harassment Zones for injury. The following assumptions were assumed and input into the NMFS model:

- For impact driving, an average of 14 strikes per pile and 6 piles per day; a weighting factor 2; and a sound level 205.9 dB
- For vibratory driving, 0.69 hours per day of driving; a weighting factor of 2.5; and sound level of 183.8 dB
- For down-hole drilling, 4.08 hours per day of drilling; a weighting factor 2; and a sound level of SL 192.5 dB
- For monitoring purposes, the distances are rounded to the nearest 10 or 100, or 1,000 m, and in general, are more conservative estimates PTS Isopleth to threshold (m) were rounded

For Level B Harassment, JASCO's Pier 1 monitoring sites are shown in Figure 18. Received source levels from impact and vibratory pile driving and down-hole drilling were measured, and acoustic threshold distances were calculated using the received source levels obtained from acoustic monitoring (Warner and Austin 2016, Warner and Austin 2016a).

Figure 18. Pier 1 pile driving acoustic recorder locations.
JASCO's AMAR (acoustic recorders; yellow "x") deployment locations during acoustic monitoring for Pier 1 in Kodiak, Alaska (Warner and Austin 2016). Kodiak Transient Float (red dot) is adjacent to the Pier 1 Ferry Terminal (adapted from Warner and Austin 2016).

Table 10. Calculated threshold distances (m) from an acoustic monitoring study conducted for the Pier 1 in March 2016.

	Threshold distances (m)[1]	
Source	**160 dB**	**120 dB**
Impact pile driving	183	--
Vibratory pile driving	--	821
Down-hole drilling	--	6,846

[1]Under JASCO recommendation, the 90th percentile threshold distances were considered instead of the mean threshold distances (Melanie Austin [Acoustician, JASCO] personal communication with Lindsey Kendall, May 31, 2016).

The threshold distances measured and calculated by JASCO for Pier 1 will be implemented for the proposed Kodiak Transient Float Replacement Project Level B Harassment Zones because 1) Pier 1 is 100 m away from the proposed project; 2) similar construction equipment will be used on the proposed project (e.g., pile driving hammers); and 3) the same piles (24-inch steel piles) will be used for the proposed project. For monitoring purposes, the distances are rounded to the nearest 10, 100, or 1,000 m, and in general, are more conservative estimates (Table 8 and Table 9; **Error! Reference source not found.**and Figure 16).

6.2.2 Calculation of Disturbance Zones for In-air Noise

During the installation of piles, the project could increase airborne noise levels, resulting in disturbance to pinnipeds at the surface of the water or hauled out in the harbor. Distances for in-air noise have not changed with the new NMFS acoustic guidance (NMFS 2016c); therefore to determine the distances at which airborne noise could result in disturbance, a formula for calculating the spherical spreading loss (Equation 1) was used, where *TL* is the transmission loss (in dB) and *r* is the distance from the source to the receiver. Spherical spreading results in a 6 dB decrease in SPL per doubling of distance (PND 2015).

TL = 20log r **(Equation 1)**

Where:
TL = Transmission loss (dB)
r = Distance from the source to the receiver

Equation 2, along with representative source levels were used to determine in-air threshold distances (FHWA and DOT&PF 2015, PND 2015). Magnoni et al. (2014) found that unweighted in-air measurements during impact installation of 24-inch steel piles ranged from 97 to 98 dB rms at 15 m (49 ft). The source level for impact driving 24-inch steel piles is therefore assumed to be 98 dB rms at 15 m (49 feet). No unweighted in-air data are available for vibratory installation of 24-inch steel piles; however, in-air measurements during vibratory installation of 30-inch steel piles averaged 96.5 dB rms at 15 m (49 ft; Laughlin 2010). Vibratory installation of 24-inch steel piles will therefore be conservatively estimated to generate 96.5 dB rms at 15 m (49 ft; Table 11). No unweighted in-air data are available for down-hole drilling to secure 24-inch piles into bedrock. Sound will be substantially muted because the drill will be located within and below the pile shaft and drilling/hammering will begin at least 3 to 9 m (10 to 30 ft) below the marine floor. Airborne sound for down-hole drilling will be considered a continuous noise source, and therefore, will be estimated to be the same as from vibratory hammering (96.5 dB rms at 15 m [49 ft]; Table 11). Calculated acoustic threshold distances are listed in Table 11 (FHWA and DOT&PF 2015). For monitoring purposes, the distances are rounded to the nearest 10.

Note that any takes from in-air exposure would be included in takes from underwater exposure. Animals can only be taken once per day; therefore, it would be double counting to include takes for both underwater and in-air on the same day.

Table 11. Estimates for in-air sound levels (dB) that will be generated during pile driving and removal during Kodiak Transient Float Replacement Project.

Source	Sound Level dB rms (24-inch steel piles) at 15m
Impact pile driving	98 [1]
Vibratory pile driving	96.5 [2]
Down-hole drilling	96.5[2]

[1]Magnoni et al. 2014
[2]Laughlin 2010

6.3 Estimated Incidental Takes

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a disturbance zone during active pile installation and removal. Expected marine mammal presence is determined by past observations and general abundance in the project area during construction. The take requests for this IHA were estimated using data from local marine mammal data sets and counts (e.g., marine mammal monitoring logs) and observations from biologists as described in Section 4.

Many Steller sea lions are expected to be present in the project area daily and it is assumed that take requests will include multiple harassments of the same individual(s). Harbor seals, harbor porpoises, and Dall's porpoise could be in the area more often and some take is predicted. Humpback whales and killer whales are expected to be in the project area only occasionally, although some take would be expected.

6.3.1 Steller Sea Lions

Steller sea lions are common in the project area and may be encountered daily. Near Island Channel counts of Steller sea lions adjacent to Pier 1 have ranged from 0 to approximately 25 sea lions at one time (FHWA and DOT&PF 2015). During monitoring of Near Island Channel during construction of the Kodiak Ferry Terminal and Dock Improvements Project, monthly averages of Steller sea lions have ranged from 1 per hour in December 2015 to 13 per hour in March 2016, with an averages of approximately 33 per day during 110 days of total monitoring and 19 Steller sea lions takes per day during the 67 days of construction (ABR 2016).

Although the DOT&PF requested and received an authorization for 3,200 Steller sea lions, only 1,281 Level B takes (or about 40% of the allocated take) were recorded over the 67 days of construction (ABR 2016). Monitoring information indicates that up to 11 sea lions can be present in Near Island Channel at one time; the largest group observed during in the Kodiak Ferry Terminal and Dock Improvements Project construction area was in late February, when groups of 10 were seen twice and a group of 11 was seen one time (ABR 2016).

It is assumed that Steller sea lions may be present every hour during construction, and that take will include multiple harassments of the same individuals. To be conservative, exposure is

estimated at 40 unique individual Steller sea lions per day during pile installation and removal. As stated in Section 2.0, pile installation and removal is estimated to occur for a total of approximately 12 days during 2017. Using this estimates, it is expected that the following number of Steller sea lions may be present in the Level B disturbance zone:

- Underwater exposure estimate: 40 animals/day × 12 days of pile activity = 480

The attraction of sea lions to the nearby seafood processing plant increases the possibility of individual Steller sea lions occasionally entering the Level A harassment zone before they are observed and before pile driving can be shut down. Although marine mammal observers will be present at all times during pile installation, it is possible that sea lions could approach quickly and enter the Level A harassment zone, even as pile driving activity is being shut down within a 30 m zone. This likelihood is increased by the high level of sea lion activity in the area, with Steller sea lions following vessels and swimming around vessels at the neighboring dock. A single sea lion could be taken each day that impact pile driving occurs; therefore, the City of Kodiak requests an additional 8 Level A takes. Potential for Level A harassment of Steller sea lions is estimated to only occur during impact hammering, when the zone is 30 m, due to the very small Level A harassment zones for all other construction activities (10 m for vibratory and down-hole drilling).

The City requests authorization for 480 Level B and 8 Level A acoustical harassment takes of Steller sea lions.

6.3.2 Harbor Seals

Harbor seals are expected to be encountered in low numbers within the project area. Based on the known range of the South Kodiak stock, 13 single sightings during 110 days of monitoring of the Kodiak Ferry Terminal and Dock Improvements Project, and occasional sightings at other locations on Kodiak Island, it is assumed that harbor seals could be present every day.

This analysis conservatively assumes that 4 harbor seals could be present on any one day during the 12 days of pile installation and removal. Using this number, it is estimated that the following number of harbor seals may be present in the disturbance zone:

- Underwater exposure estimate: 4 animal/day × 12 days of pile activity = 48

Although PSO will be present at all times during pile installation, it is possible that harbor seals could approach quickly and enter the Level A harassment zone (400 m for impact; 20 m for vibratory, and 200 m for down-hole drilling), even as pile driving activity is being shut down. A single harbor seal could be taken each day that pile driving occurs; therefore, the City of Kodiak requests an additional 12 Level A takes.

The City requests authorization for 48 Level B and 12 Level A acoustical harassment takes of harbor seals.

6.3.3 Harbor Porpoises

Harbor porpoises are expected to be encountered in low numbers within the project area. Based on the known range of the Gulf of Alaska stock, 6 sightings of singles or pairs only during 110 days monitoring of the Kodiak Ferry Terminal and Dock Improvements Project, and occasional sightings at other locations on Kodiak Island, it is assumed that harbor porpoises could be present every day.

This analysis, assumes that two harbor porpoises could be present on any one day during the 12 days of pile installation and removal. Using this number, it is estimated that the following number of harbor porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 2 animal/day × 12 days of pile activity = 24

It is possible that a single or pair of harbor porpoise could approach quickly and enter the Level A harassment zone (700 m for impact; 30 m for vibratory, and 200 m for down-hole drilling), even as pile driving activity is being shut down. Within the Level A Harassment area, a single harbor porpoise could be taken on 4 days or a pair of harbor porpoise could be taken on 2 days during pile driving; therefore, the City of Kodiak requests an additional 4 Level A takes.

The City requests authorization for 24 Level B and 4 Level A acoustical harassment takes of harbor porpoises.

6.3.4 Dall's Porpoise

Dall's porpoises are expected to be encountered in within the project area. Although no sightings of Dall's porpoise occurred during 110 days monitoring of the Kodiak Ferry Terminal and Dock Improvements Project, the project area is within the known range of the Gulf of Alaska stock and they have been observed at other locations on Kodiak Island. Conservatively, it assumed that Dall's porpoises with an average pod size of 5 individuals could be present in the area every day of in-water construction. Using these numbers, it is estimated that the following number of Dall's porpoise may be present in the disturbance zone:

- Underwater exposure estimate: 5 animal/day × 12 days of pile activity = 60

It is possible that a pod of Dall's porpoise could approach quickly and enter the Level A harassment area (700 m for impact; 30 m for vibratory, and 200 m for down-hole drilling), even as pile driving activity is being shut down. Within the Level A Harassment area, a single pod of 5 Dall's porpoise could be taken on 2 days during pile driving; therefore, the City of Kodiak requests an additional 10 Level A takes.

The City requests authorization for 60 Level B and 10 Level A acoustical harassment takes of Dall's porpoises.

6.3.5 Killer Whales

Killer whales are expected to be in the Kodiak harbor area sporadically from January through April and to enter the project area in low numbers. Based on 19 killer whale observations during 110 days of monitoring for the Kodiak Ferry Terminal and Dock Improvements Project with the largest pod size of 7 individuals, it is reasonable to estimate that pod of 7 whales may enter the project area twice during the 12 days of pile installation and removal . Using this calculation, it is estimated that the following number of killer whales may be present in the disturbance zone:

- Underwater exposure estimate: 7 animal/day × 2 days of pile activity = 14

The City requests authorization for 14 Level B acoustical harassment takes of killer whales. No Level A take is requested under this authorization, since it is expected that construction could be shut down before the whales enter the Level A harassment area (30 m for impact; 10 m for vibratory, and 200 m for down-hole drilling).

6.3.6 Humpback Whales

Humpback whales are expected to be encountered rarely in within the project area. There was only one sighting of humpback whales during 110 days monitoring of the Kodiak Ferry Terminal and Dock Improvements Project, the project area is within the known range of the species, and they have been observed at other locations on Kodiak Island. Conservatively, it assumed that 1 individual could be present in the area during 6 of the 12 days of in-water construction. Using this calculation, it is estimated that the following number of humpback whales may be present in the disturbance zone:

- Underwater exposure estimate: 1 animal/day × 6 days of pile activity = 6

Based Wade et al. (2016), the probability is that 5 of the humpback whales that would be taken through Level B acoustic harassment would be from the Hawaii DPS (not listed under ESA). One humpback whale would be from the ESA-listed threatened Mexico DPS, and no humpback whales would be from the endangered Western North Pacific DPS.

It is possible that one humpback whale could approach quickly and enter the Level A harassment area (700 m for impact; 20 m for vibratory, and 300 m for down-hole drilling), even as pile driving activity is being shut down. Within the Level A Harassment area, a single humpback whale could be taken on one (1) pile driving day; therefore, the City of Kodiak requests an additional 1 Level A take. It is expected that this take would be a humpback from the Hawaii DPS (not listed under ESA).

The City requests authorization for 5 takes of the Hawaii DPS humpback whales and 1 take of Mexico DPS by Level B acoustical harassment. The City also requests authorization for 1 take of a Hawaii DPS humpback whale by Level A acoustical harassment.

6.4 All Marine Mammal Takes Requested

This analysis for the Kodiak Transient Float Replacement Project predicts 480 potential exposures of Steller sea lions, 48 potential exposures of harbor seals, 24 potential exposures of harbor porpoises, 60 potential exposures of Dall's porpoises , 14 potential exposures of killer whales, and 6 potential exposures of humpback whales (5 Hawaii DPS and 1 Mexico DPS) to noise from pile activity over the course of the project that could be classified as Level B harassment under the MMPA. In addition, for Level A harassment under MMPA, this project predicts 8 potential exposures of Steller sea lions, 12 potential exposures of harbor seals, 4 potential exposures of harbor porpoises, 10 potential exposures of Dall's porpoises, and 1 potential exposures of humpback whales (Hawaii DPS). The total number of takes for which Level B and Level A acoustical harassment authorization is requested is shown in Table 12.

Table 12. Level B and Level A acoustical harassment take requests for the Kodiak Transient Float Replacement Project.

Species	Level B Harassment Takes	Level A Harassment Takes
Steller sea lion (in-air)[a]	0	0
Steller sea lion (in-water)	480	8
Harbor seal (in-air)[a]	0	0
Harbor seal (in-water)	48	12
Harbor porpoise	24	4
Dall's porpoise	60	10
Killer whale	14	0
Humpback whale (Hawaii DPS)	5	1
Humpback whale (Mexico DPS)	1	

[a] No known haulouts occur within the disturbance zone of the Transient Float Project. Therefore, pile driving will not exceed in-air disturbance threshold for hauled-out pinnipeds. Additionally, any takes from in-air exposure are included in takes from underwater exposure.

7 Anticipated Impact of the Activity

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

7.1 Potential Effects of Pile Driving on Marine Mammals

7.1.1 Hearing Loss, Discomfort, or Injury

If a received sound level is high enough, the sound may cause discomfort or tissue damage to auditory or other systems. An animal may experience temporary loss of hearing, partial, or full hearing loss. Marine mammals exposed to high received sound levels may experience non-auditory physiological effect such as increased stress, neurological effects, bubble formation,

resonance effects, and other types of organ or tissue damage. Permanent, partial or full hearing loss may occur if marine mammals are exposed to underwater sounds exceeding the injury threshold of 180 or 190 dB rms for cetaceans and pinnipeds, respectively.

Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak and Schusterman 1999, Schlundt et al. 2000, Finneran et al. 2005). threshold shifts can be permanent (PTS), in which case the loss of hearing sensitivity is not recoverable, or temporary threshold shift (TTS), in which case the animal's hearing threshold would 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. 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. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury, but TTS does not (Southall et al. 2007). TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter et al. 1965). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends (Southall et al. 2007). Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound.

When PTS occurs, there is physical damage to the sound receptors in the ear. In severe cases, there can be total or partial deafness, while in other cases the animal has an impaired ability to hear sounds in specific frequency ranges. This permanent change following intense noise exposure results from damage or death of inner or outer cochlear hair cells (Southall et al. 2007). It is often followed by retrograde neuronal losses and persistent chemical and metabolic cochlear abnormalities (Saunders et al. 1991, Ward 2007). There is no specific evidence that exposure to pulses of sound can cause PTS in any marine mammal. However, given the possibility that mammals close to a sound source can incur TTS, it is possible that some individuals might incur PTS. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing TTS onset might elicit PTS. California sea lions experienced TTS-onset from underwater non-pulsed sound at 174 dB re 1 µpa (Kastak et al. 2005), but also did not show TTS-onset from pulsed sound at 183 dB re 1 µpa (Finneran et al. 2003). It is not clear exactly when Steller sea lions may experience TTS and PTS, but sound levels greater than 190 dB have been identified as the NMFS threshold of concern for harm/injury to the species.

Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox et al. 2006, Southall et al.

2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall et al. 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways.

Masking

Marine mammal auditory signals may be masked by increased noise levels or overlapping frequencies. The transient float is located within an existing active harbor area and navigation channel, and therefore marine mammals that occur in Near Island Channel vicinity have likely become habituated to increased noise levels.

Behavioral Disturbance

Potential effects related to in-water pile driving associated with the Kodiak Transient Float Project may include behavioral modifications (i.e., avoidance of an area, diving and surfacing, modified vocalization). Generally, animals return to their previous behavior within an hour or so of a disturbance (Porter 1997); however, they may abandon a site for longer periods depending on the duration of a disturbance activity (NMFS 2005).

Marine mammals that are exposed to elevated noise levels could exhibit behavioral changes such as increased swimming speed, increased surfacing time, or decreased foraging. Additional responses of marine mammals to pile driving activity might include a reduction of acoustic activity, a reduction in the number of individuals in the area, and avoidance of the area. Of these, temporary avoidance of the noise-impacted area is anticipated to be the most likely response. Avoidance responses may be initially strong if an individual moves rapidly away from the source or weak if animal movement is only slightly deflected away from the source.

Noise from pile driving could potentially displace marine mammals from the immediate proximity of pile driving activity. However, individuals will likely return after completion of pile installation, as demonstrated by a variety of studies about temporary displacement of marine mammals by industrial activity (Richardson et al. 1995).

Steller sea lions in Near Island Channel area are exposed to a variety of vessel and industrial sounds and maintain a presence in the area. This suggests some level of habituation to anthropogenic sounds and activity. Steller sea lions are especially habituated in this location because of the presence of commercial fishing vessels and fish processing plants with available food resources. During monitoring completed for the Kodiak Ferry Terminal and Dock Improvements Project, Steller sea lions observed in the Level B harassment area were observed exhibited behaviors associated with disturbance (e.g., alert, fleeing, disoriented, or swimming away from the construction site). Five of the sightings appeared to be reacting directly to marine vessels or killer whales, rather than construction activity (ABR 2016).

While marine mammals will likely perceive elevated underwater noise during pile installation activities, the days for pile driving will not always be successive, but rather staggered over a 2.5-month period, depending on weather, construction and mechanical delays, marine mammal shutdowns, and other potential delays and logistical constraints. These temporal breaks between pile installation activities will provide marine mammals with the opportunity to recover from any noise impacts, were such impacts to occur.

Pinnipeds can be adversely affected by in-air noise when they are hauled out. Loud noises can cause hauled-out pinnipeds to flush back into the water, leading to disturbance and possible injury. However, the predicted distances to the in-air noise disturbance threshold for hauled-out pinnipeds (100 dB rms) will not extend more than 10 m (33 ft) from any type of pile being driven. Because there are no haulouts within this distance, and surrounding docks are elevated high above the surface of the water, and therefore inaccessible to Steller sea lions, no in-air disturbance to hauled-out individuals is anticipated as a result of the Kodiak Transient Float Replacement Project.

Airborne sound during impact pile driving may be perceptible at the nearest known pinniped haulout, the Dog Bay Float (1,400 m [4,600 ft] from the proposed project); however, sound levels will be well below the NMFS-established disturbance level for hauled-out Steller sea lions, and impacts will be negligible. (No monitoring of the Dog Bay Float was conducted during Kodiak Ferry Terminal and Dock Improvements Project pile driving activities.) If Steller sea lions are hauled out on fishing vessels at the nearby seafood processing dock during the limited periods of impact pile proofing, they will be more than 150 m (492 ft) away, from Kodiak Transient Float Replacement Project. Though such individuals would likely perceive impact pile driving noise, it is unlikely to distract them from foraging activities aboard the vessels.

Three harbor seals occurred within the disturbance zone during Kodiak Ferry Terminal and Dock Improvements Project pile driving activities. No individuals displayed disturbance behaviors during construction activity; however, three harbor seals were observed displaying alert behaviors after construction activities or on a non-construction day, and one harbor seal fled from an area to avoid an interaction with a motorboat unrelated to construction activity. (ABR 2016).

Harbor porpoise were observed travelling through the Kodiak Ferry Terminal and Dock Improvements Project disturbance zone during pile driving activities. Of the three groups of killer whales observed during pile driving activities, two were observed milling and the other was observed traveling through the area. The animals did not remain in the area; however, disturbance behaviors were not recorded (ABR 2016).

7.2 Conclusions Regarding Impacts to Species or Stocks

Incidental take is expected to result only in short-term changes in behavior, such as avoidance of the project area, changes in swimming speed or direction, and changes in foraging behavior.

These takes would be unlikely to have any impact on recruitment or survival, and therefore, would have a negligible impact on the wDPS of Steller sea lions or the affected stocks of harbor seals, harbor porpoises, or killer whales. Implementation of mitigation measures proposed in Section 11 is likely to avoid most potential adverse underwater impacts to individual marine mammals from pile driving activities. Impacts to individual Steller sea lions, harbor seals, harbor porpoises, Dall's porpoises, killer whales, and humpback whales are expected to be small and of short duration. Nevertheless, some level of impact is unavoidable. The expected level of unavoidable impact (defined as an acoustic or harassment "take") is described in Section 6.

Level B and Level A take of Steller sea lions will likely include multiple (estimated as daily) takes of the same individual(s), resulting in estimates of take (as percentage of the wDPS) that are high compared to actual take that will occur. Estimates of Level B and Level A take of harbor seals, harbor porpoises, Dall's porpoises, killer whales, and humpback whales are also small percentages of affected stocks.

8 Description of Potential Impacts to Subsistence Uses

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

Alaska Natives have traditionally harvested subsistence resources, including sea lions and harbor seals, in the Kodiak region for hundreds of years. Archeological sites on Marmot Island (approximately 46 km from the proposed project) indicate that sea lions have been harvested there since prehistoric times (Haynes and Mishler 1991). Harvest of sea lions and harbor seals in the City of Kodiak from 1992-2008 and 2011 is summarized in Table 13 and Table 14. No traditional hunting areas are located within the project vicinity. There is no reported subsistence harvest of killer whales or harbor porpoises in Alaska (Allen and Angliss 2014).

8.1 Steller Sea Lion Subsistence Takes In the City of Kodiak

Subsistence harvest of marine mammals by Alaska Natives is currently authorized under the MMPA. The most recent published data summarizing subsistence harvest of sea lions and harbor seals was collected in 2011. In 2011, an estimated 20 Steller sea lions were harvested on Kodiak Island, and two of them were harvested near the City of Kodiak (Wolfe et al. 2012). Between 1992 and 2011, the number of Steller sea lions harvested per year ranged from 0 to 13 sea lions near the City, with an average number of 1.9 Steller sea lions harvested per year.

Table 13. Estimated subsistence takes of Steller sea lions in the City from 1992-2008, 2011 (Wolfe et al. 2012)

Year	Estimated Harvest
1992	0
1993	12.7
1994	1.1
1995	2.2
1996	3
1997	3
1998	1
2000	2.4
2001	2.5
2002	2.5
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
2011	1.6

Overall sea lion subsistence takes on Kodiak Island have declined since the mid-1990s, with takes leveling off in recent decades. The decreased takes of sea lions may be associated with fewer sea lion hunters and secondarily to lower productivity of successful hunters (Wolfe et al 2012).

8.2 Harbor Seal Subsistence Takes In the City of Kodiak

In 2011, an estimated 163 harbor seals were harvested on Kodiak Island, and 36 of them were harvested near the City of Kodiak. The number of harbor seals harvested near the City of Kodiak from 1992 to 2011 ranged from 7 to 71 individuals per year, with an annual average of 21.8 harbor seals (Table 14).

Table 14. Estimated subsistence takes of harbor seals in Kodiak City from 1992-2008, 2011 (Wolfe et al. 2012).

Year	Estimated Harvest
1992	36.9
1993	7
1994	7.6
1995	8.8
1996	9
1997	13
1998	11
2000	26.4
2001	17.5
2002	17.5
2003	38
2004	25.5
2005	10.8
2006	10.8
2007	23.6
2008	71.3
2011	35.7

The subsistence take of harbor seals in 2011 was the third lowest recorded on Kodiak Island since 1992. Data indicates that there are more harbor seal hunters on Kodiak Island in recent years and that the success rate of hunters in recent years is low compared with past years (Wolfe et al. 2012).

8.3 Impact on Subsistence

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

- Construction activities are localized and will only cause temporary non-lethal disturbance of marine mammals in the project area.
- Sea lions and harbor seals will not be disturbed or displaced from traditional hunting grounds.
- The project will not result in changes to availability of subsistence resources.

9 Anticipated Impacts on Habitat

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

9.1 Impacts to Physical Habitat

9.1.1 Project Footprint

The Kodiak Transient Float Replacement Project area is previously disturbed by the existing float. The replacement float will decrease the permanent project footprint by approximately 48 m^2 (540 ft^2) (Figure 5).

9.1.2 Turbidity/Sedimentation

During installation of piles, a temporary and localized increase in turbidity near the seafloor is possible in the immediate area surrounding each driven pile. Due to the general lack of high silt content in the sediments within the construction footprint (FHWA and DOT&PF 2015), such turbidity is unlikely to measurably affect marine mammals, or their prey, in the project area.

9.2 Effects of Project Activities on Steller Sea Lion Habitat

9.2.1 Animal Avoidance of Abandonment

Steller sea lions could experience a temporary loss of suitable habitat in the action area if elevated noise levels associated with in-water construction result in their displacement from the area. Displacement of Steller sea lions by noise is not expected to be permanent and will not result in long-term effects to the local population.

Steller sea lions use the Dog Bay Float in St. Herman's Harbor, approximately 1,400 m (4,600 ft) (Google Earth 2010) from the Kodiak Transient Float (Figure 2). Disturbance and even temporary displacement from the Dog Bay Float may occur; however, Dog Bay Float it is located well beyond the 100 dB in-air acoustic threshold of 10 m for Steller sea lions, and therefore, noise is not anticipated to negatively affect Steller sea lions hauled out on Dog Bay Float.

9.2.2 Critical Habitat

As discussed in Section 4.1.2, the project area occurs within critical habitat for Steller sea lion haulouts at Long Island and Cape Chiniak (approximately 7 km (4 nm) and 24 km (13 nm), respectively, from the project footprint) (Figure 7 and Figure 8). The closest rookery is on the southeast corner of Marmot Island, which is approximately 55.6 km (30 nm) from the project area. The critical habitat surrounding the rookery at Marmot Island does not overlap with the project area.

As previously mentioned, Steller sea lions haul out on a man-made float in St. Herman Harbor (Dog Bay Float); however, it is not a federally recognized haulout used to define critical habitat.

Construction activities will likely have temporary impacts on Steller sea lion critical habitat through increases in underwater and airborne sound in the project vicinity from pile removal and installation. However, project-related disturbances will not be detectable at the haulouts.

9.3 Effects of Project Activities on Habitat for Other Marine Mammals

9.3.1 Animal Avoidance of Abandonment

Based on observations recorded during Kodiak Ferry Terminal and Dock Improvements Project pile driving activities, harbor seals, harbor porpoises, Dall's porpoise, killer whales, and humpback whales could experience a temporary loss of suitable habitat in the action area if elevated noise levels associated with in-water construction result in their displacement from the area. Displacement of by noise is not expected to be permanent and will not result in long-term effects to the local population.

9.3.2 Critical Habitat

The project area is not within or near critical habitat for other marine mammals under consideration in this application.

9.4 Effects of Project Activities on Marine Mammal Prey Habitat

Essential Fish Habitat has been designated within the project area for the Alaska stocks of Pacific salmon (chum salmon [*O. keta*], pink salmon [*O. gorbuscha*], coho salmon [*O. kisutch*], sockeye salmon (*O.* nerka), and Chinook salmon), walleye pollock; Pacific cod, yellowfin sole (*Limanda aspera*), arrowtooth flounder (*Atheresthes stomias*), rock sole (*Lepidopsetta* bilineata), flathead sole (*Hippoglossoides elassodon*), sculpins (*Cottidae* spp.), skates (*Rajidae* spp.), and squid (NMFS 2016).

There are no anadromous fish streams in the project area (ADF&G 2016).

Fish populations in the project area that serve as marine mammal 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 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 Kodiak Island. 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 disturbed area will still leave large areas of fish and marine mammal foraging habitat in the action area. Therefore, indirect effects on marine mammal prey during the proposed project are not expected to be substantial. Beneficial effects to prey species may include increased

habitat resulting from the decrease in footprint of the float and from removal of a higher number of piles than the number to be re-installed (FHWA and DOT&PF 2015).

10 Anticipated Effects of Habitat Impacts on Marine Mammals

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

The proposed project will occur within the existing Kodiak Transient Float operational footprint and is not expected to result in a significant permanent loss or modification of habitat for marine mammals or their food sources. The most likely effects on marine mammal habitat for the proposed project will be temporary, short duration in-air and in-water noise, temporary prey (fish) disturbance, and localized, temporary water quality effects. The direct loss of habitat available to marine mammals during construction due to noise, water quality impacts, and other construction activity is expected to be minimal.

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

Another essential feature of Steller sea lion critical habitat pertinent to the project is adequate food resources. It is expected that most fish are able to move away from the proposed activity to avoid harm, and will still be available to Steller sea lions and other marine mammals. The quantity, quality, and availability of adequate food resources are therefore not likely to be reduced (due to the small area affected, mobility of fish, anticipated recolonization, and the temporary nature of the project).

These temporary impacts have been discussed in detail in Section 9.

11 Mitigation Measures

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

The exposures outlined in Section 6 represent a conservative maximum expected number of marine mammals that could be exposed to acoustic sources reaching Level B harassment levels. The City proposes to employ a number of mitigation measures, discussed below, in an effort to minimize the number of marine mammals potentially affected. Marine mammal monitoring

and mitigation measures are summarized below and presented in detail in the Kodiak Transient Float Replacement Project Marine Mammal Monitoring Plan (Appendix B).

11.1 General Construction Mitigation Measures

- No fill, dredging, or blasting will be used for this project.
- Plans for avoiding, minimizing, and responding to releases of sediments, contaminants, fuels, oil, and other pollutants will be developed and implemented. A contractor supplied Storm Water Pollution Prevention Plan will be in place during construction.
- Spill response equipment will be kept on-site during construction.
- Work in waters of the U.S. will be conducted in accordance with the terms and conditions of the U.S. Army Corps of Engineers permit obtained for the project.

11.2 Pile Removal and Installation Mitigation Measures

- The replacement float uses a design that incorporates the smallest diameter piles practicable while still minimizing the overall number of piles. This design was selected to minimize noise impacts associated with larger piles.
- Noise associated with in-water pile driving will be localized and short-term. In-water construction would last approximately 2.5 months; during that time vibratory pile driving would occur for approximately 8.33 hours and down-hole drilling would occur for approximately 48 hours, and impact pile driving may occur for approximately 0.6 hours (Table 1).
- To minimize construction noise levels as much as possible the contractor will first attempt to direct pull piles; if those efforts prove to be ineffective, they will proceed with a vibratory hammer.
- Vibratory hammers and down-hole drilling methods will be used to install piles; the impact hammer will be used only to ensure the piles are secure (proofed) in bedrock.
- Before impact or vibratory pile driving begins, the contractor will employ “soft start” procedures[1].
- In the rare case that impact hammers are used, pile caps or cushions will be employed for sound attenuation.
- As recommended by Alaska Department of Fish & Game, to minimize impacts to pink salmon fry and coho salmon smolt, the contractor will refrain from impact pile driving from May 1 through June 30, within the 12-hour period beginning daily at the start of civil dawn. If impact pile driving occurs from May 1 through June 30, it will occur in the evenings during daylight hours, after the 12-hour period that begins at civil dawn.

[1] The soft start or “ramp –up” procedure for vibratory driving is not a requirement of NMFS, it is a requirement of the U.S Fish and Wildlife Service’s Anchorage Fish and Wildlife Field Office to mitigate noise impacts on Northern sea otters and Steller’s eiders as outlined in their August 7, 2012 Observer Protocols.

11.3 Monitoring and Shutdown of Disturbance Zones

The proposed Level A (190 dB and 180 dB, **Error! Reference source not found.**) and Level B (160 and 120 dB, Figure 1) disturbance zones will be monitored 30 minutes before, during, and 30 minutes after all in-water construction activity. If marine mammals are observed approaching or within the Level A disturbance shutdown zones, shut-down procedures will be implemented to prevent exposure. The shutdown zones are as follows:

- Steller sea lion: 30 m during impact pile driving
- Harbor seal: 30 m during impact pile driving
- Harbor porpoise: 100 m during all pile driving activities
- Dall's porpoise: 100 m during all pile driving activities
- Killer whale: 30 m during all pile driving activities
- Humpback whale: 200 m during all pile driving activities

If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale is observed within the Level A or B zones, the sighting will be documented as a Level A or B exposure, depending on location of take. If the number of Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise, killer whales, or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA, the City will notify NMFS and seek further consultation. If any marine mammal species is encountered that is not authorized by the IHA and are likely to be exposed to SPLs greater than or equal to the Level B harassment zone, the City will shut down in-water activity to avoid exposure of those species and consult with NMFS.

11.4 Marine Mammal Observation and Protection

Monitoring plans are discussed in detail in Section 13 and in the Marine Mammal Monitoring and Mitigation Plan (Appendix B). Monitoring activities will include and require:

- Trained PSOs will be present during all pile installation, down-hole drilling, and pile extraction operations.
- Monitoring for marine mammals will take place for at least 30 minutes prior to and 30 minutes following pile installation, down-hole drilling, and pile extraction operations.
- Prior to initiating construction, NMFS will approval PSOs following review of each proposed PSOs' curriculum vitae (CV).
- PSOs will maintain verbal contact with construction personnel to immediately call for a halt of pile installation and removal operations to avoid exposures as described in Section 6.
- NMFS will be provided with a report of all marine mammal sightings during the project. The sighting report will include dates, numbers, group sizes, species, sex and age classes (if possible), and locations observed as possible.

12 Arctic Plan of Cooperation

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

Not applicable. The proposed activity will take place in the City of Kodiak on Kodiak Island. Kodiak is located south of 60° North, the latitude NMFS regulations consider Arctic waters. No activities will take place in or near a traditional Arctic subsistence hunting area. Therefore, there are no relevant subsistence uses of marine mammals impacted by this action.

13 Monitoring and Reporting

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

13.1 Monitoring Plan

The Marine Mammal Monitoring and Mitigation Plan that has been developed for this project is summarized in Section 11 and provided in Appendix B. The Marine Mammal Monitoring and Mitigation Plan will be implemented during all pile installation and removal activities.

13.2 Reporting

A monitoring report will be prepared to document general compliance and that projected related takes do not exceed those authorized by NMFS through this application process. In general, reporting will include:

a. Numbers of days of observations
b. Lengths of observation periods
c. Locations of observation stations and dates used
d. Numbers, species, dates, group sizes, sex age classes (if possible), and locations of marine mammals observed
e. Descriptions of work activities, categorized by type of work taking place while marine mammals were being observed
f. Distances to marine mammal sightings, including closest approach to construction activities
g. Descriptions of any observable marine mammal behavior in the Level A and Level B disturbance zones
h. Actions performed to minimize impacts to marine mammals
i. Times of shutdown events including when work was stopped and resumed due to the presence of marine mammals or other reasons
j. Refined take estimates based on the numbers of Steller sea lions, harbor seals, harbor porpoises, and killer whales observed during the course of pile installation and removal activities

k. Descriptions of the type and duration of any noise-generating work occurring and ramp-up procedures used while marine mammals were being observed

l. Details of all shutdown events, and whether they were due to presence of marine mammals

m. Tables, text, and maps to clarify observations

Full documentation of monitoring methods, an electronic copy of the data spreadsheet, and a summary of results will also be included in the report.

14 Suggested Means of Coordination

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

In-water and in-air noise generated by vibratory and impact pile driving and down-hole drilling at the Kodiak Transient Float is the primary issue of concern to local marine mammals during this project. Potential impacts on marine mammals have been studied, with the results used to establish the noise criteria for evaluating take.

The data recorded during marine mammal monitoring for the proposed project will be provided to NMFS in monitoring reports. These reports will provide information on the usage of the site by marine mammals. The monitoring data may also inform NMFS and future permit applicants about the behavior of marine mammals, specifically Steller sea lions, during pile installation and removal for future projects of a similar nature.

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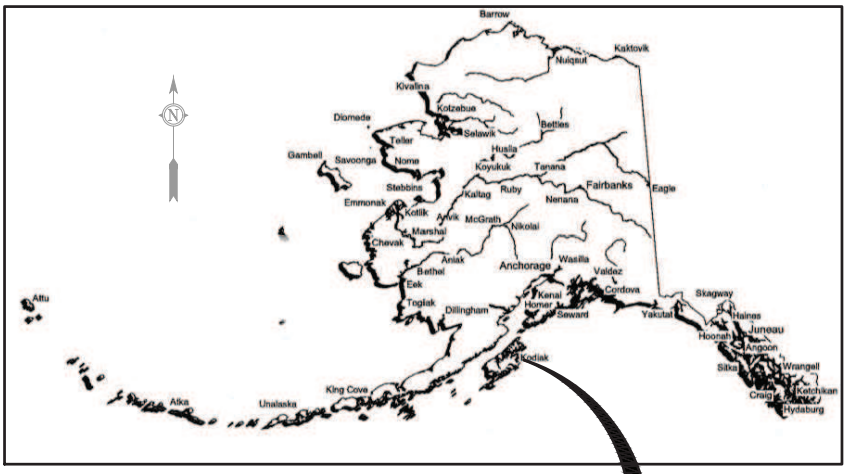
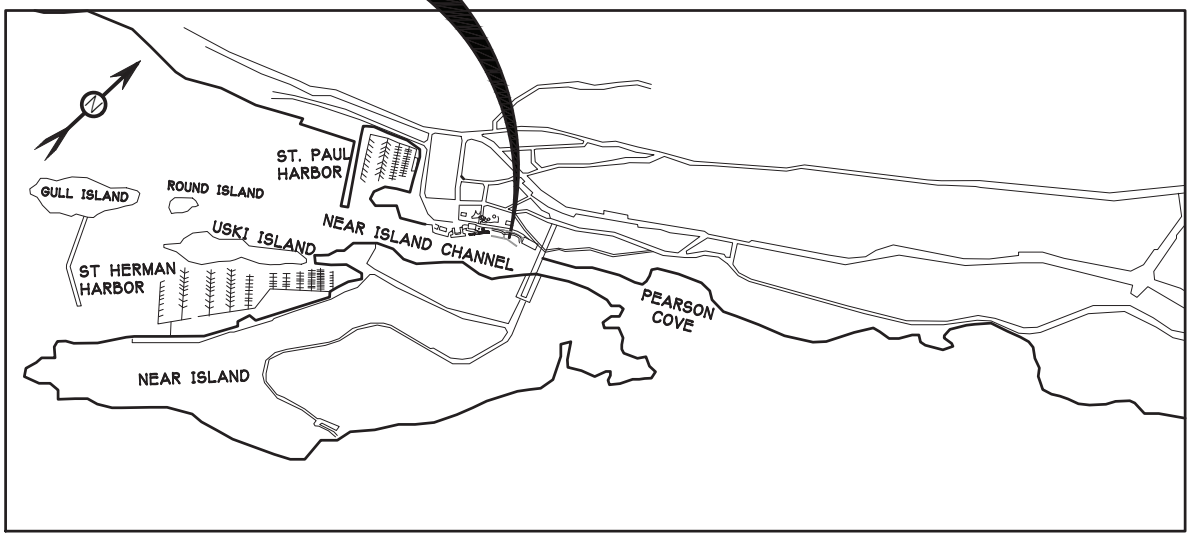
Appendix A
Project Permit Drawing

City of Kodiak Transient Float Replacement Project
Kodiak, Alaska
October 2016



PROJECT LOCATION

PROJECT VICINITY



ADJACENT PROPERTY OWNERS:

CHANNEL SIDE CHOWDER HOUSE
420 E MARINE WAY
KODIAK, AK 99615

PETRO MARINE SERVICES
105 E. MARINE WAY,
KODIAK, AK 99615

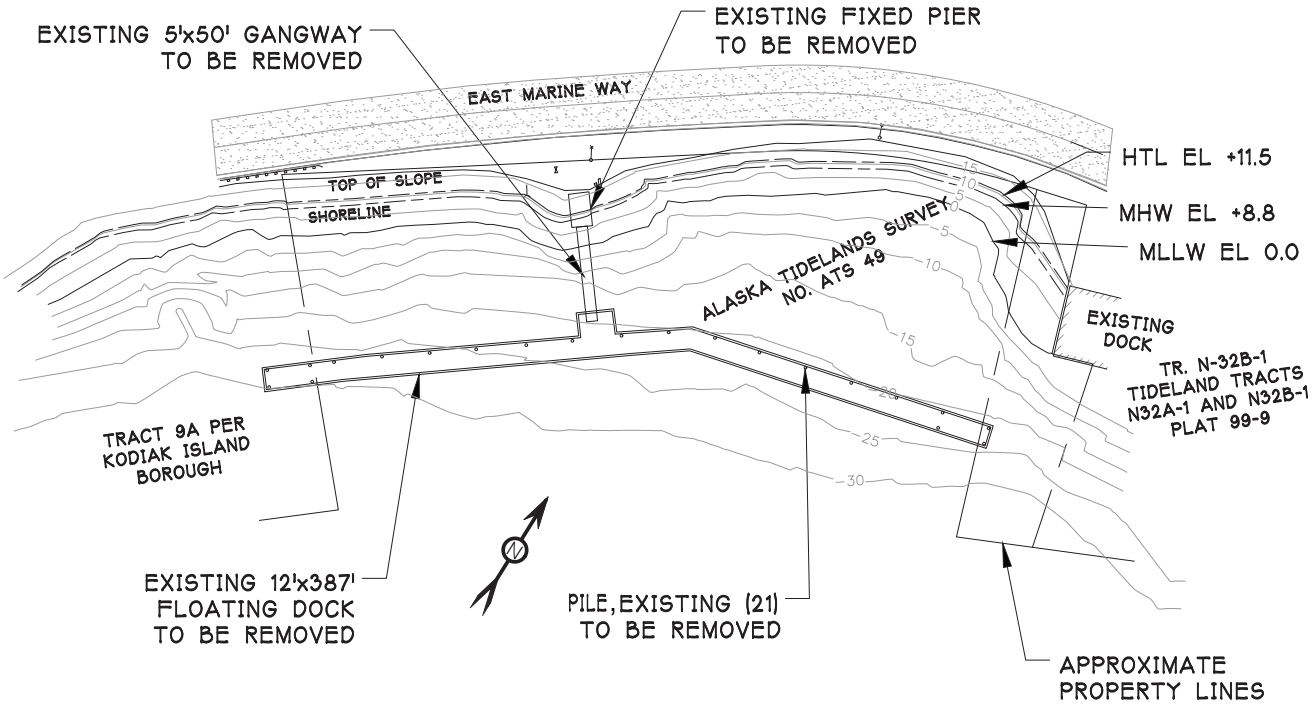
PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT

DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'

VICINITY MAP & LOCATION MAP

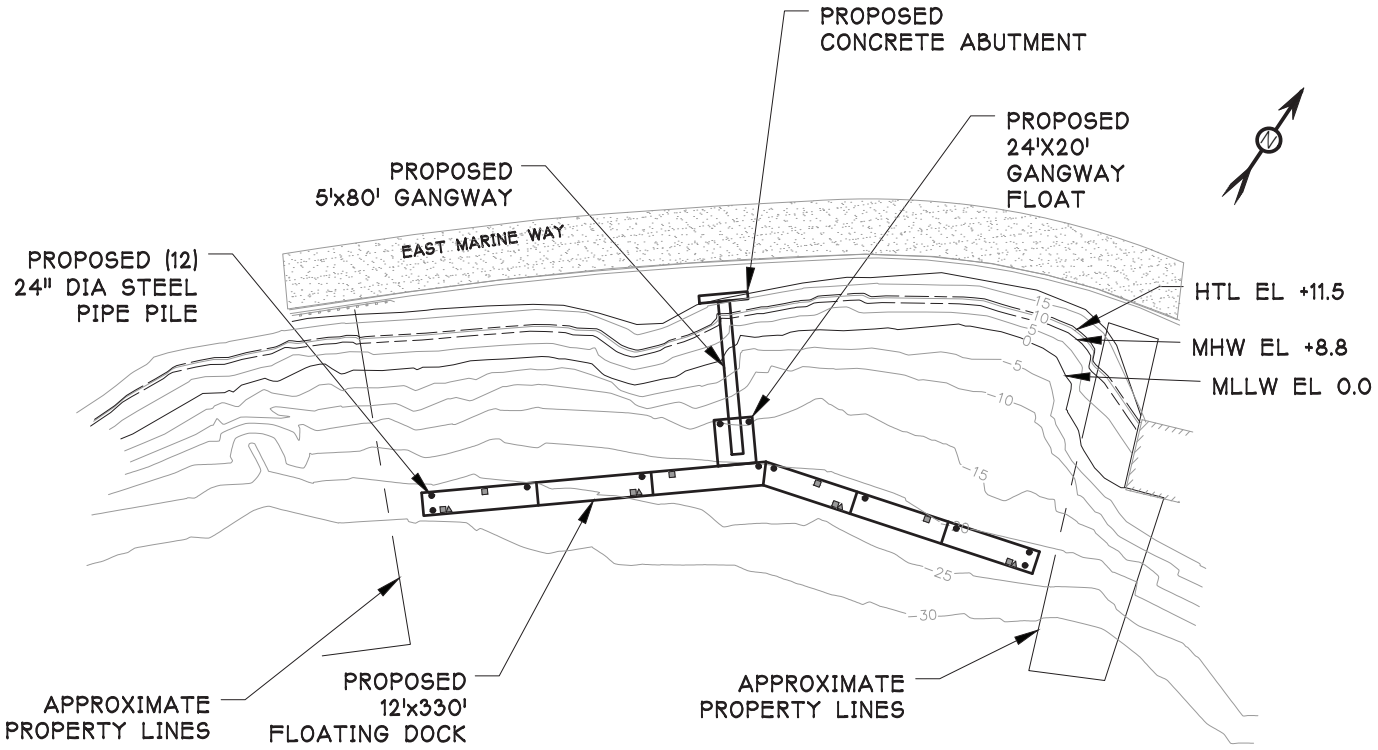
CITY OF KODIAK
JOB NO. 13_145_A

PROPOSED: TRANSIENT FLOAT
IN: NEAR ISLAND CHANNEL
AT: KODIAK, AK
APPLICATION BY: CITY OF KODIAK
DATE: 6 APR '16 SHEET: 1 OF 6



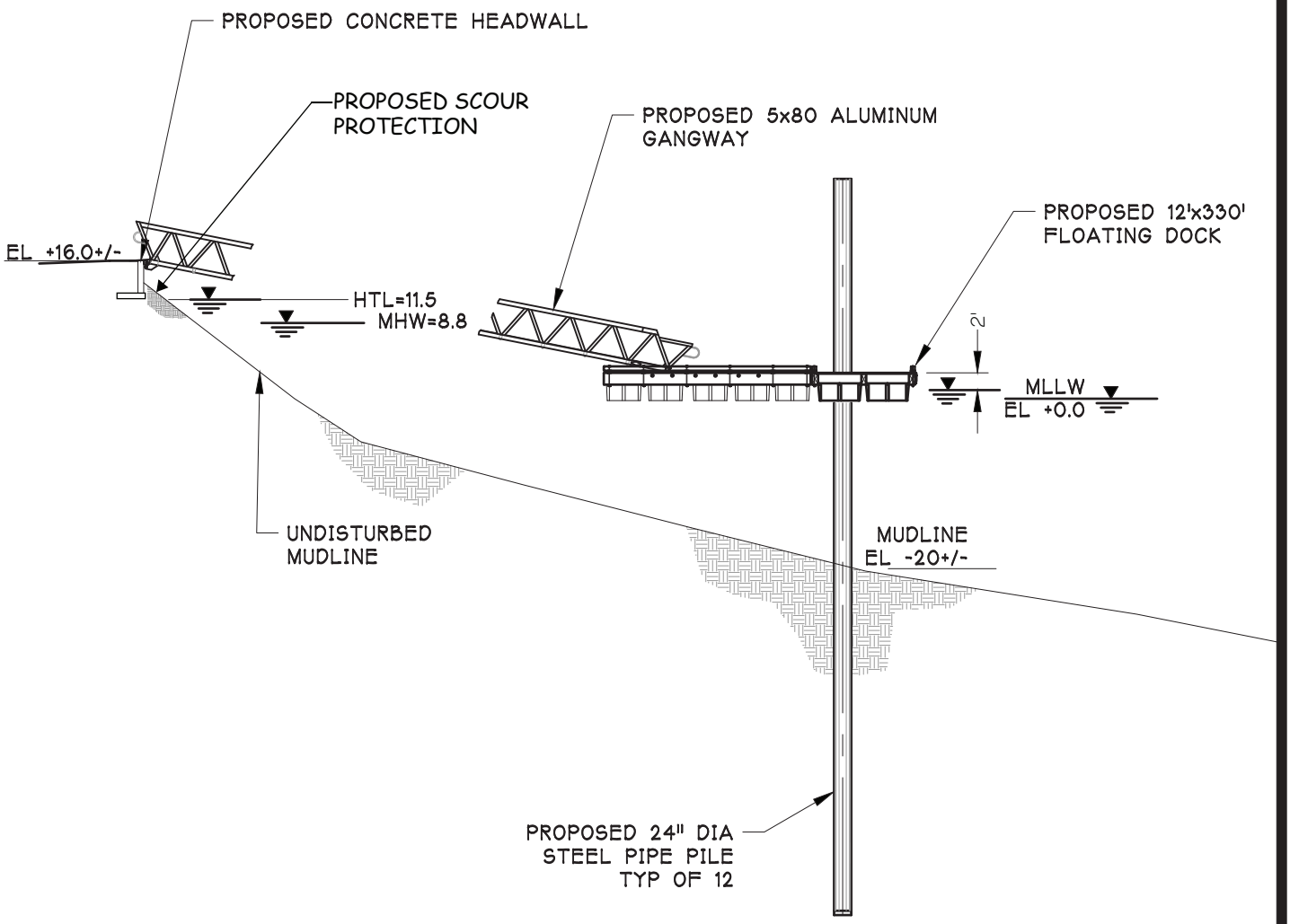
EXISTING SITE PLAN

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	EXISTING SITE PLAN	PROPOSED: KODIAK TRANSIENT FLOAT
	0 50 100	IN: NEAR ISLAND CHANNEL
	SCALE: 1" = 100'	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 17 OCT '16 SHEET: 2 OF 6



PROPOSED SITE PLAN

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	SITE PLAN OF IMPROVEMENTS	PROPOSED: KODIAK TRANSIENT FLOAT
	0 50 100	IN: NEAR ISLAND CHANNEL
	SCALE: 1" = 100'	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 06 APR '16 SHEET: 3 OF 6



TYPICAL ELEVATION

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT

DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'

TYPICAL ELEVATION

0 10 20

SCALE: 1" = 20'

CITY OF KODIAK

JOB NO. 13_145_A

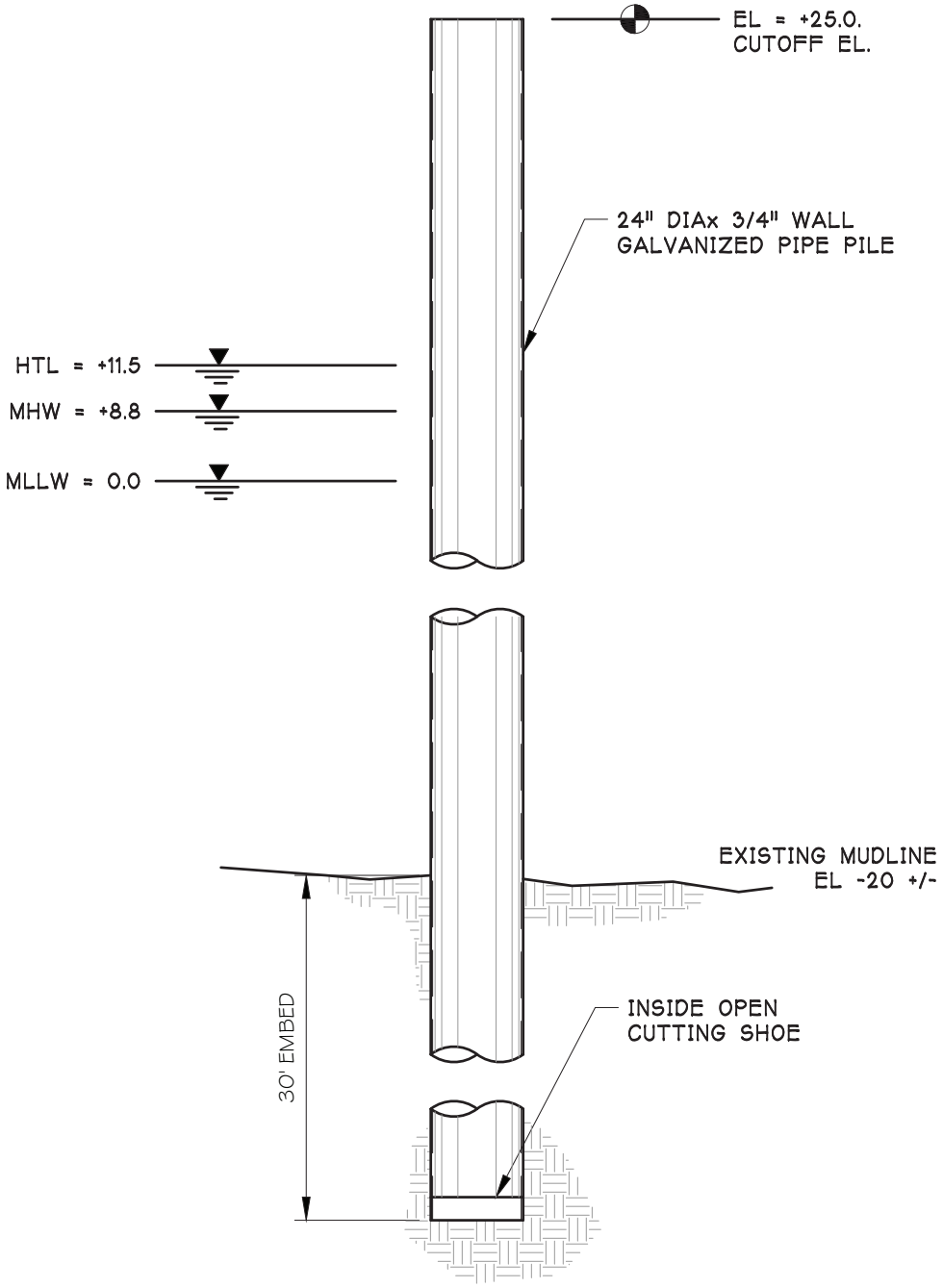
PROPOSED: KODIAK TRANSIENT FLOAT

IN: NEAR ISLAND CHANNEL

AT: KODIAK, AK

APPLICATION BY: CITY OF KODIAK

DATE: 17 OCT '16 SHEET: 4 OF 6



TYPICAL PILE

* FLOAT NOT SHOWN FOR CLARITY

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT

DATUM: 0.0'

HTL = 11.5'
MHW = 8.78'
MLLW = 0.0'

PILE DETAILS

0 1' 2' 4'

SCALE: 1/4" = 1'-0"

CITY OF KODIAK

JOB NO. 13_145_A

PROPOSED: KOKIAK TRANSIENT FLOAT

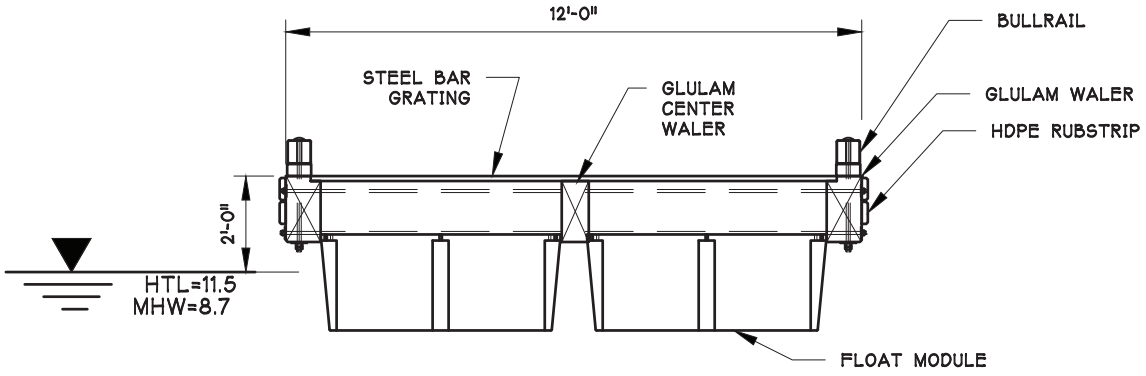
IN: NEAR ISLAND CHANNEL

AT: KODIAK, AK

APPLICATION BY: CITY OF KODIAK

DATE: 06 APR '16

SHEET: 5 OF 6



TYPICAL FLOAT SECTION

PURPOSE: REPLACE AGING CITY TRANSIENT FLOAT	FLOAT TYPICAL SECTION	PROPOSED: KODIAK TRANSIENT FLOAT
	0 1' 2' 4'	IN: NEAR ISLAND CHANNEL
	SCALE: 1/4" = 1'-0"	AT: KODIAK, AK
DATUM: 0.0' HTL = 11.5' MHW = 8.78' MLLW = 0.0'	CITY OF KODIAK	APPLICATION BY: CITY OF KODIAK
	JOB NO. 13_145_A	DATE: 06 APR '16 SHEET: 6 OF 6

Appendix B
DRAFT Marine Mammal Monitoring and Mitigation Plan

City of Kodiak Transient Float Replacement Project
Kodiak, Alaska
October 2016

Marine Mammal Monitoring and Mitigation Plan

City of Kodiak Transient Float Replacement Project
Kodiak, Alaska

October 2016

Prepared for:
City of Kodiak Port and Harbors
403 Marine Way
Kodiak, Alaska 99615

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

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Acronyms and Abbreviations

ADEC	Alaska Department of Environmental Conservation
BA	Biological Assessment
City	City of Kodiak
dB	decibels
dB re 1 µPa	decibels referenced to one microPascal
FR	Federal Register
ESA	Endangered Species Act
IHA	Incidental Harassment Authorization
MMPA	Marine Mammal Protection Act
NMFS	National Marine Fisheries Service
PSO	Protected Species Observer
rms	root mean square
SPL	sound pressure level
wDPS	western distinct population segment

1 INTRODUCTION

The City of Kodiak (City) proposes the following Marine Mammal Monitoring and Mitigation Plan (4MP) for use during pile installation and extraction for the proposed removal and replacement of the existing Transient Float in Kodiak, Alaska. The 4MP was prepared as an appendix to the request for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA), and in support of the Biological Assessment (BA) for formal Section 7 consultation with the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA). The 4MP for the Kodiak Transient Float Replacement project relies heavily on the 4MP created for the Kodiak Ferry Terminal and Dock Improvements Project (Pier 1) and is subject to change when the IHA and Biological Opinion are issued for this project.

The Kodiak Transient Float Replacement project will reconstruct an existing transient float, including the removal and installation of piles in the marine environment. The project has the potential to generate elevated levels of underwater and in-air noise that could exceed Level A (injury) and Level B (disturbance) harassment thresholds established by NMFS for marine mammals under the MMPA (70 Federal Register [FR] 1871-1875).

Level A harassment means any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild. Level B harassment means any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering, but that does not have the potential to injure a marine mammal or marine mammal stock in the wild.

On August 4, 2016, NMFS released final *Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing—Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts (Technical Guidance or Guidance)* (2016). This guidance provides updated received levels, or acoustic thresholds, above which individual marine mammals under NMFS' jurisdiction are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources.

Updates include a protocol for deriving Permanent Threshold Shift (PTS) and Temporary Threshold Shifts (TTS) onset levels for impulsive (*e.g.,* impact pile drivers) and non-impulsive (*e.g.,* vibratory pile drivers) sound sources and the formation of marine mammal hearing groups (low-, mid-, and high-frequency cetaceans and otariid and phocid pinnipeds in water) and associated auditory weighting functions. Acoustic thresholds are presented using the dual metrics of cumulative sound exposure level (SEL_{cum}) and peak sound pressure level (PK) for impulsive sounds and the SEL_{cum} metric for non-impulsive sounds (NMFS 2016c). The new guidance only determined PTS and TTS (or Level A take, injury) for marine mammal hearing groups and Level B take zones are not affected.

NMFS defined levels of harassment for marine mammals under water as:

- **Level A Harassment – injury by continuous or impulse noise**: Under the new guidelines this varies by marine mammal hearing group (low-frequency cetaceans, mid-frequency cetaceans, high-frequency cetaceans, phocid pinnipeds, and otariid pinnipeds)
- **Level B Harassment – harassment by impulse noise** (e.g., impact pile driving) is set at 160 dB re 1 µPa rms for all marine mammals
- **Level B Harassment – harassment by continuous noise** (e.g., vibratory pile driving and down-hole drilling) is set at 120 dB re 1 µPa rms (70 FR 1871-75) for all marine mammals

The City requested an IHA for the take of marine mammals protected under the MMPA including Steller sea lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), and humpback whale *(Megaptera novaeangliae*) by Level A and B harassment and killer whale (*Orcinus orca*) by B harassment incidental to replacing the existing Transient Float. Fin whales (*Balaenoptera physalus*) generally inhabit more offshore habitats than the Near Island channel and are not expected to occur in the vicinity of the Kodiak Transient Float Replacement project area; no Level A or Level B takes were requested for these species, and pile removal or installation will cease to avoid take of these species.

The overall goal of this 4MP is to ensure compliance with the ESA and MMPA when the 4MP is implemented by the Protected Species Observers (PSO) at the project site. This 4MP has been developed to minimize and mitigate harassment to marine mammals during Kodiak Transient Float Replacement project construction activities, and to monitor and record the extent of harassment when it does occur. This 4MP also describes the methods that will be used to monitor and record the extent of Level A and Level B harassment. Please refer to the IHA application and BA prepared for the Kodiak Transient Float Replacement project for a more detailed discussion of the project and its potential effects on marine mammals, including additional details on mitigation methods that will be implemented during construction.

2 HARASSMENT THRESHOLDS

The area of impacts of the proposed action encompasses the injury and behavioral disturbance zones for marine mammals exposed to waterborne noises generated by pile driving and down-hole drilling. The Level A harassment zones are outlined in Table 1 and shown in Figure 1. The distances were developed following the protocol for deriving PTS from NMFS's recently released *Technical Guidance*.

Table 1. Proposed In-water Sound Exposure Levels and Disturbance Zones (m) for Level A Harassment for all Marine Mammals for the Kodiak Transient Float Replacement Project.

	PTS Isopleth to threshold (m) Hearing Group				
Source	**Low-Frequency Cetaceans**	**Mid-Frequency Cetaceans**	**High-Frequency Cetaceans**	**Phocid Pinnipeds**	**Otariid Pinnipeds**
Impact	700	30	700	400	30
Vibratory	20	10	30	20	10
Down-hole Drilling	300	20	200	200	10

Injury zones calculated assuming:

- Impact driving=14 strikes per pile (average) and 6 piles per day; weighting factor 2; SL 205.9
- Vibratory driving=0.69 hours per day; weighting factor 2.5; SL 183.8
- Down-hole drilling=4.08 hours per day; weighting factor 2; SL 192.5
- PTS Isopleth to threshold (m) rounded to the nearest 10, 100, or 1,000 m
-

From: NMFS. 2016c. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Dept. of Commer., NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178 p.

Distances to the harassment thresholds, as defined by sound isopleths, vary by marine mammal type (cetacean vs. pinniped) and by the pile removal and installation tool. The Level B harassment isopleth will be 7,000 meters during down-hole drilling, 900 meters during vibratory pile driving, and 200 meters during impact pile driving. The Level B harassment isopleths for down-hole drilling, vibratory and impact pile driving were rounded to the nearest 100 or 1,000 meters for monitoring purposes for the Kodiak Transient Float Replacement project. The monitored Level B harassment zone for down-hole drilling will include the entire area that is ensonified within Near Island Channel, and then will extend along the channel to the northeast and southwest based on vectors from the sound source. Marine waters will not be monitored if they are located behind landmasses such as islands or headlands that have blocked transmission of sound, as it will be assumed that these areas will not be ensonified. See Table 2 and Figure 2.

Table 2. In-water proposed sound exposure threshold distances[1] (m) for Level B Harassment for all Marine Mammals the Kodiak Transient Float Replacement Project.

Source	Exposure Threshold Distances (m)[1]	
	Level B Harassment (Impulsive) 160 dB	Level B Harassment (Continuous) 120 dB
Impact Pile Driving	200	--
Vibratory Pile Driving	--	900
Down-Hole Drilling	--	7,000

[1]For monitoring purposes, the distances were rounded to the nearest 10, 100, or 1,000 m, which are more conservative estimates.

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Figure 1. Level A Harassment zones for all marine mammals for the Kodiak Transient Float Replacement Project.

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Figure 2. Level B harassment zones. Distances to the 160 (impulsive) and 120 dB (continuous) in-water thresholds (m).

3 MARINE MAMMAL MONITORING

To minimize impacts of project activities on marine mammals, PSOs will be present at the Kodiak Transient Float Replacement project site during down-hole drilling, impact pile installation, and vibratory pile removal and installation. PSOs will search for, monitor, document, and track marine mammals around and within the Level A and Level B harassment zones (Figure 1 and Figure 2). It should be noted that the titles PSO, Marine Mammal Observer, and Wildlife Observer are intended to be synonymous for consultation, documentation, and construction purposes.

3.1 Monitoring Overview

Two PSO will begin observations of the appropriate harassment zones 30 minutes prior to the start of pile installation or extraction, and will continue to observe for 30 minutes after completion of pile installation or extraction. During monitoring, the PSO will scan the water every few minutes with high-quality binoculars, and will use the naked eye to scan during the remainder of the time. A high-powered spotting scope will also be available for scanning greater distances, so that any marine mammals swimming toward the harassment zones can be observed. A third PSO will be available to observe during alternate shifts of 4–6 hours each day to prevent fatigue.

The PSOs will be stationed during construction activities at the project site and at a location on the south side of the community of Kodiak, for example at the south end of Jackson Lane, Turner Lane, or where a clear line of sight can be established throughout the Level B harassment area. If it is determined that the Level B harassment area cannot be monitored effectively by two PSOs, another PSO will be added to monitor the area.

PSOs will have no other construction-related tasks or responsibilities while monitoring for marine mammals. Each PSO will be trained in marine mammal identification and behaviors, and provided with reference materials to ensure standardized and accurate observations and data collection.

Before construction commences, the PSO will meet with the Contractor and the point of contact with the City to determine the most appropriate observation platform or platforms for monitoring during pile removal and installation. Considerations will include:

- Height of the observation platform(s), to maximize field of view and distance
- Ability to see the harassment zones
- Safety of the PSO, construction crews, and other people present during construction
- Minimization of interference with construction activities

A clear authorization and communication system will be in place to ensure that PSOs and the construction crew understand their respective roles and responsibilities. If pile installation or extraction must be shutdown to avoid take, the PSO will contact a designated member of the construction crew. A "shutdown" is defined as a duration of 30 minutes or more when in-water noise from pile removal or installation does not occur. All communications with the construction crew will be documented in the environmental conditions and construction activities log (Section 3.3.2). Although it is the role of the PSOs to watch for marine mammals, the City's construction personnel will be trained and instructed to notify the PSOs immediately if they observe a marine mammal.

Specific aspects and protocols of marine mammal observations will also include:

- Monitoring distances will be measured with range finders.
- Distances to animals will be based on the best estimate of the PSOs, relative to known distances to objects in the vicinity of the PSO.
- Bearings to animals will be determined by using a compass.
- Pre-Activity Monitoring:
    - The Level A and Level B harassment zones will be monitored for 30 minutes prior to in-water pile removal or installation.
    - If a marine mammal is present within a particular shutdown zone (varies with species and pile driving technique; see below and Section 4.6), a soft-start will be delayed until the animal(s) leaves the shutdown zone. Activity will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the shutdown zone.
    - There is no Level A take authorized for killer whales. If a killer whale is present within the Level A harassment zone, a soft-start will be delayed until the animal(s) leaves the Level A harassment zone. Activity will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the Level A harassment zone.
    - If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, , or humpback whale is present in the Level A or B harassment zone or a killer whale is in the Level B harassment zone, a soft-start will begin and a Level B exposure will be documented.
    - If any marine mammal other than Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise, killer whales, or humpback whales are present in the Level A or Level B harassment zone, a soft-start will be delayed until the animal(s) leaves the zone. A soft-start will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the harassment zone.

- During-Activity Monitoring:
    - **Down-hole drilling**
        - Level A at 300 meters for humpback whale; 200 meters for harbor porpoise, Dall's porpoise, harbor seal; 20 meters killer whale; and 10 meters Steller sea lion.
            - Down-hole drilling will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then down-hole drilling will be stopped as these species approach to avoid additional take of these species.
            - Down-hole drilling will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.
        - Level B at 7,000 meters
            - Down-hole drilling will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure will be documented. If Level B take reaches the authorized limit, then down-hole drilling will be stopped as these species approach to avoid additional take of these species.
            - Down-hole drilling will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.
        - Down hole drilling will be stopped if a humpback whale approaches within 200 meters.
        - Down hole drilling will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
        - Down hole drilling will be stopped if a killer whale approaches within 30 meters.
    - **Vibratory pile driving**
        - Level A at 30 meters for harbor porpoise and Dall's porpoise; 20 meters for humpback whale and harbor seal; and 10 meters for killer whale and Steller sea lion.
            - Vibratory pile driving will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then

vibratory pile driving will be stopped as these species approach to avoid additional take of these species.

- Vibratory pile driving will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.

- Level B at 900 meters
  - Vibratory pile installation or removal will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure will be documented. If Level B take reaches the authorized limit, then vibratory pile installation will be stopped as these species approach to avoid additional take of these species.
  - Vibratory pile installation or removal will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.
- Vibratory pile installation or removal will be stopped if a humpback whale approaches within 200 meters.
- Vibratory pile installation or removal will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
- Vibratory pile installation or removal will be stopped if a killer whale approaches within 30 meters.

- **Impact pile driving**
  - Level A at 700 meters for humpback whale, harbor porpoise, and Dall's porpoise; 400 meters for harbor seal; 30 meters for killer whale and Steller sea lion.
    - Impact pile driving will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale enters the Level A harassment zone and a Level A exposure will be documented. If Level A take reaches the authorized limit, then vibratory pile driving will be stopped as these species approach to avoid additional take of these species.
    - Impact pile driving will be stopped if a killer whale or any other marine mammal for which take is not authorized approaches the Level A harassment zone.
  - Level B at 200 meters
    - Impact pile installation will continue if a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale enters the Level B harassment zone and a Level B exposure

will be documented. If Level B take reaches the authorized limit, then impact pile installation will be stopped as these species approach to avoid additional take of these species.

- Impact pile installation will be stopped if any other marine mammal for which take is not authorized approaches the Level B harassment zone.

- Impact pile installation will be stopped if a humpback whale approaches within 200 meters.
- Impact pile installation will be stopped if a harbor porpoise or Dall's porpoise approaches within 100 meters.
- Impact pile installation will be stopped if a killer whale, harbor seal, or Steller sea lion approaches within 30 meters.

- Post-Activity Monitoring
  - Monitoring of the Level A and Level B harassment zones will continue for 30 minutes following the completion of the activity.

3.2 Protected Species Observer Qualifications

At a minimum, all PSOs must be capable of spotting and identifying marine mammals and documenting applicable data during all types of weather, including rain, sleet, snow, and wind. All PSOs must also be comfortable with handling the authority to stop work when necessary. NMFS will approval PSOs following review of each proposed PSOs' curriculum vitae (CV).

Minimum qualifications will include:

- Visual acuity in both eyes (correction is permissible) sufficient to allow detection and identification of marine mammals at the water's surface. Use of binoculars may be necessary to correctly identify the target to species.
- Ability to work in cold, wet weather, including sleet, wind, snow, and rain.
- Ability to conduct field observations and collect data according to assigned protocols.
- Experience or training in the field identification of marine mammals, including the identification of behaviors.
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound

of marine mammals observed within a defined shutdown zone; and marine mammal behavior as detailed in Section 3.3.

3.3 Data Collection

3.3.1 Environmental Conditions and Construction Activity

The PSO will document environmental conditions, types of construction activities, types of nearby commercial activities, and any communications with the construction crew in the environmental conditions and construction activities log. Environmental conditions will be documented at the beginning and end of every monitoring period and every half hour, or as conditions change. Any nearby commercial activities that could influence marine mammal behavior will be documented at the time of a marine mammal sighting. These could include presence and number of vessels offloading at the seafood processing facility dock, the number and type of vessels sailing by, and the number and type of vessels refueling at the neighboring dock. Data collected will also include the PSOs' names; location of the observation station; time of observation; wave height; wind speed; amount and position of glare; weather conditions; and visibility (Table 3

Table).

The PSO will document the time of startup or ramping up as well as shutdowns (Section 4). The reason for stopping work, time of shutdown, and type of pile driving or other in-water work taking place will also be documented. Additionally, all communications between a PSO and the construction crew will be documented.

Data collected regarding environmental conditions, marine mammal sightings, and mitigation measures will be entered into a spreadsheet. Each data entry will be checked for quality assurance and quality control. Upon request, the data will be submitted to NMFS along with the final monitoring report.

3.3.2 Sightings

Each marine mammal sighting will be documented on a sighting form, which consists of a data sheet and map (Appendix A). Alternatively, data will be collected using a laptop, tablet or similar electronic device that is protected from wet weather. Regardless of the collection platform, data will consist of start and end times of each sighting; number of individuals; sex and age class, if possible; behavior and movement; location of sighting; distances from project activities to the sighting; type of in-water activity at the time of sighting; and whether and when project activities were stopped in response to the sighting.

Monitoring distances will be measured with range finders and marked with buoys as needed. To the extent practicable, the PSOs will record behavioral observations that may make it possible to determine if the same or different individuals are being “taken” as a result of project activities over the course of a single day. While monitoring and tracking a sighting, PSOs will also continue to sweep the water with binoculars and the naked eye to identify other marine mammals potentially entering the area. These data will be submitted to NMFS as part of the final monitoring report.

Table 3. Data attributes and definitions.

Data Attribute	Attribute Definition and Units Collected
Environmental Conditions	
Weather conditions	Dominant weather conditions, collected every 30 minutes: sunny (S), partly cloudy (PC), light rain (LR), steady rain (R), fog (F), overcast (OC), light snow (LS), snow (SN)
Wind speed	In knots
Wind direction	From the north (N), northeast (NE), east (E), southeast (SE), south (S), southwest (SW), west (W), northwest (NW)
Wave height	Calm, ripples (up to 4 inches), small wavelets (up to 8 inches), large wavelets (up to 2 feet), small waves (up to 3 feet), moderate waves (up to 6 feet), large waves (up to 9 feet)
Cloud coverage	Amount of cloud cover (0–100%)
Visibility	Maximum distance at which a marine mammal could be sighted
Glare	Amount of water obstructed by glare (0–100%) and direction of glare (from south, north, etc.)
Tide	Predicted hourly data information gathered from National Oceanic and Atmospheric Administration will be available on-site
Construction and Communication Activities	
Time of event	Time that construction activities and all communications between Wildlife Observers and construction crews take place
Type of construction activity	Type of construction activity occurring, including ramp up, startup, shutdown, and type of pile driving
Communication	Information communicated between PSOs and construction crew
Marine Mammal Sightings Data	
Time of initial and last sighting	Time the animals are initially and last sighted
Number of individuals	Minimum and maximum number of animals counted; record the count the PSO believes to be the most accurate
Sex and age, if possible	Generally, numbers of females with pups or calves
Initial and final heading	Direction animals are headed when initially and last sighted
In-water construction activities at the time of sighting	Type of construction activities occurring at time of sighting
Distance from marine mammal to construction activity	Distance from marine mammal to construction activities when initially sighted, closest approach to activities, and final sighting
Commercial activities at time of sighting	Description of nearby commercial activities occurring at time of sighting, such as presence and number of vessels offloading at seafood processing facility dock, number and type of vessels sailing by, number and type of vessels refueling at dock
Behavior	Behaviors observed, indicating the primary and secondary behaviors
Change in behavior	Changes in behavior; indicate and describe
Group composition	Orientation of animals within the group and the distance between animals

Adapted from Kodiak Ferry Terminal and Dock Project – Marine Mammal Monitoring and Mitigation Plan

4 MITIGATION MEASURES

The City proposes to employ mitigation measures to minimize the number of marine mammals potentially affected. Marine mammal monitoring and mitigation measures for the proposed project include marine mammal monitoring and reporting, implementation of proposed monitoring zones, clearing the monitoring zone, soft starts, and shut down procedures. Mitigation measures described below will decrease the likelihood that marine mammals will be exposed to SPLs that may result in injury or disturbance.

4.1 Protected Species Observers

Qualified PSOs will be employed for marine mammal monitoring (Section 3.2). PSOs will maintain verbal communication with the construction personnel to implement appropriate mitigation measures.

4.2 Proposed Monitoring Zones

Modeling results for Level A and Level B harassment zones discussed in Section 2.0 were used to develop monitoring zones for pile removal and installation (Tables 1 and 2).

The proposed Level A and Level B harassment zones will be monitored 30 minutes before, during, and 30 minutes after all in-water construction activity. If marine mammals are observed approaching or within the shutdown zones (varies with species and pile driving technique; Section 4.6), shut-down procedures will be implemented to prevent exposure. If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, or humpback whale is observed within the Level A or Level B zones or a killer whale is observed within the Level B zone, the sighting will be documented as a Level A or B exposure. If the number of Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise killer whales, or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA, the City will notify NMFS and seek further consultation. If any marine mammal species is encountered that is not authorized by the IHA and are likely to be exposed to sound pressure levels greater than or equal to the Level A or B harassment zones, City will shut down in-water activity to avoid exposure of those species and consult with NMFS.

4.3 Clearing the Monitoring Zone

Prior to the start of daily in-water construction activity day or when pile driving activities have been stopped for longer than a 30-minute period, the PSO will clear the monitoring zones for a period of 30 minutes. Clearing the monitoring zone means a marine mammal has not been observed within the monitoring zones for that 30-minute period. If a killer whale is within the Level A zone or if a fin whale or other species for which Level A or B take is not authorized is present within the Level A or B harassment zone, a soft start (Section 4.4) will not proceed until the marine mammal has left the monitoring zones or has not been observed for 30 minutes for

cetaceans and 15 minutes for pinnipeds. If a Steller sea lion, harbor seal, harbor porpoise, Dall's porpoise, killer whale, or humpback whale is present within the Level B zone, a soft start will be authorized to begin and a Level B exposure will be recorded for each individual marine mammal. Monitoring of the Level A and Level B harassment zones will continue for 30 minutes following the completion of the activity.

4.4 Soft Start Procedure

Soft start procedures will be used prior to pile removal and installation at the start of the work day or when pile-driving activities have been stopped for longer than a 30-minute period, to allow marine mammals to leave the area prior to exposure to maximum noise levels. For vibratory hammers, the soft-start technique will initiate noise from the hammer for 15 seconds at a reduced energy level, followed by 1-minute waiting period and repeat the procedure two additional times. For impact hammers, the soft-start technique will initiate three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.

4.5 Shut Down Procedures

A shut down will occur when pile driving is suspended. Shut down procedures will be implemented if a marine mammal is observed in or approaching the shutdown zone (varies with species and pile driving technique; Section 4.6), if other marine mammal species for which Level B take is not authorized is present within the Level B harassment zone, or if the number of Steller sea lions, harbor seals, harbor porpoises, Dall's porpoise, killer whales, or humpback whales exposed to Level A or Level B harassment approaches the number of takes allowed by the IHA. Activity will cease until the observer is confident that the marine mammal is clear of the Level A or B harassment zones (depending on the species). The animal will be considered clear if:

- It has been observed leaving the Level A or B harassment zones (depending on the species); or
- A pinniped has not been observed within the harassment zone for 15 minutes;
- A cetacean has not been observed within the harassment zone for 30 minutes.

Clearing the monitoring zone and a soft start procedure will be implemented if the shut down duration is longer than 30 minutes.

4.6 Construction Mitigation

During in-water construction not involving pile driving or drilling, to prevent injury to the listed species from the physical interaction with construction equipment, a shutdown zones will be implemented. These zones include:

- 200 meters for humpback whales during all pile-driving activities
- 100 meters for harbor porpoise and Dall's porpoise during all pile-driving activities
- 30 meters for killer whales during all pile-driving activities
- 30 meters for Steller sea lion and harbor seals during impact pile driving

4.7 Environmental Conditions

Ongoing in-water pile removal or installation will be continued during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone, provided both the in-water noise-generating activity and marine mammal monitoring continues (acknowledging that monitoring will occur at a reduced level of effectiveness). A PSO will continue to monitor the visible portion of the Level B harassment zone throughout the duration of activities producing in-water noise. Pile removal or installation will not be initiated or a soft start from a "shutdown condition" when the complete Level B harassment zone is not visible for a continuous 30-minute pre-operational monitoring period (whether due to darkness, low light, high sea state, fog, ice, heavy rain, glare, or other conditions).

5 REPORTING

A draft report will be submitted to NMFS within 90 calendar days of the completion of marine mammal monitoring. A final report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS. To the extent practicable, the PSOs will record behavioral observations that may make it possible to determine if the same or different individuals are being "taken" as a result of project activities over the course of a single day.

In general, reporting will include:

a. Numbers of days of observations
b. Lengths of observation periods
c. Locations of observation stations and dates used
d. Numbers, species, dates, group sizes, and locations of marine mammals observed
e. Descriptions of work activities, categorized by type of work taking place while marine mammals were being observed
f. Distances to marine mammal sightings, including closest approach to construction activities
g. Descriptions of any observable marine mammal behavior in the Level A and Level B harassment zones
h. Actions performed to minimize impacts to marine mammals
i. Times of shutdown events including when work was stopped and resumed due to the presence of marine mammals or other reasons
j. Refined take estimates based on the numbers of Steller sea lions, harbor seals, harbor porpoises, and killer whales observed during the course of pile installation and removal activities
k. Descriptions of the type and duration of any noise-generating work occurring and ramp-up procedures used while marine mammals were being observed
l. Details of all shutdown events, and whether they were due to presence of marine mammals, inability to clear the hazard area due to low visibility, or other reasons
m. Tables, text, and maps to clarify observations

Full documentation of monitoring methods, an electronic copy of the data spreadsheet, and a summary of results will also be included in the report.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as serious injury or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), the *entity* would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Stranding Coordinator. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- 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 equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with the *entity* to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The *entity* would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that the *entity* discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in the next paragraph), the *entity* would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Stranding Coordinator. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with the *entity* to determine whether modifications in the activities are appropriate.

In the event that the *entity* discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the *entity* would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS West Coast Stranding Hotline and/or by email to the Alaska Stranding Coordinator, within 24 hours of the discovery. The *entity* would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Appendix A
Data Form

Marine Mammal Sighting Form

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

Date: **Observer(s):**

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

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

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

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

Project Activities and Harassment Zone

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

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

SHUT DOWN or **DELAYED** from _____ to _____ (time)

NO SHUT DOWN, *EXPLANATION REQUIRED*:

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

Additional Information (include more detailed information on behavior):

Draw locations on hardcopy map

Daily Environmental Conditions, Construction, and Communication Activity Log

Page _____ of _____

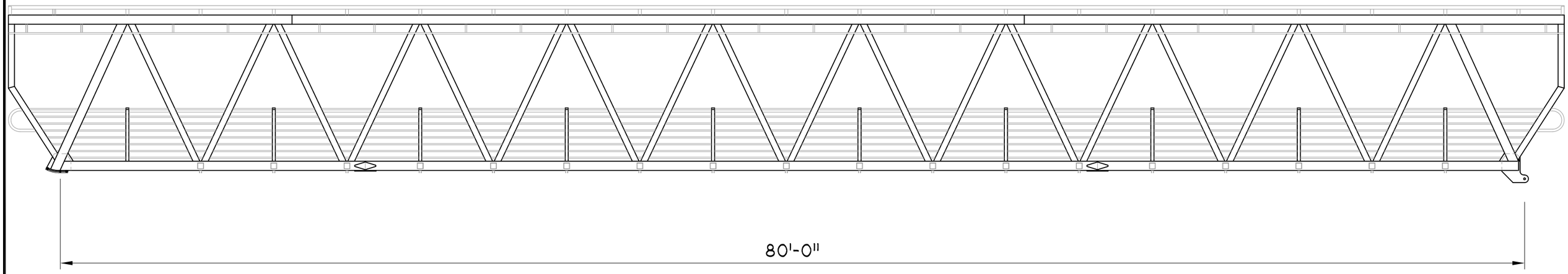
Project:_____ Location:_____ Observer(s):_____ Date: _____

Environmental Conditions (Recorded every 30 minutes or as conditions change)									Construction and Communication Activities *(Include all start up and shut-down activities and all communication to construction crew)*		
Time	Weather Conditions	Wind Speed	Wind Direction	Beaufort Sea State	Glare (%)	Visibility (m)	Cloud Cover (%)	Comments	Time	Type of Construction Activity *(Ramp up, Startup, shutdown, type of pile driving)*	Communication/Comments

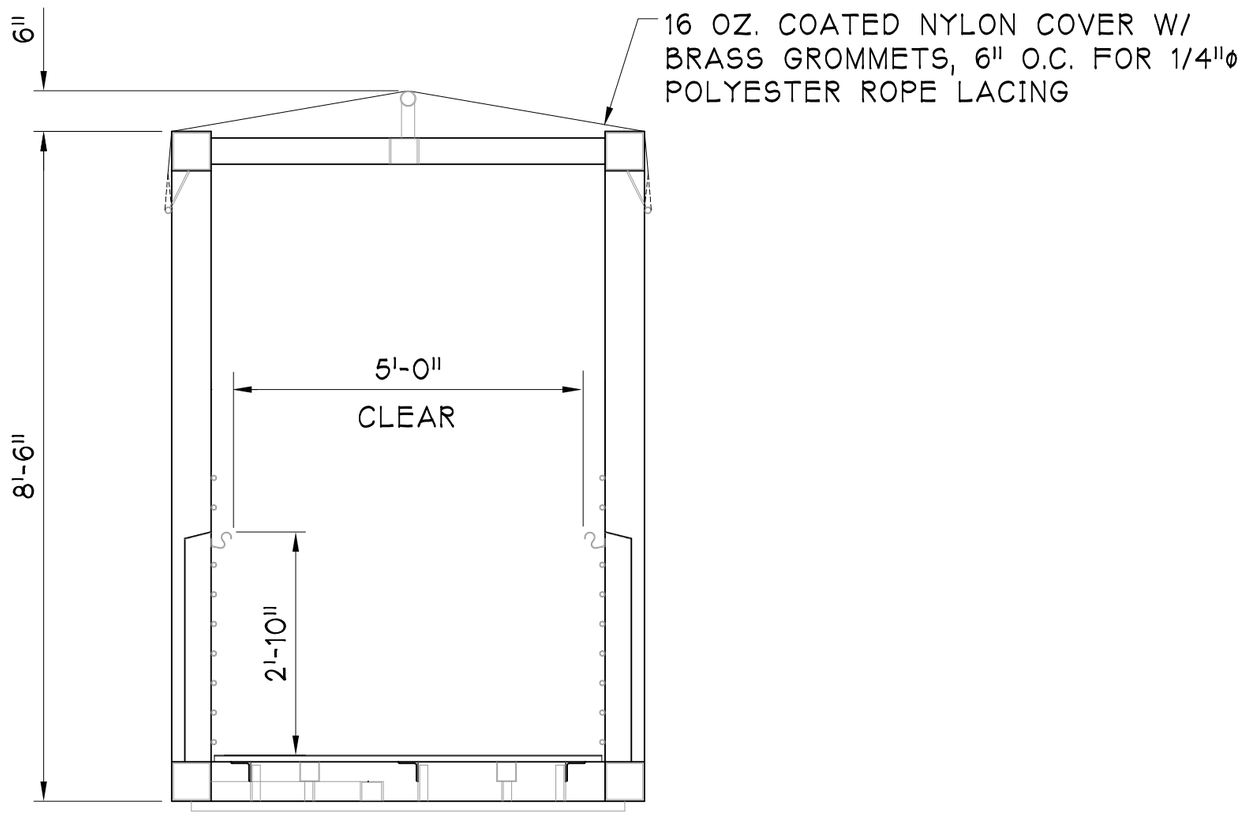
Weather Conditions: (S) Sunny, (PC) Partly Cloudy, (L) Light Rain, (R) Steady Rain, (F) Fog, (OC)Overcast, (LS) Light Snow, (SN) Snow
Beaufort Scale: (0) Calm (1) ripples- up to 4 in (2) small wavelets- up to 8 in (3) large wavelets- up to 2 ft, (4) small waves- up to 3 ft (5) moderate waves- up to 6 ft (6) large waves- up to 9 ft

Insert new Level A figure here


Kodiak
Near Is. Channel
Saint Paul Harbor
Inner Harbor
Transient Float
Round Is.
Gull Is.
Near Is.
Rocky Islet
Saint Herman Harbor
Woody Island
LEGEND
Transient Float
200m - 160 dB (impulsive) impact pile-driving
900m - 120 dB (continuous) vibratory pile-driving
7000m - 120 dB (continuous) down-hole drilling
0
0.5
1
1.5
2
Miles
N
City of Kodiak
Transient Float
Replacement Project
Date: June 30, 2016



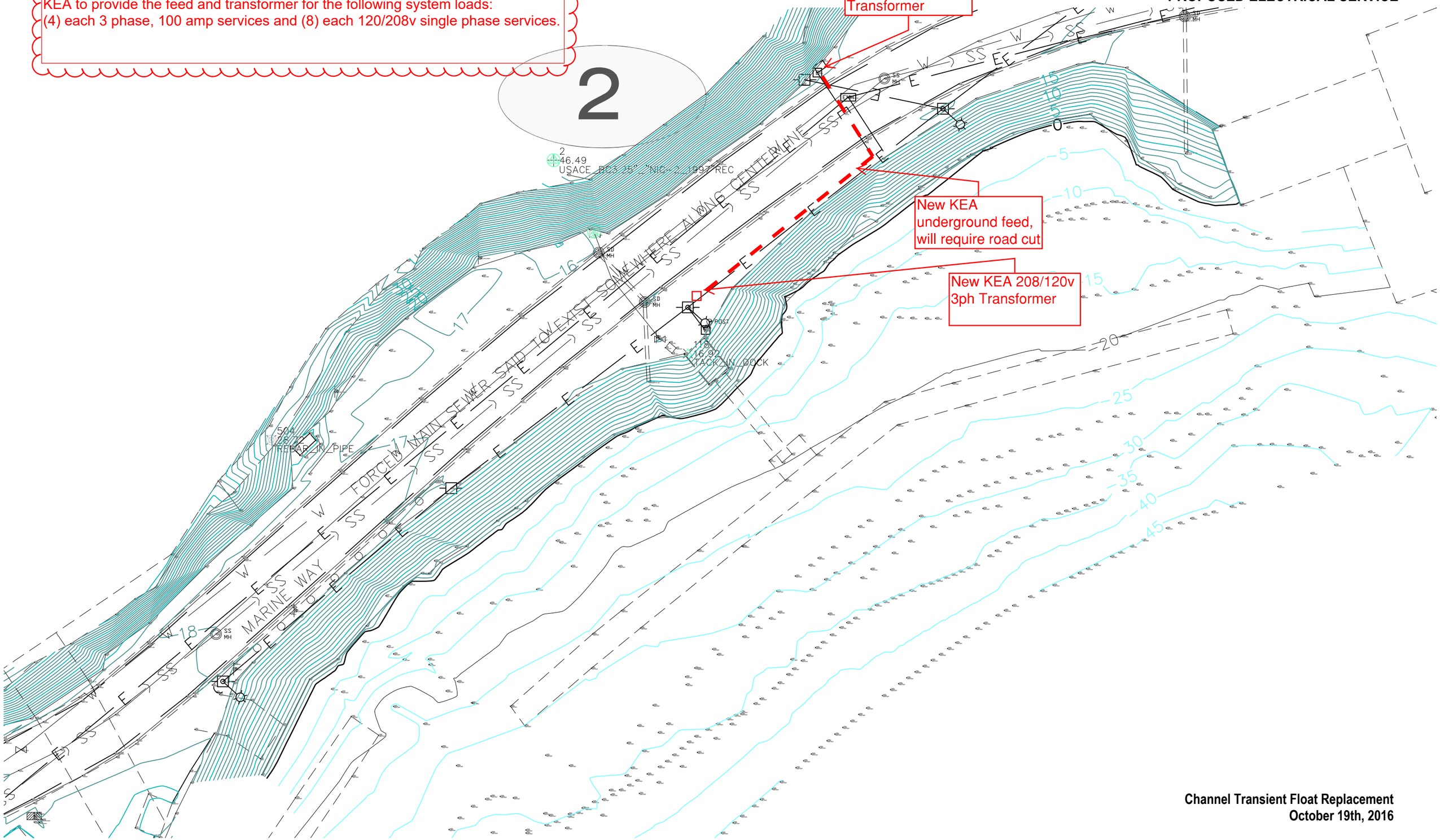
5x80 GANGWAY ELEVATION



TYPICAL SECTION

October 17th, 2016

Proposed CTF Upland Electrical Layout, by Others (KEA)
KEA to provide the feed and transformer for the following system loads:
(4) each 3 phase, 100 amp services and (8) each 120/208v single phase services.



FOUNDATION GEOLOGY REPORT

KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS (AKSAS #68938) KODIAK, ALASKA

Prepared For: **ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES**
Southeast Region, Design & Engineering Services
6860 Glacier Highway
Juneau, Alaska 99801-7999

Prepared By: **R&M CONSULTANTS, INC.**
9101 Vanguard Drive
Anchorage, Alaska 99507

18 OCTOBER 2013

FOUNDATION GEOLOGY REPORT
KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS
KODIAK, ALASKA

This report presents R&M Consultants' interpretation of the geotechnical conditions at the Kodiak Ferry Dock (aka City Dock/Pier 1) relevant for planning, design, and construction of a replacement structure. This interpretation is based on the findings from our geotechnical investigation authorized in NTP No. 1 of *Professional Services Agreement* No. 02523041. This report includes both factual and interpretative information, and establishes a baseline for assessing changes in geotechnical conditions if or when they are suspected during construction.

The discussions in this report reflect our interpretation of the cited information, findings from the geotechnical explorations at the site, and our understanding of the project as described hereinafter. This report is intended solely for use by the DOT&PF and its contractors directly involved with the Kodiak Ferry Terminal and Dock Improvements project under the condition that the reader: has a basic understanding of geotechnical terminology and principals; understands the differences between and nature of factual and interpretative information; and is familiar with the DOT&PF policies and procedures related to geotechnical investigations.

R&M Consultants, Inc. performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. R&M's services for this project were performed by, or under the responsible charge of the individuals listed below.

BRIAN MULLEN, E.I.T.
Staff Geotechnical Engineer

ROBERT L. SCHER, P.E.
Senior Geotechnical Engineer

REVIEWED BY:

CHARLES H. RIDDLE, C.P.G.
Senior Vice President

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Cover photo from www.akaskaferryvacations.com

FOUNDATION GEOLOGY REPORT
KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS
KODIAK, ALASKA

PART 1: INTRODUCTION

The Alaska DOT&PF intends to improve the State's ferry terminal and dock at Kodiak, Alaska (Figure 1). The DOT&PF authorized R&M Consultants (R&M) to complete a geotechnical investigation to support the project design under NTP No. 1 of Professional Services Agreement No. 02523041.

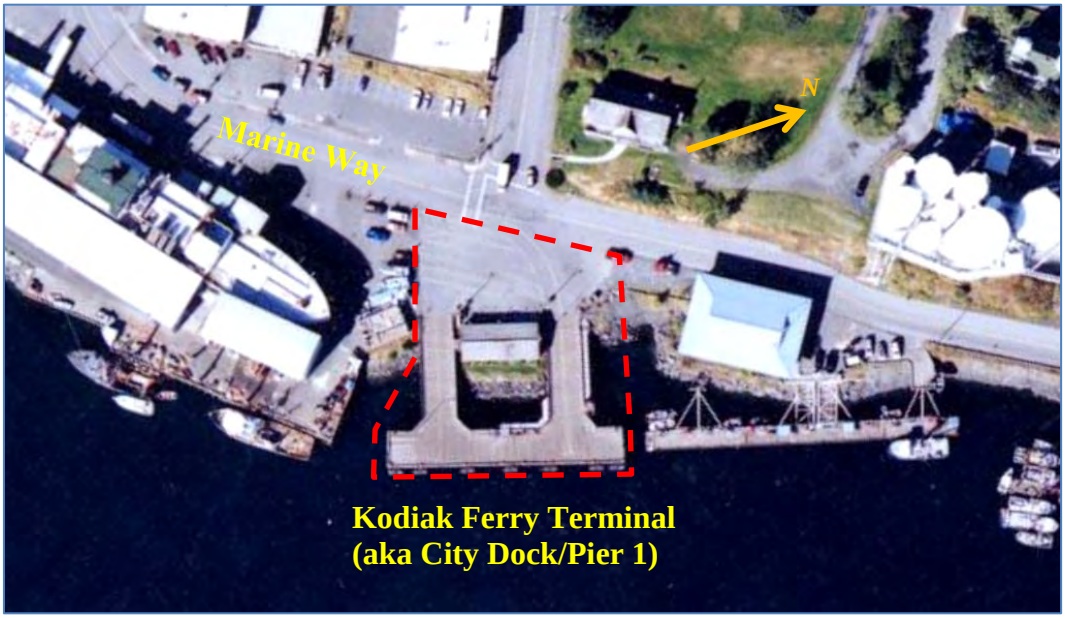

FIGURE 1: PROJECT AREA MAP (CIRCA 2000)

The present dock (aka City Dock/Pier 1) is a timber structure constructed in 1965-1966 (Pacific American Engineering Consultants, 1966); approximately 200 feet long (parallel to shore) by 30 feet wide, and connected to the shore by two piers each about 100 feet long and 30 feet wide. The dock and piers are supported on timber piles (nominal 12 inch diameter), spaced about 11 feet on-center. The as-built plans state the piles were "driven to refusal", with the 'bearing piles' embedded (in soil) between about seven to 12 feet at the base of the piers, and 12 to 21 feet at the outer face of the dock[1].

The planned improvements include replacing the existing timber dock with a steel structure, and widening the 'north' pier (Figure 2).

[1] We are not aware of driving logs for any of the piles.

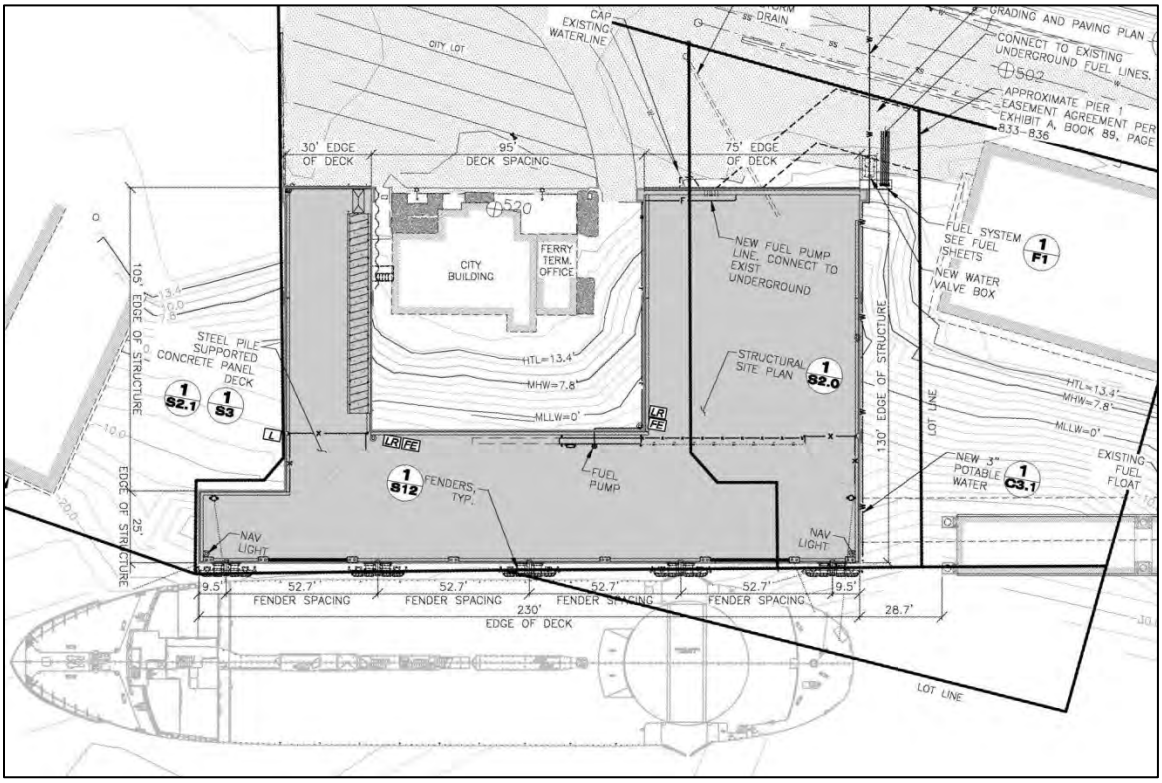

FIGURE 2: PLANNED NEW KODIAK FERRY DOCK LAYOUT
(Excerpt from Draft PS&E Plans; R&M)

R&M completed geotechnical explorations at the dock site in 2012 for the purpose of qualifying the geotechnical conditions (i.e. soil profile and rock properties) important for design and construction of the replacement structure[2]. This report summarizes our interpretation of the geologic setting and geotechnical conditions at the site. Appendices A and B summarize our field explorations (including the test hole logs and photographs of the rock cores) and laboratory testing (soil and rock), respectively. Appendix C summarizes our understanding of how the geotechnical conditions (i.e. the surficial soils) at the site have changed since 1964.

PART 2: PROJECT SETTING

2.1 REGIONAL GEOLOGY

Kodiak Island is underlain by marine shales, slates, and thin-bedded greywacke (designated the 'Kodiak Formation') which are part of the Chugach Terrane; a long belt of Cretaceous turbidite flysch and melange accreted to the edge of the North American plate along south Alaska (Plafker et al., 1994b; Solie and Reifenstuhl, 1989). Rocks in this formation near the City of Kodiak have been described as dark-gray to black mudstone, siltstone, sandstone and conglomerate that have been subjected to varying degrees of compaction and low-grade metamorphism (Sample and Moore, 1987; Solie and Reifenstuhl, 1989). These rocks have also been isoclinally folded, and

[2] R&M's scope did not include research or investigation of either a material source (borrow or aggregate), or hydrocarbons and other hazardous materials.

tilted to near vertical, generally striking N30-40°E (Sample and Moore, 1987; Solie and Reifenstuhl, 1989).

2.2 SEISMIC ENVIRONMENT

Earthquake Sources: Kodiak Island is situated in a highly-seismic region, with a well-documented recent history of numerous damaging earthquakes over the past several hundred years. The Aleutian subduction zone is the most dominate source of historic and recent earthquakes in the region; although there are several other crustal fault systems with interpreted Quaternary activity including the Albatross fault zone, and the Kodiak Shelf fault zone, (Carver et al., 2008; Koehler et al., 2012) (Figure 3).

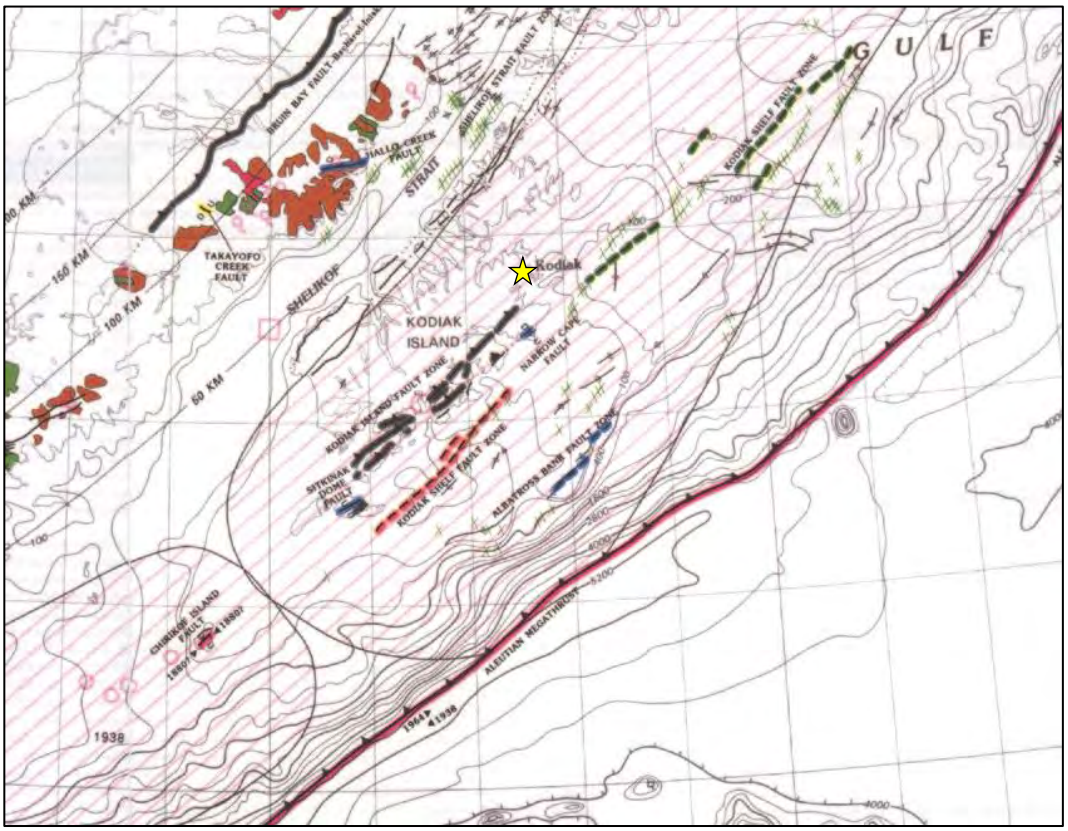

FIGURE 3: KODIAK ISLAND AREA SEISMIC SOURCES
(Excerpt from Plafker, et al. {1994a}. Yellow star = City of Kodiak; Red hashed areas = Aleutian megathrust earthquake ruptures in 1938 {M_w 8.3} southwest of Kodiak Island, and in 1964 {M_w 9.2} under and northeast of Kodiak Island; 50 km contours west of Kodiak Island reflect the depth to the subducting Pacific plate)

Seismicity within the Aleutian subduction zone is divided between two general settings: the shallow interface between the North American plate and the underthrusting Pacific plate (*megathrust* zone), characterized by infrequent great (*>M8*) earthquakes; and within the downward moving Pacific plate (intra-slab, or Wadati-Benioff zone), characterized by deep, more frequent moderate (*M5-6*) to major (*M7-8*) earthquakes. The City overlies the 'Kodiak

Segment' of the Aleutian megathrust zone, which last ruptured in 1964 (M_w 9.2 Alaska Earthquake) at a depth of about 18 miles (Carver et al., 2008). The interpreted recurrence interval of great earthquakes on the Kodiak segment of the Aleutian subduction zone ranges from about 400 to 650 years (Carver et al., 2008).

The Narrow Cape fault (Figure 3; part of the Kodiak Shelf fault zone), about 17 miles southwest of the City, is the closest major crustal source to the project with known Holocene activity (Carver et al., 2008; Koehler et al., 2012). This structure is a major northeast-southwest trending, high-angle oblique-slip fault (Carver et al., 2008), interpreted to produce major earthquakes every 1,000 to 2,000 years (Carver et al., 2008).

Tsunamis: Kodiak Island is in a region of known high risk for devastating tsunamis, which could be generated during earthquakes on all of the sources described above, as well as elsewhere around the Pacific Ocean (Suleimani et al., 2002). Most of the damage experienced at the City during the 1964 (M_w 9.2) Alaska Earthquake was caused by the seismic waves that began arriving minutes after the ground shaking stopped (Kachadoorian and Plafker, 1967). Figure 4 illustrates predictions of the potential tsunami inundation at the City of Kodiak modeled for a number of earthquake scenarios.

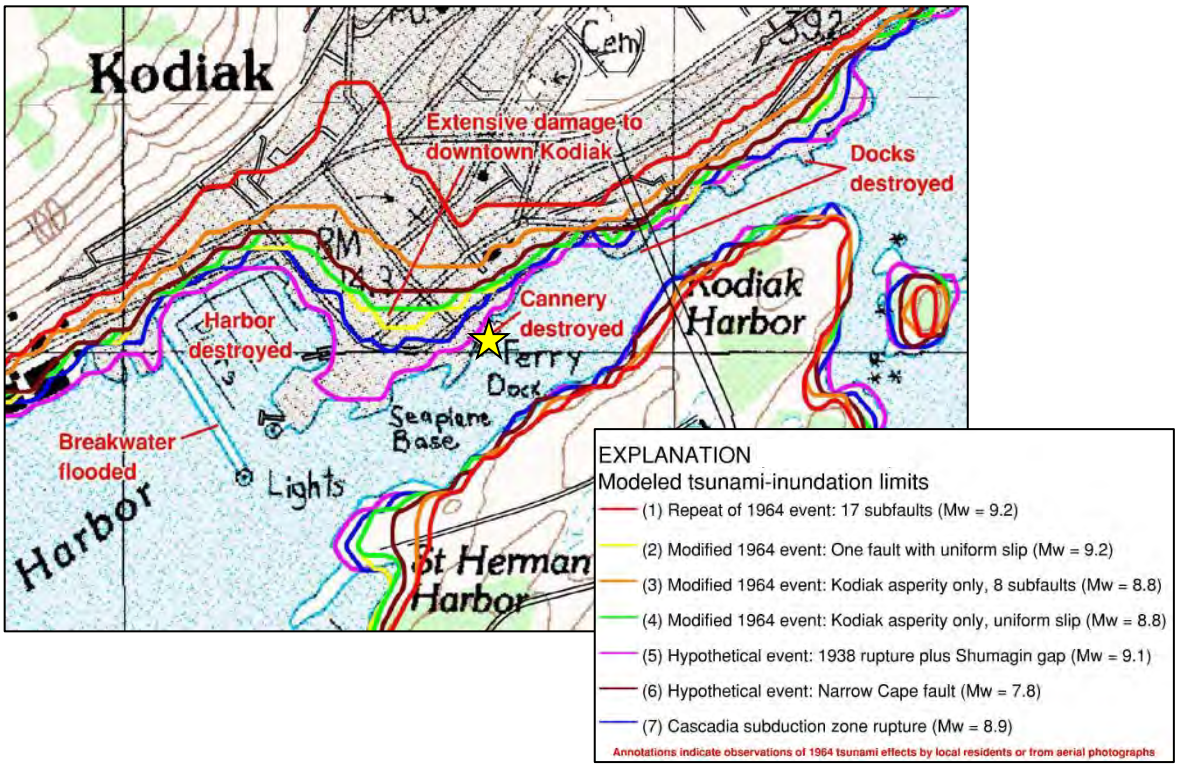

FIGURE 4: TSUNAMI INUNDATION HAZARD MAP
(Excerpt from Suleimani et al. {2002}. Yellow star = Kodiak Ferry Dock)

PART 3: GEOTECHNICAL SITE CONDITIONS

3.1 GENERAL

Based on recent bathymetric and surface topographic surveys, the surface of the dock and paved area at the base of the piers (Figure 1) are at about Elevation 20 feet, MLLW (about 15-16 feet above mean sea level); while the seafloor along the face of the dock ranges from about Elevation -17 to -23 feet MLLW (i.e. between 37 and 43 feet below the dock surface). The seafloor under the dock slopes towards the channel at roughly 10-15 degrees. The paved area at the base of the piers is underlain by a fill embankment (see Appendix C), with side-slopes ranging from roughly 1.3 to 1.8(h):1(v) (steepest in front of the terminal building). The fill side-slopes are also armored with rip-rap shore protection.

Geotechnical conditions across the Kodiak Ferry Terminal site appear to be relatively uniform and consistent with the regional geologic mapping and interpreted site history (Appendix C). The general soil profile (Figure 5) consists of variable gravel and sand with silt, overlying bedrock. The upper portion of the soil unit at the base of the piers is interpreted to be fill, which appears to extend into the channel almost to the dock. The deep portion of the soil unit at the base of the piers, and the entire soil column under the dock is interpreted to be marine colluvium. Bedrock under the dock slopes towards the channel at roughly 15-20 degrees. Groundwater under the fill is expected to closely match the sea level.

3.2 SOIL COLUMN

For the purpose of our geotechnical evaluations, the soils covering the project area were grouped into two general units (Figure 5), designated as 'fill' and 'marine colluvium', as discussed below (see also Part 3.4):

***Fill*:** The ground between Marine Way and the terminal building is predominately coarse-grained fill that was placed in about 1965 (see Appendix C). Based on R&M's test holes (see Appendix A), the fill appears to be about 20 to 24 feet thick at the base of both piers. This fill was described as black to brown, poorly to well-graded sand with gravel and non-plastic silt (estimated *Unified Soil Classification*: *(SP-SM*)g to (SM*)g*). Based on the field sampler penetration resistance rates, the fill appears to be medium dense. Based on limited laboratory testing, the fraction of soil particles, by mass, passing the No. 200 sieve (0.074 mm; P200) ranged from about 6-19 percent (avg 11%; 6 tests); and the moisture contents ranged from about 7-13 percent above the water table (avg 9%; 5 tests), to about 14-16 percent below the water table (2 tests). Note that within this general soil unit, a buried layer of cobbles and boulders (possibly old rip-rap), from about one to plus-five feet thick was encountered in R&M's test holes at the base of both piers (about five to nine feet below the surface).

***Marine Colluvium*:** The surface fill overlies a general unit of coarse-grained soil interpreted to be either colluvium, and/or very old fill. The soils blanketing the channel slope under the dock were also considered to be part of this colluvial unit. Based on R&M's test holes (see Appendix A), the thickness of this unit ranged from about three to plus-four feet at the base of both piers, up to 15 to 20 feet under the dock. This unit was described as black, poorly to well-graded sand with

gravel and non-plastic silt, (estimated *(SP-SM*)g to (SM*)g*). Based on the field sampler penetration resistance rates, this material appears to be loose to medium dense. Based on limited laboratory testing, the P200 values ranged from about 6-15 percent (avg 10%; 8 tests); and the moisture contents ranged from about 14-23 percent (avg 17%; 5 tests; all samples from below the water level).

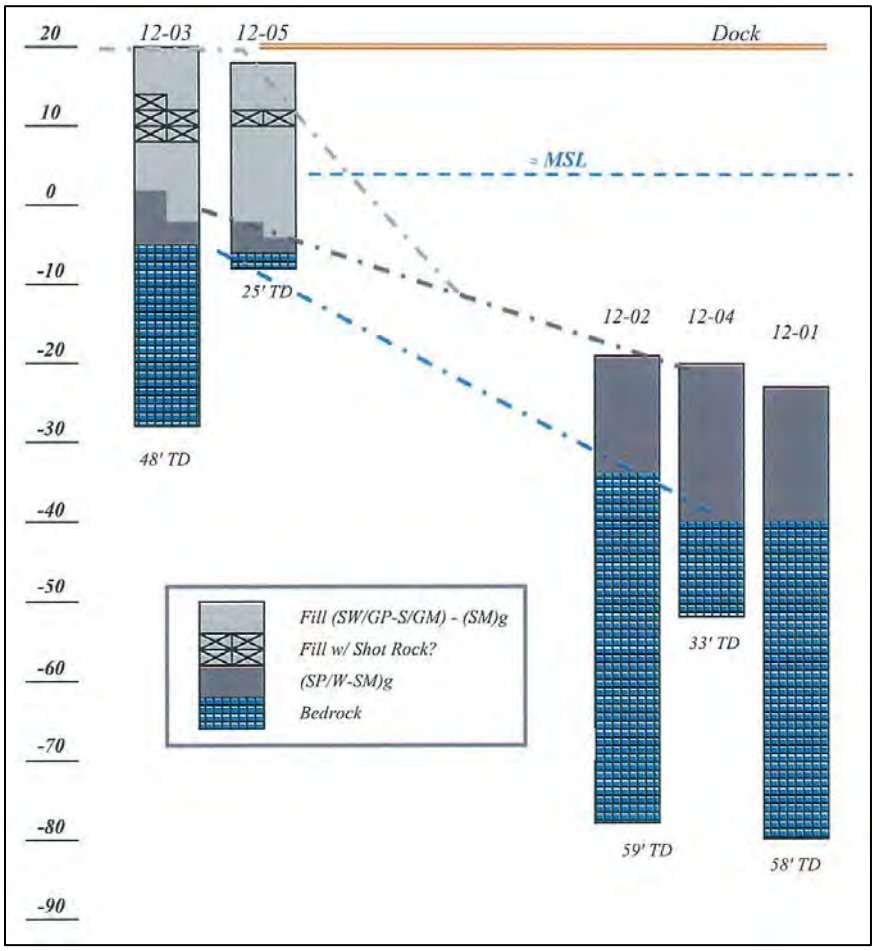

FIGURE 5: SCHEMATIC GEOTECHNICAL PROFILE

(See site map in Appendix A; no horizontal scale, vertical scale is elevation in feet, MLLW, TD = total depth drilled below ground surface)

3.3 BEDROCK

All five of R&M's test holes were terminated in bedrock (four of these borings were cored into the rock 13 to 44 feet) generally described as gray to dark gray, fine-grained greywacke interlayered with phyllite and scattered veins of carbonate. Photographs of all the recovered rock cores are provided in Appendix A. Table 1 summarizes several rock index parameters, including the core recovery, *Rock Quality Designator* (RQD), and estimated compressive strength based on point load testing (see Appendix B).

Based on visual inspection, the rock appeared to be bedded near vertical, and the phyllite was soft and often washed out of the core barrel while drilling. These factors likely contributed to the wide range in core recoveries and RQD listed in Table 1. Further, none of the recovered phyllite core specimens were large enough for point load testing. Therefore, the estimated compressive strength values in Table 1 may not be representative of the overall rock mass.

TABLE 1: ROCK INDEX PARAMETERS

	CORE		Est Compressive Strength, ksf
	Recovery, %	RQD	
Minimum	0	0	725
Maximum	100	90	2,320
Average	83	13	1,645
StDev	29	22	470
Count	52	50	15

3.4 GEOTECHNICAL PROPERTIES MODEL

Table 2 summarizes the general index and strength properties we estimated considering the laboratory test results (Appendix B), and methods described in Hoek et al. (2002), Kulhawy and Mayne (1990), and Sabatini et al. (2002).

TABLE 2: SOIL AND ROCK PHYSICAL PROPERTIES MODEL

	GENERAL UNITS		
PARAMETER	Fill	Marine Colluvium	Bedrock
Classification (*ASTM D2487/8*)	*(GP/W-GM)s (SW-SM)g, (SM)g*	*(SP/W-SM)g, (GW-GM)s, (SM)g*	*GSI ≈ 25-30*
Relative Density, %	25-30 in top ≈ 7 ft; 40-60 with depth	30-60	---
Texture (*avg*)	P_{Grv} >≈ *35*% P_{200} 6-19% (*11*) D_{50} ≈ *2.5-3* mm	P_{Grv} 30-50% P_{200} 6-15% (*10*) D_{50} ≈ *2-4* mm	---
Unit Weight, pcf	*dry* 116-118 *tot* 127-130, agw *tot* 135-137, bgw	*dry* 114-120 *tot* 133-136	*tot 160-165*
Shear Strength (*Liquefied, psf*)	φ 32-33°	φ 32-33° (*150 psf*)	q_u ≈ 1,200-1,650 ksf m_i ≈ 7-10 M_R ≈ 500-600

agw = above groundwater
bgw = below groundwater
GSI = Geological Strength Index (Marinos and Hoek, 2000)
m_i = Hoek-Brown constant for intact rock
M_R = Elastic modulus ratio

PART 4: REFERENCES

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APPENDIX A

FIELD EXPLORATIONS

PREVIOUS GEOTECHNICAL EXPLORATIONS: We are not aware of any previous geotechnical explorations at the Kodiak Ferry Terminal site (see also Appendix C).

R&M FIELD EXPLORATIONS: R&M completed five geotechnical test holes (designated RM12-01 through RM12-05) at the Kodiak Ferry Terminal between 30 September and 5 October 2012. These test holes were drilled and sampled to depths ranging from about 25 to 59 feet (measured from the ground surface or seafloor). All of the drilling was performed under the direct supervision of R&M geotechnical engineers Brian Mullen (RM12-01 through RM12-03) and Robert Scher (RM12-04 and RM12-05). A map illustrating the location of the R&M borings is provided on page A-4; logs of each test hole, along with photographs of the rock cores, are provided on pages A-5 through A-20; and general information pertaining to the format, symbols and terminology contained on the logs is provided on pages A-21 and A-22.

R&M subcontracted Discovery Drilling, Inc., of Anchorage, to provide the drilling services; using a CME 75 drill rig and rotary-wash procedures (Figure A1).

FIGURE A1: CME 75 DRILL RIG (RM12-04, 4 OCTOBER 2012)

While drilling, discrete soil samples were collected at regular intervals using a 3.0-inch O.D. by 2.5-inch I.D. split-spoon, advanced ahead of the casing using a 340-pound CME automatic hammer. The number of hammer blows, *N*, required to advance the sampler each 6-inches of an

18 to 24-inch interval are provided on the test hole logs. Below the soil, the bedrock was continuously cored using conventional HQ-size tools (2.39-inch diameter core), following ASTM D 2113. All of the recovered soil samples and rock core was returned to R&M's laboratory in Anchorage for additional inspection and testing (see Appendix B).

TEST HOLE LOGS: R&M's field engineers maintained a field log for each test hole documenting: the drilling method, progress, and samples attempted and recovered; description of the recovered soil (following ASTM D 2488; and DOT&PF, 2003a) and rock (following DOT&PF 2003b); and interpretation of the geotechnical conditions between the recovered samples. The final logs incorporate additional modifications and/or interpretations based on further visual inspection of the recovered samples, and the factual results of the laboratory testing. It is critical to understand the following items when reviewing the final logs provided within this appendix:

- The logs include factual data (e.g. sampler penetration resistance rates and laboratory test results), as well as interpretative information (e.g. relative density descriptors, estimated classification, geotechnical conditions between sample depths, etc.).
- Soil *group names* and *symbols* were assigned following the *Unified Soil Classification System* (ASTM D 2487; see Appendix B), when fully based on laboratory testing. Group symbols annotated with an asterisk (e.g. SM*) indicate that the grain-size distribution was measured, but the plasticity of the fine-grained particles was estimated using visual-manual procedures (ASTM D 2488).
- Abbreviated group symbols are used in the report text and tables using lower case letters 'g' for gravel, 's' for sand, 'c' for cobbles, 'b' for boulders, and 'o' for organic matter, for example: (SM)gc = silty sand with gravel and cobbles.
- Terminology and codes used to describe the rock are defined in Table A1.

TABLE A1: ROCK CORE LOG NOMENCLATURE AND CODES

Recovery is the total length of core extracted from the core barrel, including rock fragments, expressed as a percentage of the core interval (run). Recovery is an indicator of rock soundness; although, there are other factors which may affect/reduce recovery, such as circulation loss, existing rock fractures, core barrel blockages, bit type and condition, down pressure, operator experience, and erosion by the circulating drilling fluid.

RQD (*Rock Quality Designation*) is the sum of the lengths of all pieces of intact core ≥ four inches long (neglecting breaks caused by the drilling process or handling), divided by the total core interval.

Foliation – Core Angle is the angle between the strike of the foliation (or bedding) and the long-axis of the core: an angle of 90º would indicate that the rock was cored perpendicular to the strike of the foliation; while an angle of 0º would indicate that the rock was cored parallel to the strike of the foliation.

Fracture spacing:

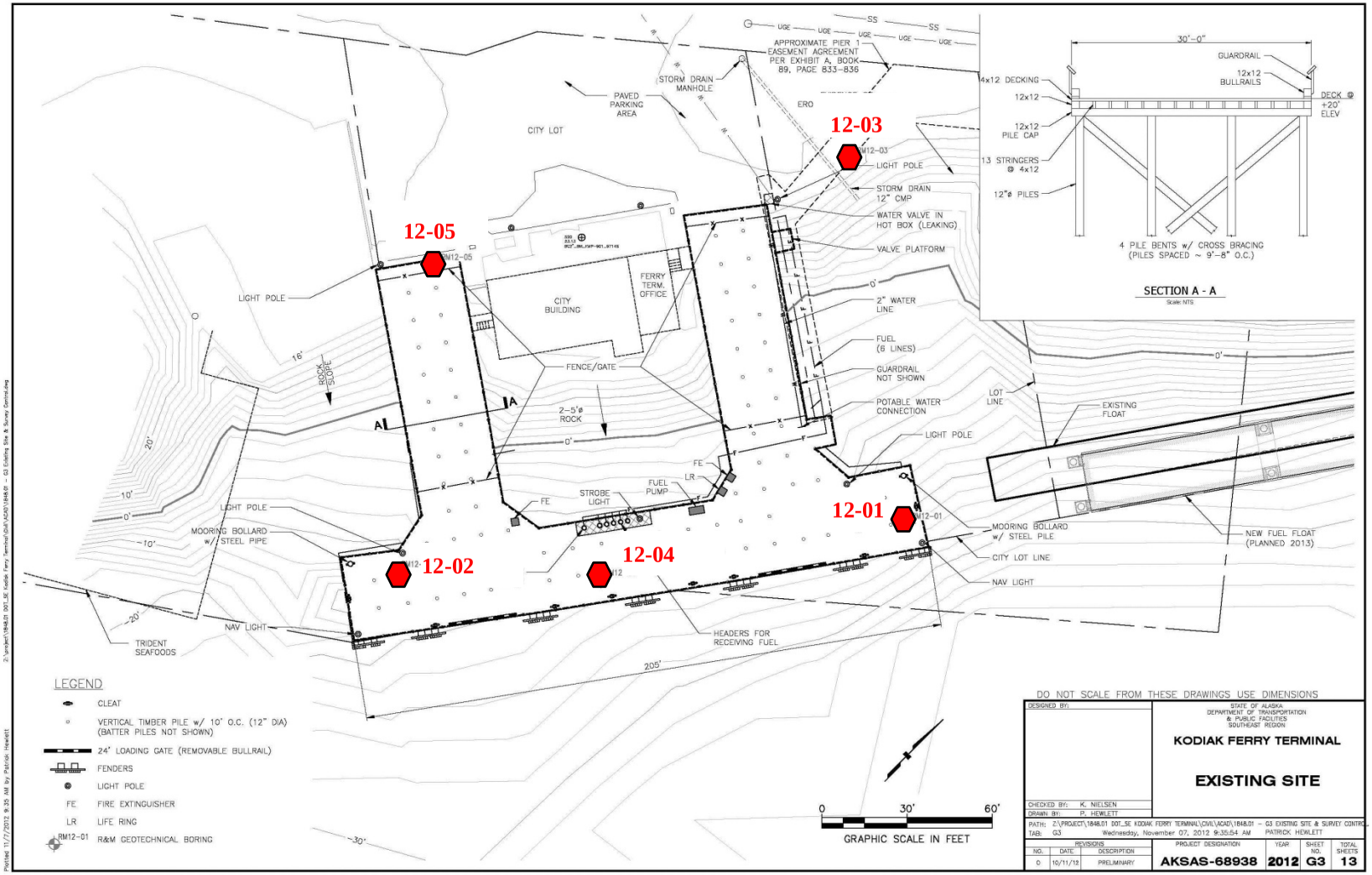
F1	*Wide* - fracture spacing greater than three feet
F2	*Moderately Close* - fracture spacing eight inches to three feet
F3	*Close* - fracture spacing four inches to eight inches
F4	*Very Close* - fracture spacing two inches to four inches
F5	*Extremely Close* - fracture spacing less than two inches

Weathering:

F	*Fresh* - no visible sign of weathering.
FW	*Faintly Weathered* - weathering limited to the surface of major discontinuities.
SW	*Slightly Weathered* - penetrative weathering developed on open discontinuity surfaces but only slight weathering of rock material.
MW	*Moderately Weathered* - weathering extends throughout the rock mass but the rock material is not friable.
HW	*Highly Weathered* - rock is wholly decomposed and in a friable condition, but the rock texture and structure are preserved.
RS	*Residual Soil* - a soil material with the original texture, structure and mineralogy of the rock completely destroyed (includes fault gouge).

Hardness:

VH	*Very Hard* - cannot be scratched with knife or sharp pick; breaking of hand specimens requires several hard blows of geologist's pick.
H	*Hard* - can be scratched with knife or pick only with difficulty; hard blow of hammer required to detach hand specimen.
MH	*Moderately Hard* - can be scratched with knife or pick; gouges or grooves to ¼-inch deep can be excavated by hard blow of point of a geologist's pick; hand specimens can be detached by moderate blow.
M	*Medium* - can be grooved or gouged to 1/16-inch deep by firm pressure on knife or pick point; can be excavated in small chips to pieces about one inch maximum size by hard blows of the point of a geologist's pick.
S	*Soft* - can be gouged or grooved readily with knife or pick point; can be excavated in chips to pieces several inches in size by moderate blows of a pick point; small thin pieces can be broken with finger pressure.
VS	*Very Soft* - can be carved with knife; can be excavated readily with point of pick; pieces one inch or more in thickness can be broken with finger pressure; can be scratched readily by fingernail.

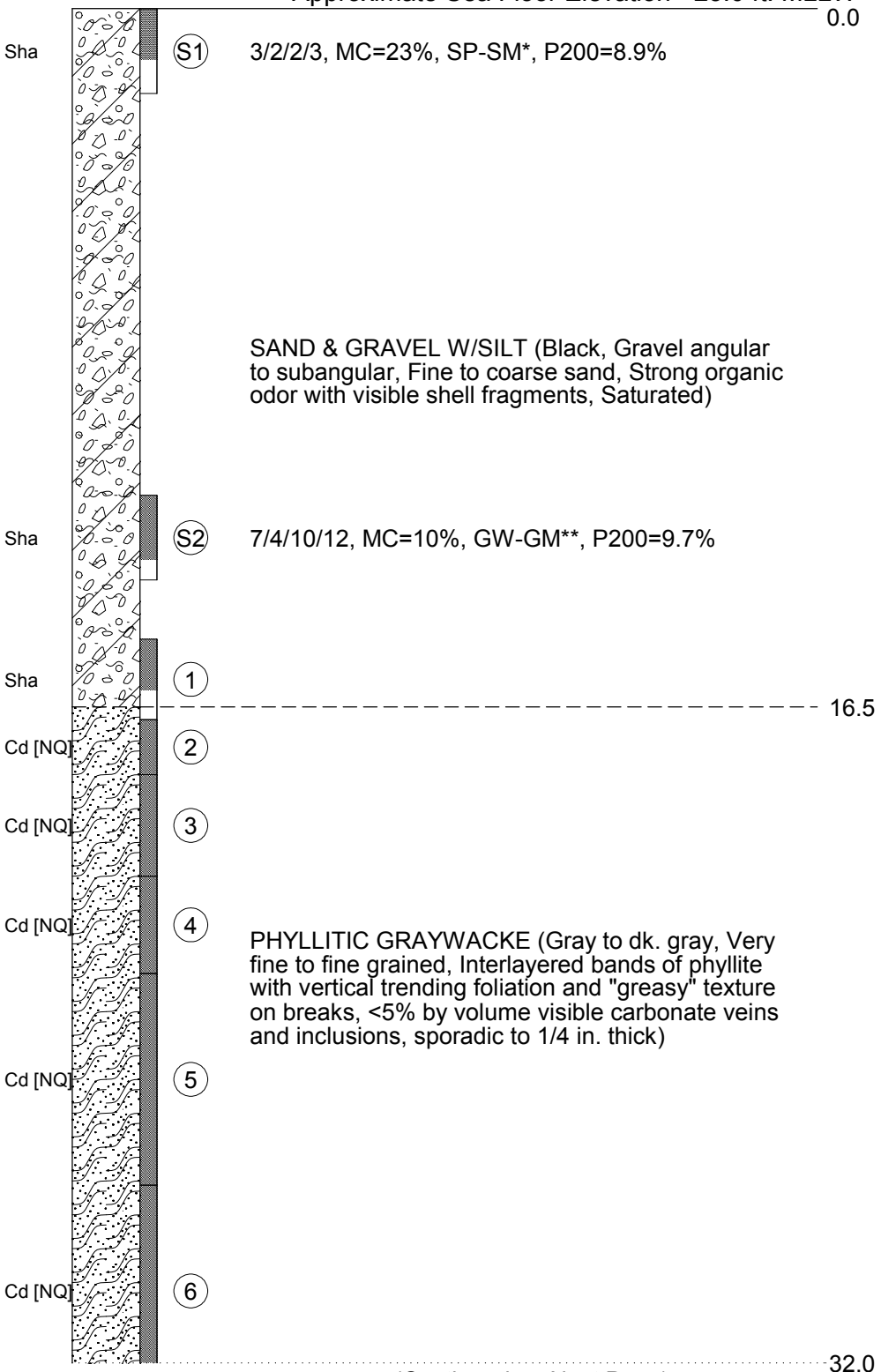


R&M TEST HOLE LOCATION MAP

RM12-01

LAT. 57.78719
LON. 152.40221
9/30/12 - 10/1/12

Approximate Sea Floor Elevation - 23.0 ft. MLLW



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Z:\PROJECT\1848.01 DOT_SE KODIAK FERRY TERMINAL\EARTH\GEOTECH\GINT\KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ

MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-01

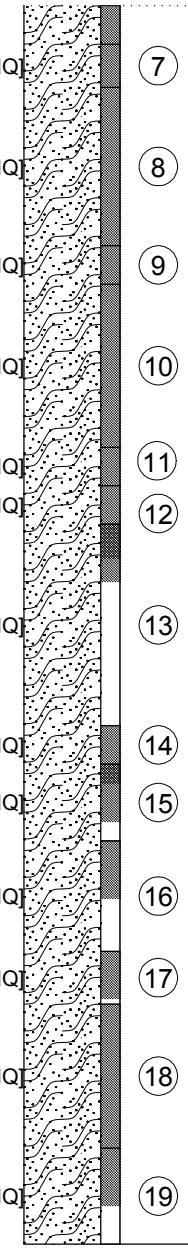
FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-5

RM12-01 (CONTINUED)

9/30/12 - 10/1/12

(Continued From Previous Page)

32.0



Cd [NQ]	7	PHYLLITIC GRAYWACKE
Cd [NQ]	8	
Cd [NQ]	9	5 to 10% by volume visible carbonate veins and inclusions to 1/2 in. below 37 ft.
Cd [NQ]	10	Shear gouge from 40 to 41 ft., Soft, intensely broken rock Zones of soft, broken rock 41 to 43 ft.
Cd [NQ]	11	
Cd [NQ]	12	
Cd [NQ]	13	Zones of soft, broken rock 46 to 47.5 ft.
Cd [NQ]	14	
Cd [NQ]	15	>50% by volume visible carbonate inclusions from 47.8 to 49.4, Slight chlorite content, Containing bands of phyllite and graywacke
Cd [NQ]	16	5 to 10% by volume visible carbonate veins and inclusions to 1/4 in. below 49.5 ft. Shear gouge from 51.3 to 51.7 ft., Soft, intensely broken rock
Cd [NQ]	17	Zones of soft, broken rock 55 to 57.8 ft.
Cd [NQ]	18	
Cd [NQ]	19	

57.8

DEPTH	ELEVATION
32	-56
34	-58
36	-60
38	-62
40	-64
42	-66
44	-68
46	-70
48	-72
50	-74
52	-76
54	-78
56	-80

Coordinates are presented in WGS84 and were obtained with a Garmin 60CSx GPS unit

*Estimated classification based in part on ASTM D 2488

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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

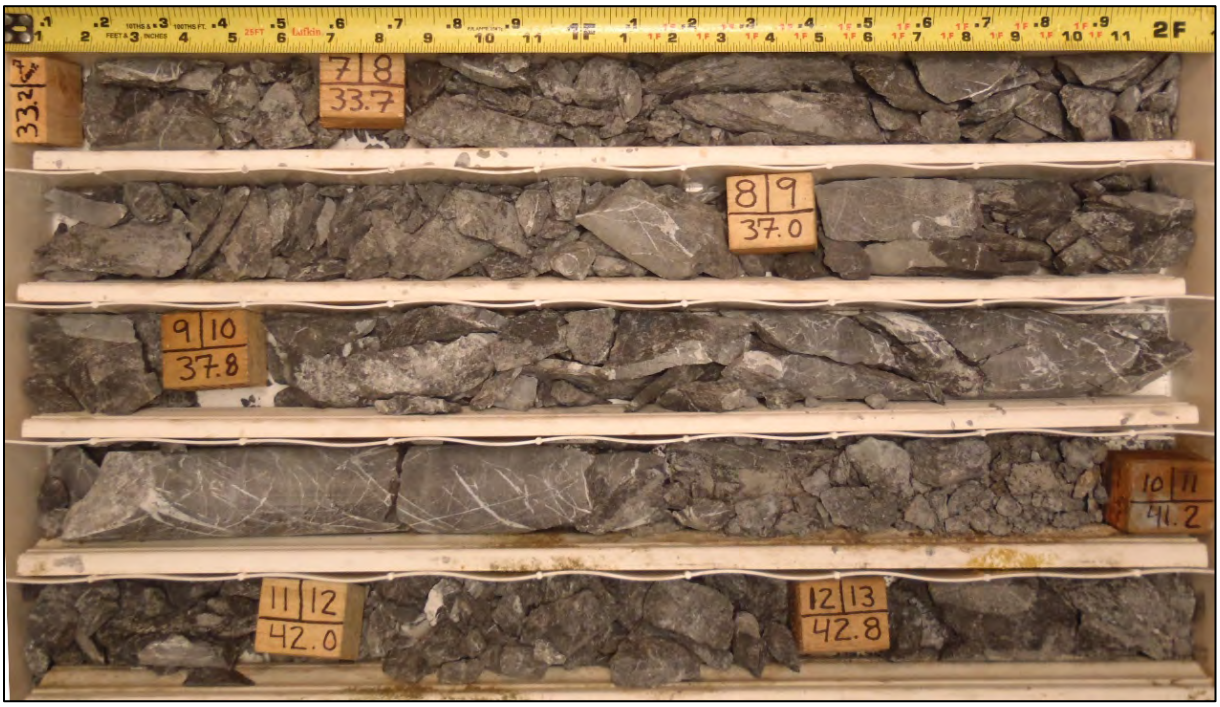
DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-01

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-6

ROCK CORE – RM12-01

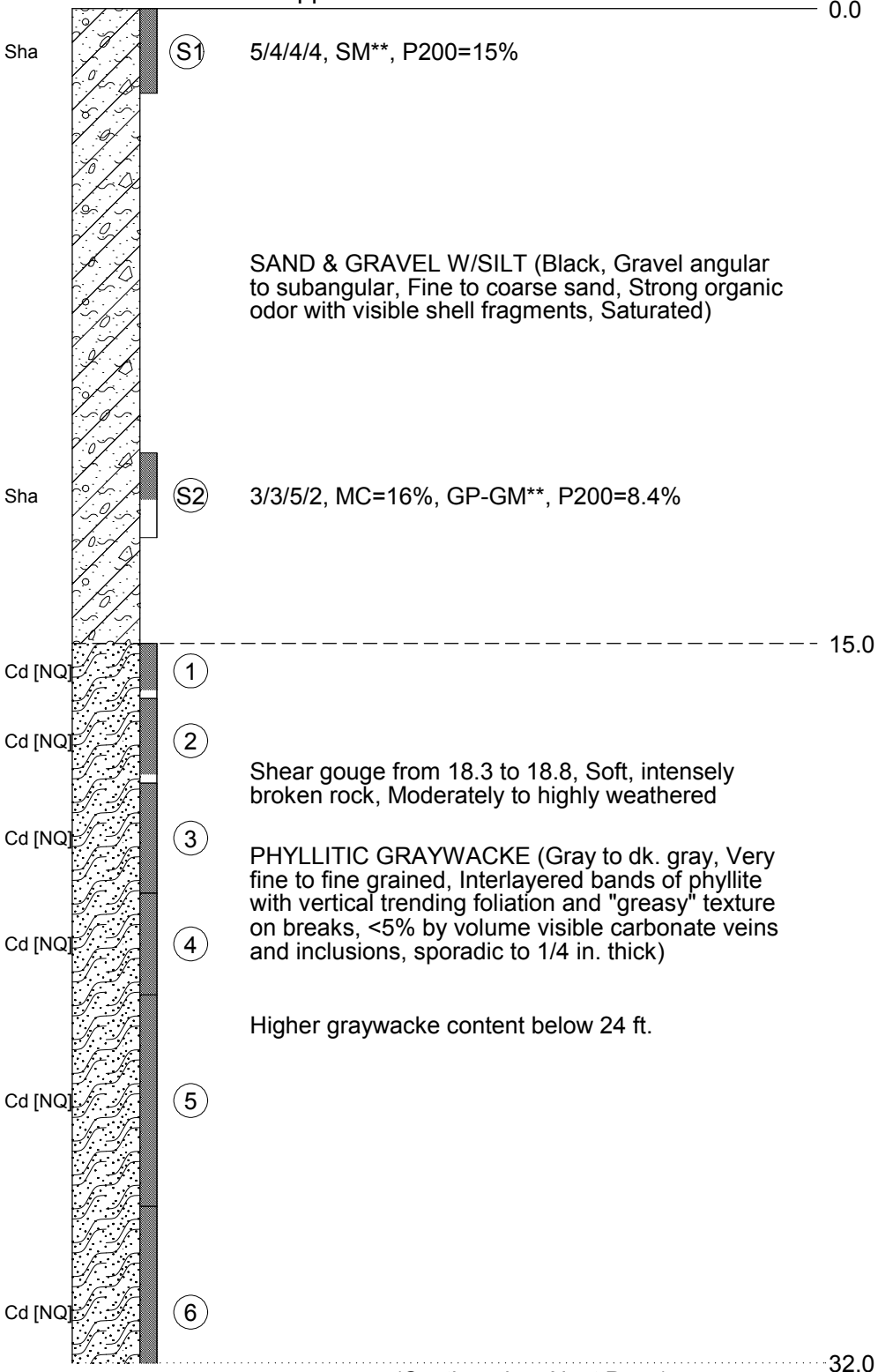


ROCK CORE – RM12-01 (CONTINUED)

RM12-02

LAT. 57.78681
LON. 152.40282
10/1/12 - 10/2/12

Approximate Sea Floor Elevation - 19.0 ft. MLLW



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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

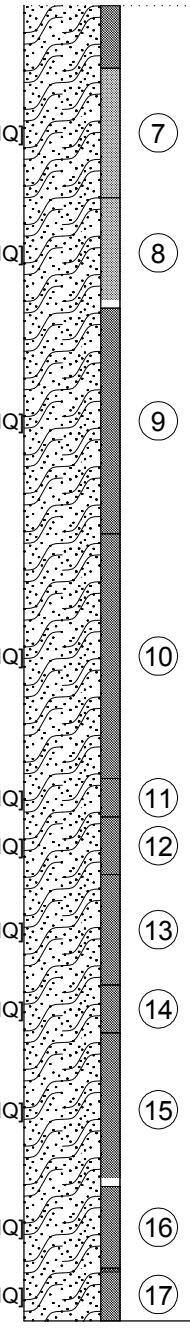
KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-02

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-9

RM12-02 (CONTINUED)

10/1/12 - 10/2/12

(Continued From Previous Page) 32.0



Cd [NQ]	7	Increasing phyllite content below 35 ft. Zones of soft, broken rock 35.5 to 38.5 ft.
Cd [NQ]	8	
		Higher graywacke content below 39 ft.
Cd [NQ]	9	
		PHYLLITIC GRAYWACKE
		1/2 in. carbonate vein group at 45 ft.
Cd [NQ]	10	
		1 in. carbonate inclusion at 46.5 ft.
Cd [NQ]	11	
		Increasing phyllite content below 49 ft.
Cd [NQ]	12	Prevelent dk. gray phyllite bands to 3 in. between 49 and 50 ft., Foliation trending ~60° from horizontal
Cd [NQ]	13	Higher graywacke content below 50 ft.
Cd [NQ]	14	
		Increasing phyllite prevelent below 55 ft.
Cd [NQ]	15	Zones of soft, intensely broken rock between 55 to 59.4 ft. 5 to 10% by volume visible carbonate veins and inclusions to 1/4 in. below 56.6 ft.
Cd [NQ]	16	
Cd [NQ]	17	

59.4

DEPTH	ELEVATION
32	-52
34	-54
36	-56
38	-58
40	-60
42	-62
44	-64
46	-66
48	-68
50	-70
52	-72
54	-74
56	-76
58	-78

Coordinates are presented in WGS84 and were obtained with a Garmin 60CSx GPS unit

*Estimated classification based in part on ASTM D 2488

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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

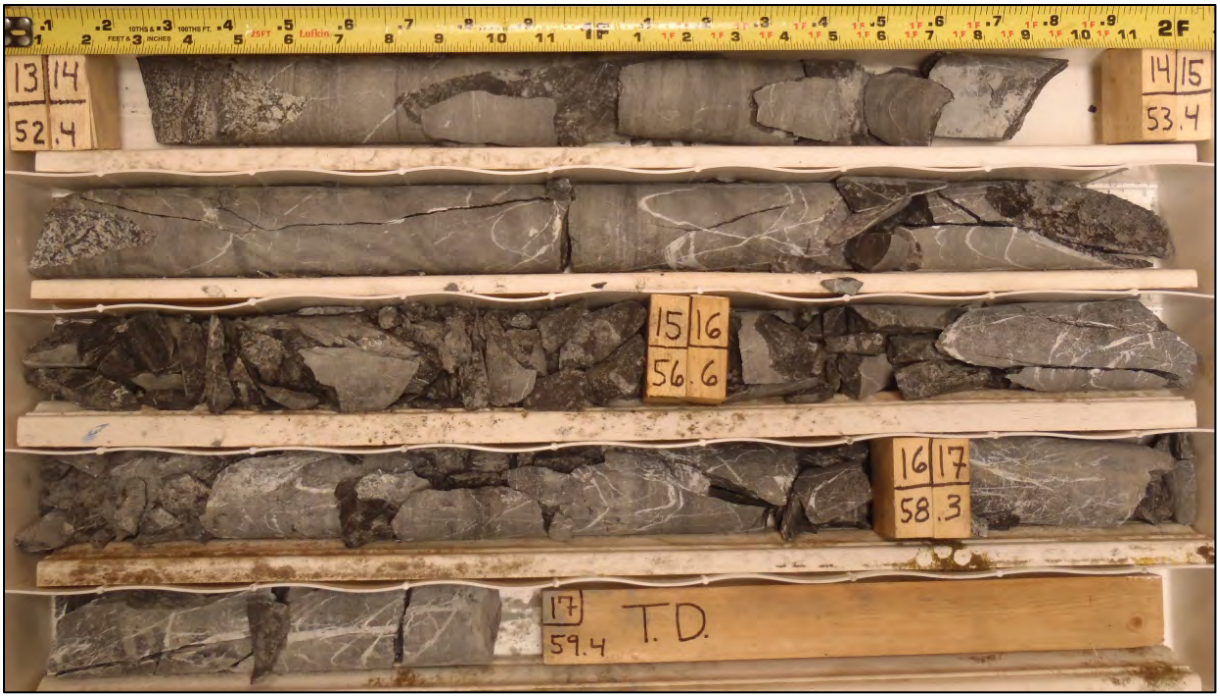
PREPARED BY: R&M CONSULTANTS, INC.

KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-02

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-10

ROCK CORE – RM12-02

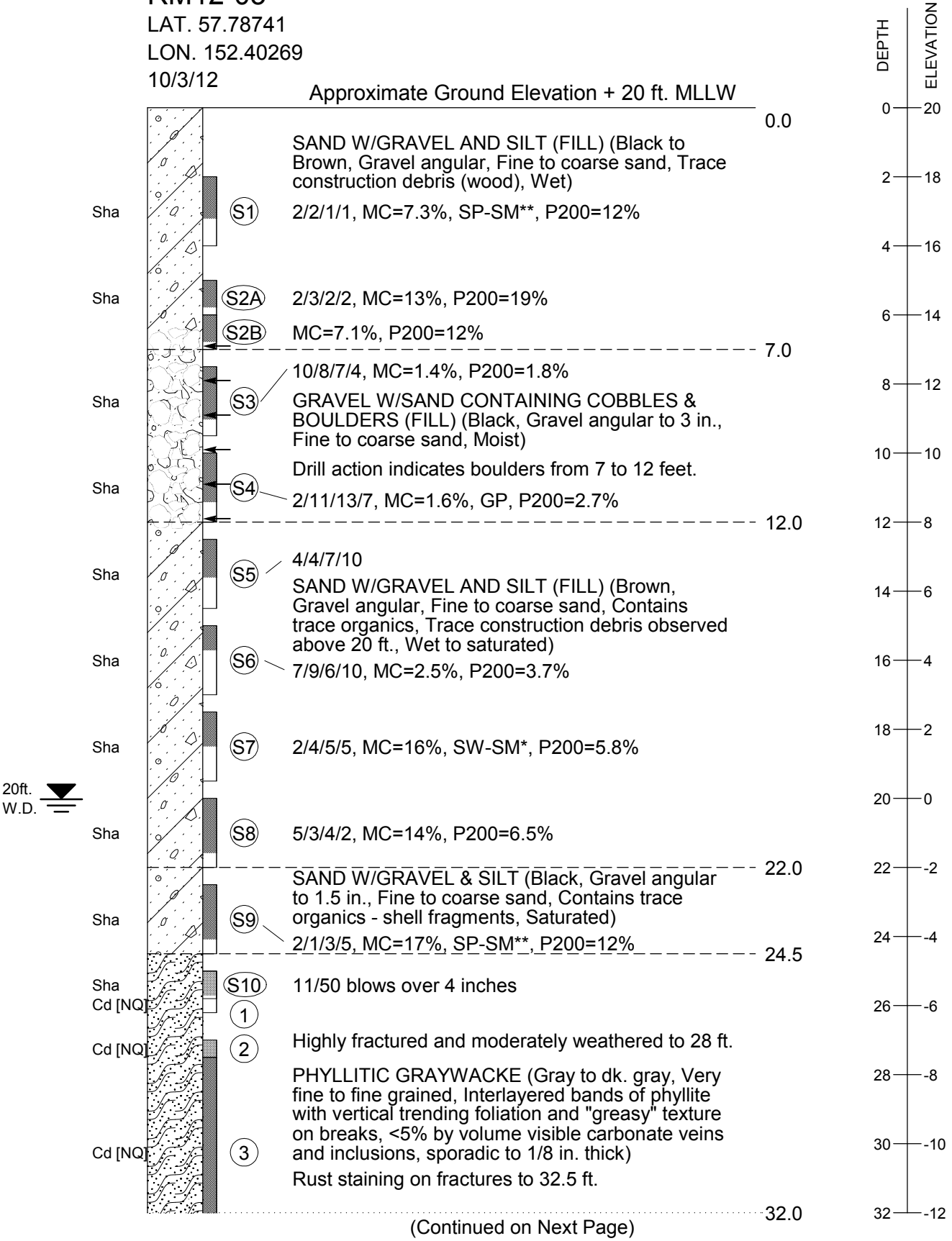
ROCK CORE – RM12-02 (CONTINUED)



ROCK CORE – RM12-02 (CONTINUED)

RM12-03

LAT. 57.78741
LON. 152.40269
10/3/12



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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

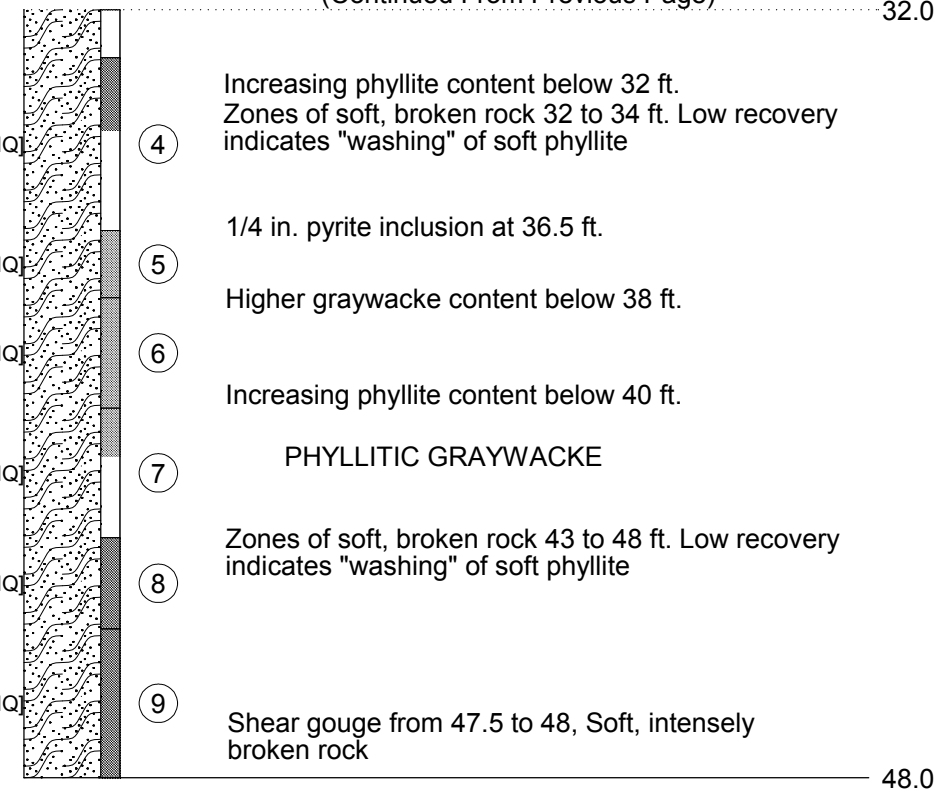
KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-03

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-14

RM12-03 (CONTINUED)

10/3/12

(Continued From Previous Page)



32.0

Cd [NQ] 4 — Increasing phyllite content below 32 ft. Zones of soft, broken rock 32 to 34 ft. Low recovery indicates "washing" of soft phyllite

Cd [NQ] 5 — 1/4 in. pyrite inclusion at 36.5 ft.

Cd [NQ] 6 — Higher graywacke content below 38 ft.

Increasing phyllite content below 40 ft.

PHYLLITIC GRAYWACKE

Cd [NQ] 7

Zones of soft, broken rock 43 to 48 ft. Low recovery indicates "washing" of soft phyllite

Cd [NQ] 8

Cd [NQ] 9 — Shear gouge from 47.5 to 48, Soft, intensely broken rock

48.0

Coordinates are presented in WGS84 and were obtained with a Garmin 60CSx GPS unit

*Estimated classification based in part on ASTM D 2488

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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

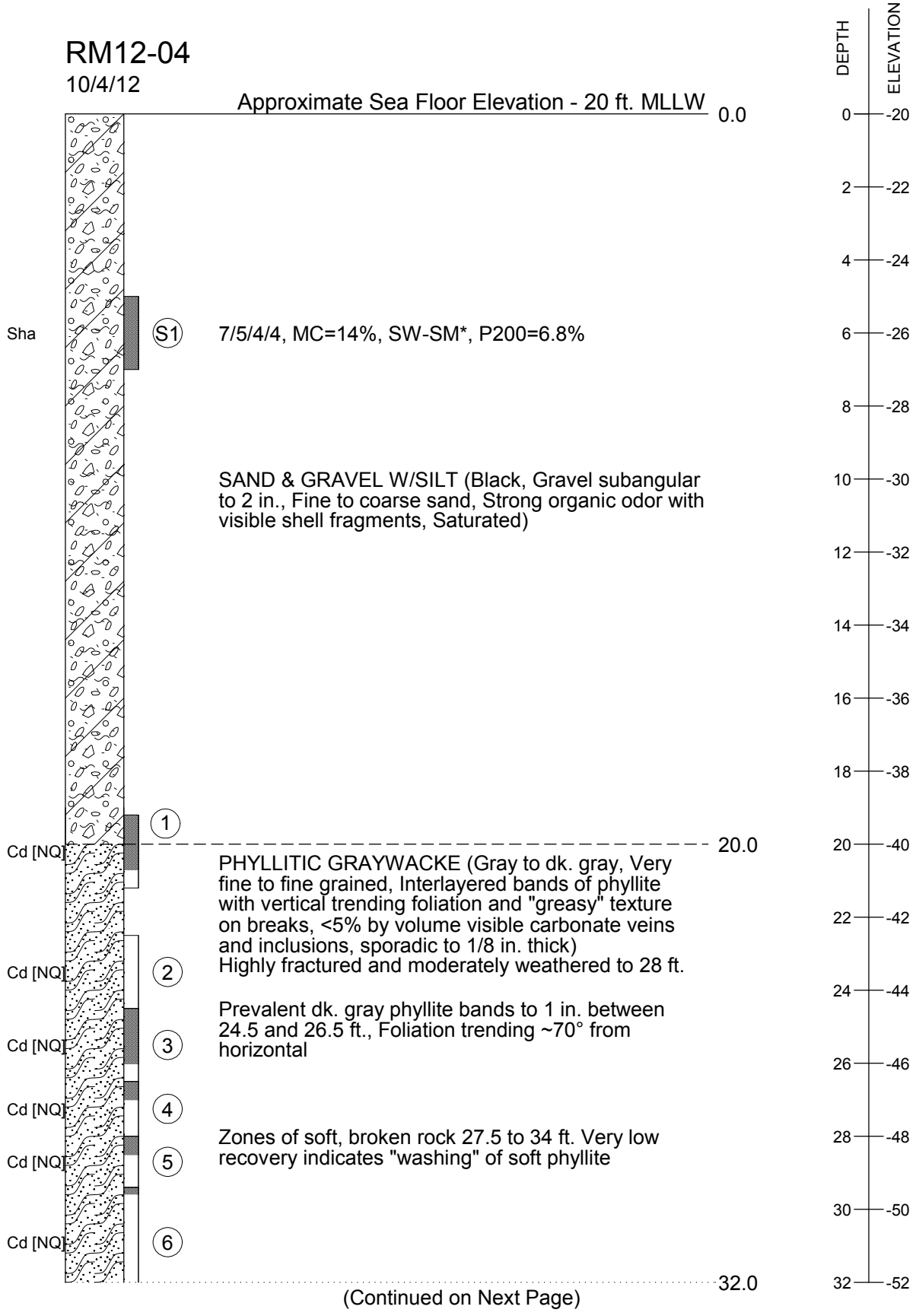
KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-03

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-15

ROCK CORE – RM12-03

RM12-04

10/4/12



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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-04

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-17

RM12-04 (CONTINUED)

10/4/12

DEPTH / ELEVATION

(Continued From Previous Page) 32.0 — 32 — -52

Cd [NQ] 7 PHYLLITIC GRAYWACKE 33.0

*Estimated classification based in part on ASTM D 2488

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

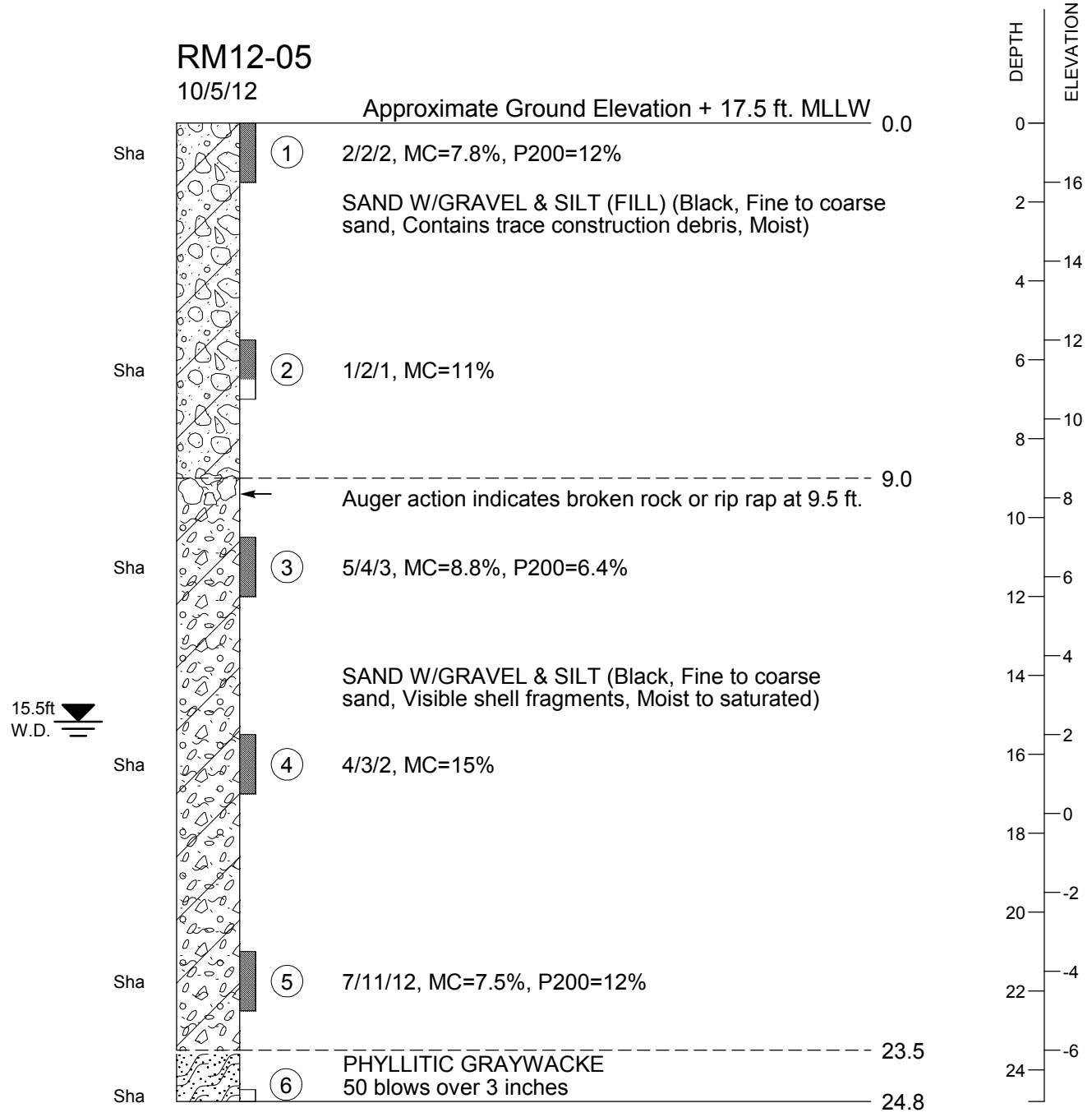
KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-04

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-18

ROCK CORE – RM12-04

RM12-05

10/5/12



Auger refusal on bedrock at 24.8 ft.

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MASTER ONE COL/PAGE KODIAK FERRY TERMINAL GEOTECH LOGS - ALS EDIT.GPJ MASTER2.GDT 4/19/13

DWN:	B.M.M.
CKD:	R.L.S.
DATE:	DEC. 12
SCALE:	1"=4'

PREPARED BY: R&M CONSULTANTS, INC.

KODIAK FERRY TERMINAL
KODIAK, ALASKA
LOG OF TEST BORING
RM12-05

FB:	NA
GRID:	KODIAK
PROJ.NO:	1848.01
DWG.NO:	A-20

STANDARD SYMBOLS

SYMBOL	NAME	PARTICLE SIZE	SYMBOL	NAME
	CLAY	< 0.002mm, Plastic		ORGANICS
	SILT	0.002mm, - #200		ICE
	SAND	#200, - #4		ICE W/SOIL INCLUSIONS
	GRAVEL	#4, - 3"		ICE LENSE IN SILT
	COBBLES & BOULDERS	3" - 12" & > 12"		ICE CRYSTALS IN CLAY

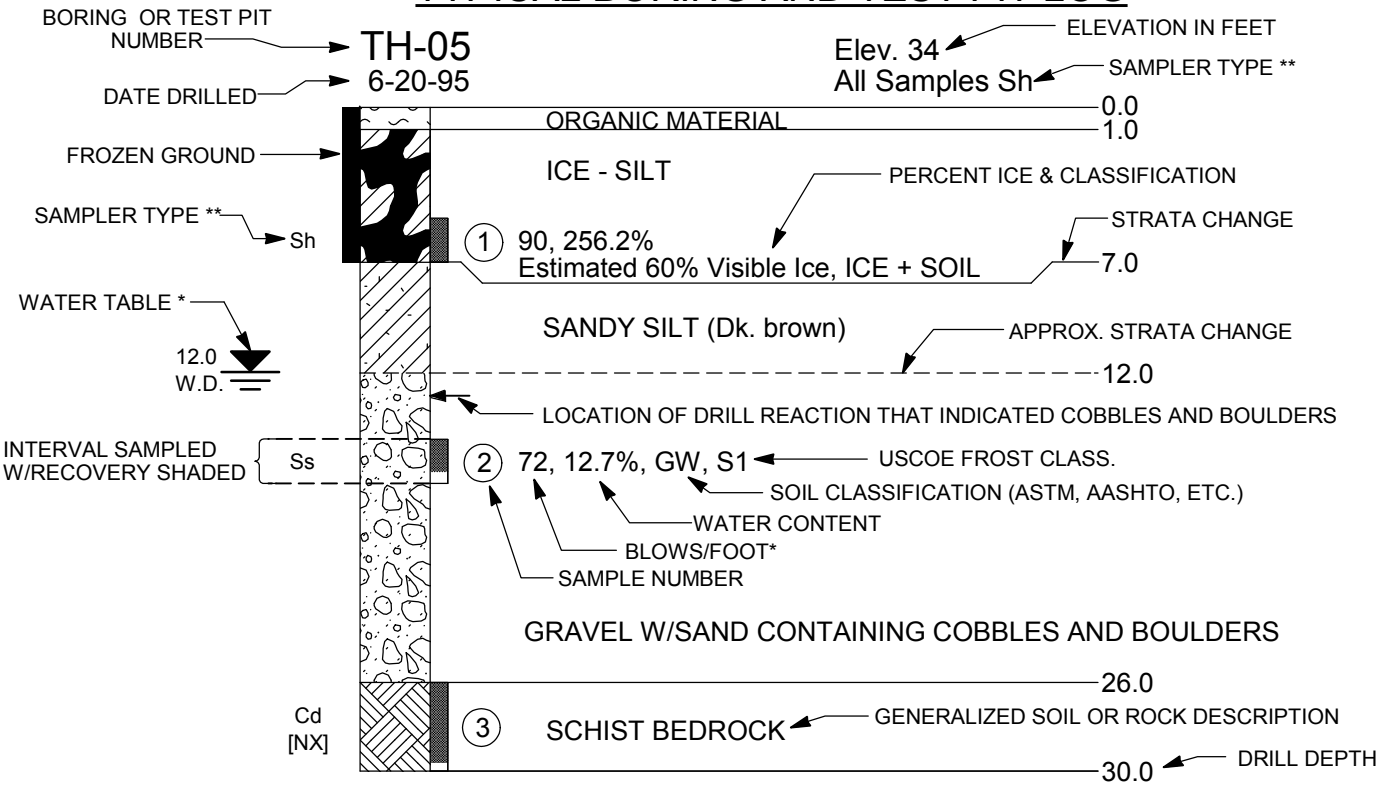
(The symbols shown above are frequently used in combinations, e. g. GRAVEL W/SILT AND SAND)

SAMPLER TYPE SYMBOLS

A	Auger Sample	Sh	2.5 In. Split Spoon w/340 lb. Manual Hammer	Sp	2.5 In. Split Spoon Pushed
C	Cuttings Sample	Sha	2.5 In. Split Spoon w/340 lb. Auto Hammer	Sz	1.4 In. Split Spoon w/340 lb. Hammer
Cd	Double Tube Core Barrel	Sl	2.5 In. Split Spoon w/140 lb. Hammer	Ts	Shelby Tube
Ct	Triple Tube Core Barrel	Ss	1.4 In. Split Spoon w/140 lb. Manual Hammer	Tm	Modified Shelby Tube
Cs	Auger Core Barrel	Ssa	1.4 In. Split Spoon w/140 lb. Auto Hammer	[x]	Sampler I. D. (Added to Symbol)
G	Grab Sample				

NOTE: Sampler types are either noted above the boring log or adjacent to it at the respective depth. An individual log may not utilize all of the items listed.

TYPICAL BORING AND TEST PIT LOG



* W.D. - WHILE DRILLING, A.B. - AFTER BORING, Ref. - SAMPLER REFUSAL
** - REFER TO SAMPLER SYMBOL (Ss, Sh, ETC.) FOR SAMPLER I.D. & HAMMER WEIGHT/TYPE
NOTE: Water levels shown on the boring logs are the levels measured in the boring at the times indicated.

DWN:	P.K.H.
CKD:	C.H.R.
DATE:	GENERAL
SCALE:	NONE

PREPARED BY: R&M CONSULTANTS, INC.

EXPLANATION OF SELECTED SYMBOLS

FB:	N/A
GRID:	N/A
PROJ.NO:	GENERAL
DWG.NO:	A-21

Z:_EARTH SCIENCES\GINT FORMS\B01&B02 B.GDW (DRAWING W - B-02 DOT ASTM (ENG)) 6/20/13 09:01 AM

SOILS
CONSISTENCY AND SYMBOLS

SOIL DENSITY/CONSISTENCY - CRITERIA: Soil density/consistency as defined below and determined by normal field methods applies only to non-frozen material. For these materials, the influence of such factors as soil structure, i.e. fissure systems shrinkage cracks, slickensides, etc., must be taken into consideration in making any correlation with the consistency values listed below. In permafrost zones, the consistency and strength of frozen soil may vary significantly and inexplicably with ice content, thermal regime and soil type.

NON-COHESIVE SOILS

Consistency	N * (blows/foot)
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

COHESIVE SOILS

Consistency	N * (blows/foot)
Very Soft	< 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

* Standard Penetration "N": Blows per 1 foot of a 140-pound manual hammer (lifted with rope & cathead) falling 30 inches on a 2" O.D. split-spoon sampler except where noted.

From State of Alaska Department of Transportation and Public Facilities "Alaska Geotechnical Exploration Procedures Manual" dated October 1, 2003.

KEY TO TEST RESULTS

DD - Dry Density
LL - Liquid Limit
MC - Moisture Content
Org - Organic Content
PI - Plastic Index
PL - Plastic Limit
PP - Pocket Penetrometer
P200 - % Passing No.200 Screen
P.02 - % Passing 0.02 mm
SG - Specific Gravity
TV - Torvane

DWN:	P.K.H.
CKD:	C.H.R.
DATE:	GENERAL
SCALE:	NONE

PREPARED BY: R&M CONSULTANTS, INC.

GENERAL NOTES

FB:	N/A
GRID:	N/A
PROJ.NO:	GENERAL
DWG.NO:	A-22

APPENDIX B

LABORATORY TESTING

SOIL TESTING: All of the soil samples returned to R&M's laboratory in Anchorage were visually inspected, and most then tested to measure the index properties (Table B1) we considered necessary to (i) classify the soils, and (ii) estimate the geotechnical properties (e.g. relative density, shear strength, compressibility, etc.) important for geotechnical engineering. The results of the laboratory tests, discussed in Part 3 of the report, are summarized in Table B2, and also included on the boring logs in Appendix A.

TABLE B1: LABORATORY TEST METHODS

TEST	ASTM DESIGNATION
Particle Size Analysis Water (Moisture) Content	D 422 and D 1140 D 2216

For this project:

- The soils were classified following the *Unified Soils Classification System* (page B-5; ASTM D 2487).
- *Soil group symbols* annotated with an asterisk (e.g. SM* or ML*) indicate that the plasticity was estimated based on visual inspection (e.g. ASTM D 2488), versus Atterberg limits.

ROCK STRENGTH TESTING: R&M performed a series of point load tests on rock samples selected from each core run for the purpose of qualifying the strength of the rock. The tests were performed following ASTM D 5731 (Determination of the Point Load Strength Index of Rock), using an ELE Model EL77-0110 test apparatus (Figure B1). The results of the point load testing are summarized in Table B3.

FIGURE B1: POINT LOAD TEST APPARATUS

NOTE: The point load test is not a direct measure of compressive strength. Instead, the measured failure load, equivalent diameter of the specimen, and a size factor (for specimens not the standard 50 mm in diameter) are used to determine the 'point load strength index' of the rock, $I_{s(50)}$. Direct measurements of unconfined compressive strength of rock have been found to correlate reasonably with the product of $I_{s(50)}$ and a factor (C), which is dependent upon the type and hardness of the rock (e.g. ranging from <10 for very soft, weak rock, to >30 for very hard, strong rock). ASTM D 5731 recommends using C = 23 for "hard" rock, when an "exact site-specific" correlation factor is not available. However, we used C = 18 for the Kodiak Ferry Terminal project, based on our interpretation of the rock hardness at the site (i.e. typically medium to medium hard), and values of C published for similar rock types.

TABLE B2: SUMMARY OF LABORATORY SOILS TEST RESULTS
KODIAK FERRY TERMINAL DOCK IMPROVEMENTS

SAMPLE IDENTIFICATION			PARTICLE SIZE ANALYSIS (% Finer) STANDARD SIEVE SIZE												MOISTURE CONTENT, %	ASTM CLASS.
TEST HOLE	NO.	DEPTH (ft)	2"	1 1/2"	1"	3/4"	1/2"	3/8"	#4	#10	#20	#40	#60	#140	#200	
RM12-01	1	0 - 2		100	98	95	89	80	64	37	25	21	17	10	8.9	23	SP-SM*
	2	11.5 - 13.5	100	85	82	81	74	71	54	37	29	20	16	11	9.7	10	GW-GM*
RM12-02	1	0 - 2			100	97	92	86	70	48	37	30	25	17	15		SM*
	2	11.5 - 13.5		100	97	94	86	77	54	31	21	17	14	10	8.4	16	GP-GM*
RM12-03	1	2 - 4			100	99	91	83	65	44	31	25	20	14	12	7.3	SP-SM*
	2A	5 - 6													19	13	
	2B	6 - 7													12	7.1	
	3	7.5 - 9.5													1.8	1.4	
	4	10 - 12	100	77	49	43	33	29	19	11	8	6	5	3	2.7	1.6	GP
	6	15 - 17													3.7	2.5	
	7	17.5 - 19.5		100	97	95	87	81	66	42	25	19	14	7	5.8	16	SW-SM*
	8	20 - 22													6.5	14	
	9	22.5 - 24.5			100	98	90	84	71	52	36	26	21	15	12	17	SP-SM*
RM12-04	1	5 - 7			100	99	91	85	63	40	23	16	12	8	6.8	14	SW-SM*
RM12-05	1	0.5 - 2													12	7.8	
	2	5.5 - 7														11	
	3	10.5 - 12		100	95	92	83	78	66						6.4	8.8	
	4	15.5 - 17														15	
	5	20.5 - 22							61						12	7.5	

* Soil plasticity was estimated following ASTM D 2488 when the Atterberg limits were not tested.

NOTE - Maximum particle size limited by sampling tool was 2.5"

TABLE B3: SUMMARY OF POINT LOAD TESTING (ASTM D 5731)
INTACT ROCK LOADED NEAR PERPENDICULAR TO SLATY CLEAVAGE
KODIAK FERRY TERMINAL & DOCK IMPROVEMENTS

Assumed Compressive Strength / $I_{s(50)}$ Ratio = *18*

Bore Hole	Approx Depth BSF, ft	Approx Depth in Rock, ft	Shape	Length, 2L (mm)	Diameter (mm)	L/D	Failure, P (lb)	I_s (ksf)	Size Correction Factor, F	$I_{s(50)}$ (ksf)	w/o 3 High & 3 Low	Est Compressive Strength, ksf
RM12-01	25.5	9.0	Diametral	*140*	47.5	1.47	2600	107	0.98	105	105	1,883
	39.8	23.3	Diametral	*70*	47.5	0.74	2600	107	0.98	105	105	1,883
RM12-02	24.0	9.0	Diametral	*51*	47.5	0.53	850	35	0.98	34		
	25.6	10.6	Diametral	*127*	47.5	1.34	2900	119	0.98	117	117	2,100
	28.8	13.8	Diametral	*171*	47.5	1.80	3000	124	0.98	121	121	2,173
	29.6	14.6	Diametral	*178*	47.5	1.87	2500	103	0.98	101	101	1,811
	30.5	15.5	Diametral	*89*	47.5	0.94	3200	132	0.98	129	129	2,318
	31.8	16.8	Diametral	*74*	47.5	0.78	2200	91	0.98	89	89	1,593
	32.4	17.4	Diametral	*114*	47.5	1.20	4400	181	0.98	177		
	34.6	19.6	Diametral	*64*	47.5	0.67	3700	152	0.98	149		
	39.2	24.2	Diametral	*234*	47.5	2.46	3000	124	0.98	121	121	2,173
	40.1	25.1	Diametral	*102*	47.5	1.07	2300	95	0.98	93	93	1,666
	40.9	25.9	Diametral	*114*	47.5	1.20	2200	91	0.98	89	89	1,593
	41.6	26.6	Diametral	*191*	47.5	2.01	1800	74	0.98	72	72	1,304
	43.9	28.9	Diametral	*102*	47.5	1.07	1400	58	0.98	56	56	1,014
	45.9	30.9	Diametral	*140*	47.5	1.47	3400	140	0.98	137		
	47.2	32.2	Diametral	*76*	47.5	0.80	610	25	0.98	25		
	48.7	33.7	Diametral	*51*	47.5	0.53	1000	41	0.98	40	40	724
RM12-03	37.9	13.4	Diametral	*48*	47.5	0.51	1700	70	0.98	68	68	1,231
	45.8	21.3	Diametral	*114*	47.5	1.20	160	7	0.98	6		
	46.6	22.1	Diametral	*147*	47.5	1.55	1700	70	0.98	68	68	1,231
STATISTICS												
	Count			21	21	21		21		21	15	15
	Min			48.3	47.5	0.5		7		6	40	724
	Max			233.7	47.5	2.5		181		177	129	2,318
	Avg			114.1	47.5	1.2		93		90	91	1,646
	StDev (σ)			50.5	0.0	0.5		44		43	26	468

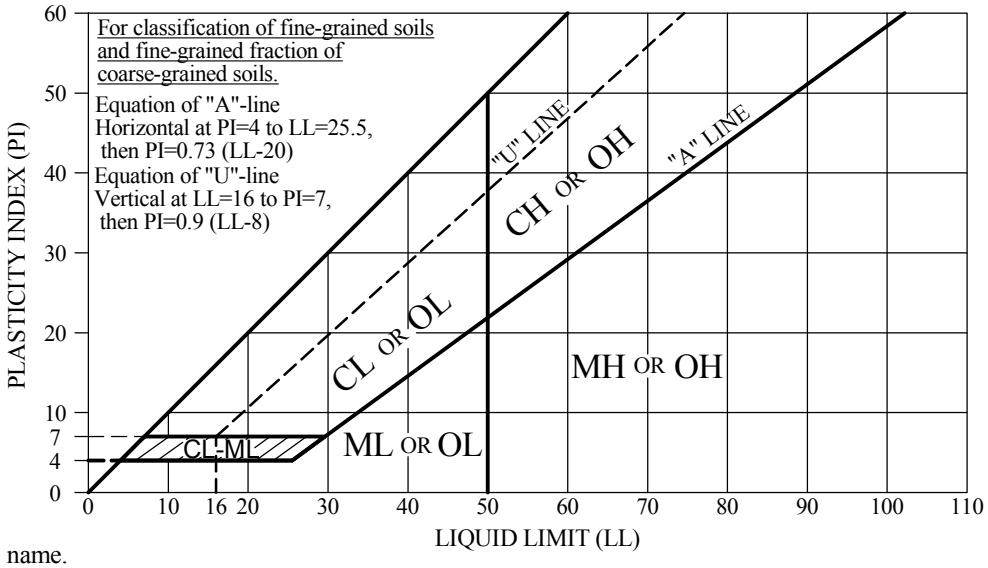
BSF = Below seafloor

L/D ratio less than one (i.e. specimen shorter than desired)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]

				Group Symbol	Group Name [B]
Coarse-grained Soils More than 50% retained on the No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	GP	Poorly-graded gravel [F]
		Gravels with Fines More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel [F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5 % fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	SP	Poorly-graded sand [I]
		Sands with Fines More than 12 % fines [D]	Fines classify as ML or MH	SM	Silty sand [G,H,I]
			Fines classify as CL or CH	SC	Clayey sand [G,H,I]
Fine-grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid Limit less than 50	inorganic	PI > 7 and plots on or above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 and plots below "A" line [J]	ML	Silt [K, L, M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OL	Organic Clay [K, L, M,N] / Organic Silt [K, L, M,O]
	Silts and Clays Liquid Limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		organic	$\frac{\text{Liquid limit - oven dried}}{\text{Liquid limit - not dried}} < 0.75$	OH	Organic Clay [K, L, M,P] / Organic Silt [K, L, M,Q]
Highly organic soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-in. (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravel with 5 to 12 % fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly-graded gravel with silt
GP-GC poorly-graded gravel with clay
[D] Sands with 5 to 12 % fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly-graded sand with silt
SP-SC poorly-graded sand with clay
[E] $Cu = D_{60} / D_{10}$ $\quad Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand " to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 and plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



DWN:	B.M.M.
CKD:	C.H.R.
DATE:	GENERAL
SCALE:	NONE

PREPARED BY: R&M CONSULTANTS, INC.

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES ASTM D 2487

FB:	N/A
GRID:	N/A
PROJ.NO:	GENERAL
DWG.NO:	B-5

APPENDIX C

CHANGES TO THE GEOTECHNICAL SITE CONDITIONS SINCE 1964

The following summarizes our interpretation of how the geotechnical conditions at the Kodiak Ferry Dock have changed since the 1964 Alaska Earthquake. These discussions are based on review of the 'as-built' plans for the existing dock (Pacific American Engineering Consultants, 1966), historic aerial photographs (1962 to present; available at Aero-Metric, Inc., in Anchorage), and R&M's geotechnical explorations (Appendices A & B).

PRE-1964: Prior to March 1964, the Kodiak Ferry Dock site was occupied by a timber wharf, seafood processing plant (Alaska Packers Association), and several commercial and warehouse buildings (Figure C1). We are not aware of any information pertaining to the geotechnical conditions (i.e. soils, bedrock, etc.), bathymetry, or depth of structural foundations (e.g. piling or footings) at that time.

1964: On 27 March 1964, southcoastal Alaska experienced the M_W9.2 Alaska Earthquake, which ruptured an area of the Aleutian Subduction zone, along the shallow inter-plate boundary, between Prince William Sound to south of Kodiak Island[3]. During this event, the ground around the City of Kodiak subsided about five to six feet. There were no seismographs in Kodiak during the earthquake, although ground motions in the City were reported to be "slight" (Modified Mercalli Intensity of VI to VII). Additionally, very little co-seismic ground failure was documented (e.g. local areas of differential settlement and spreading in unconsolidated soils); and we are not aware of any reported co-seismic ground failure at the subject Ferry Dock site. However, within minutes after the ground shaking stopped the City was struck by a series of seismic sea waves which completely destroyed most of the waterfront developments, including all of the Alaska Packers Association wharf and buildings then occupying the present Ferry Dock site (Figure C2), and inundated much of the City area (Kachadoorian and Plafker, 1967).

1965-1966: The existing Ferry Dock was originally constructed in 1965 (the design plans are dated 24 August 1964; the "as-built" plans are dated 7 October 1966). Figure C3 illustrates the area conditions in August 1966. Per the construction plans, the embankment under the dock approach/parking area was raised (roughly to its present elevation), and extended into the channel (roughly 50-70 feet) using "select common rock fill". While the constructions plans were not explicit, it appears:

- The embankment along the waterline was formed at roughly a 1.5-1.8(h):1(v) slope, covered with a minimum three feet of "heavy loose rip-rap".
- The thickness of fill ranged from about five to eight feet along the edge of Marine Way,

[3] The rupture zone is interpreted to underlie the City of Kodiak at a depth of roughly 18 miles.

to roughly 15 to plus-20 feet at the base of the approach piers.

We are not aware of any information documenting the index properties (e.g. grain size distribution) or earthwork requirements (i.e. compaction and lift thickness) at the time of construction.

POST 1966: At some time between 1966 and 1977, additional fill was placed in between the two approach piers, extending that area of the embankment roughly 40 to 50 feet into the channel, to its present limits. We are not aware of any information pertaining to the materials or methods used to construct that fill (*note that R&M did not complete any test holes in that area*). However, based on a recent topographic survey, the slope of the extended embankment is about 1.3-1.6(h):1(v).

Lastly, sometime in the mid-1980s the original terminal building (Figure C3) was removed, and the present building was constructed on the extended fill between the two approach piers (Figure C4). R&M was not provided any plans for that building (i.e. foundation and structural details). Further, we are not aware of the foundation soils being modified or otherwise improved (e.g. densified).

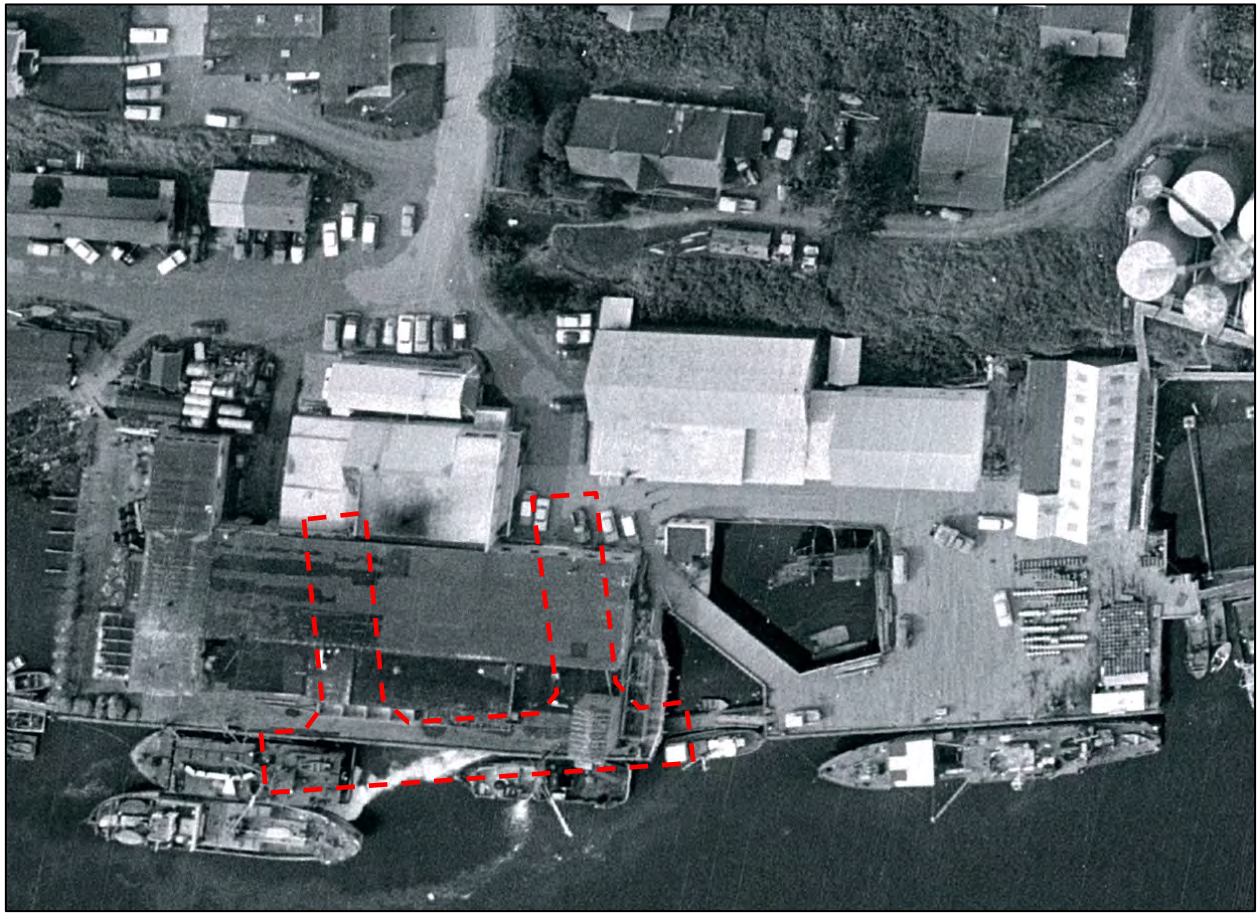


FIGURE C1: PRE-1964 FERRY DOCK SITE CONDITIONS (10 SEP 1962, AERO-METRIC, INC.)
(Wharf and buildings on it were completely destroyed and washed away by seismic sea waves generated during the 27 March 1964 Alaska Earthquake; red dashed line ≈ outline of existing ferry dock)

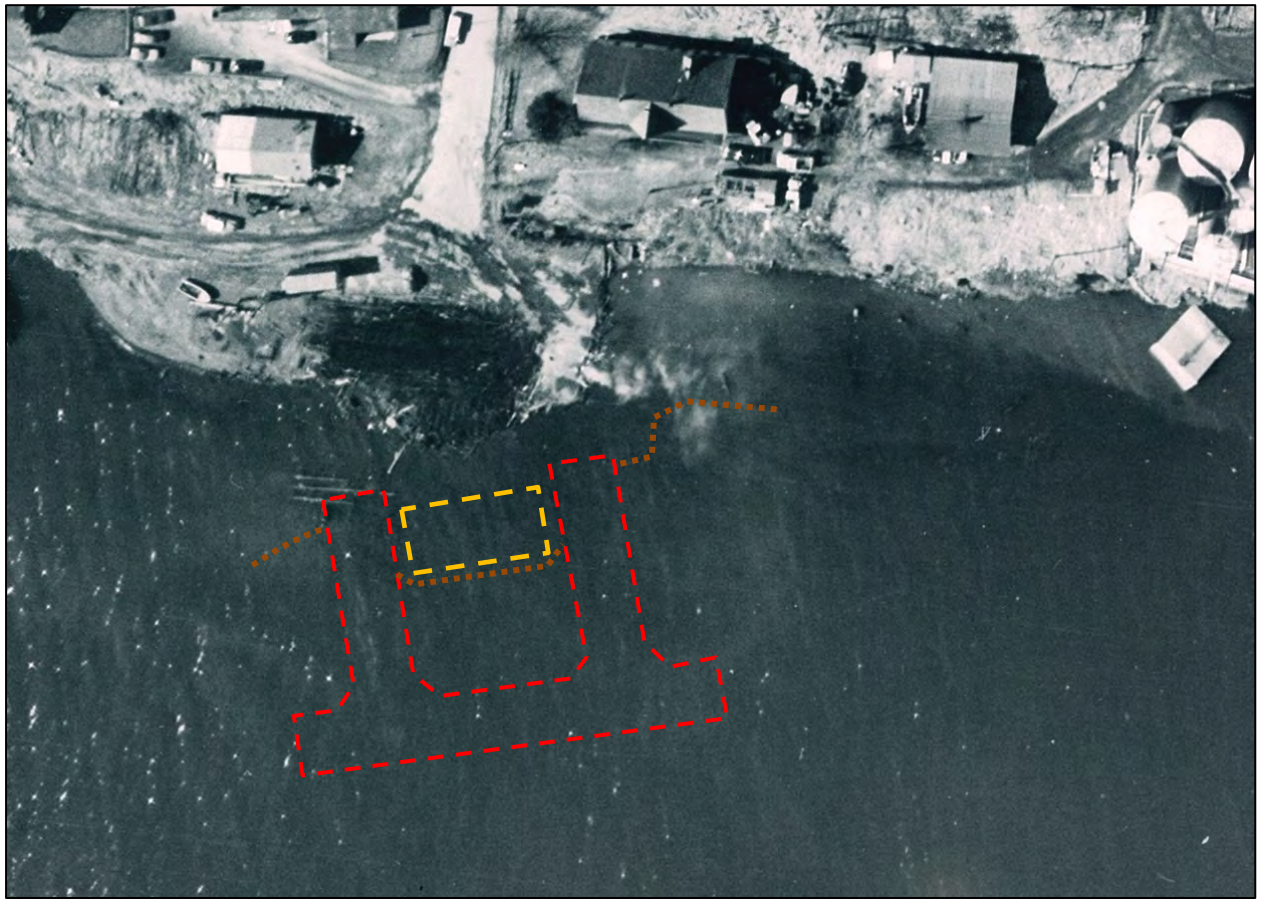


FIGURE C2: FERRY DOCK SITE AFTER THE 1964 ALASKA EARTHQUAKE (1 AUGUST 1964, AERO-METRIC, INC.)
(red dashed line ≈ existing ferry dock; orange dashed line ≈ present terminal building; brown dot line ≈ top of present fill area)

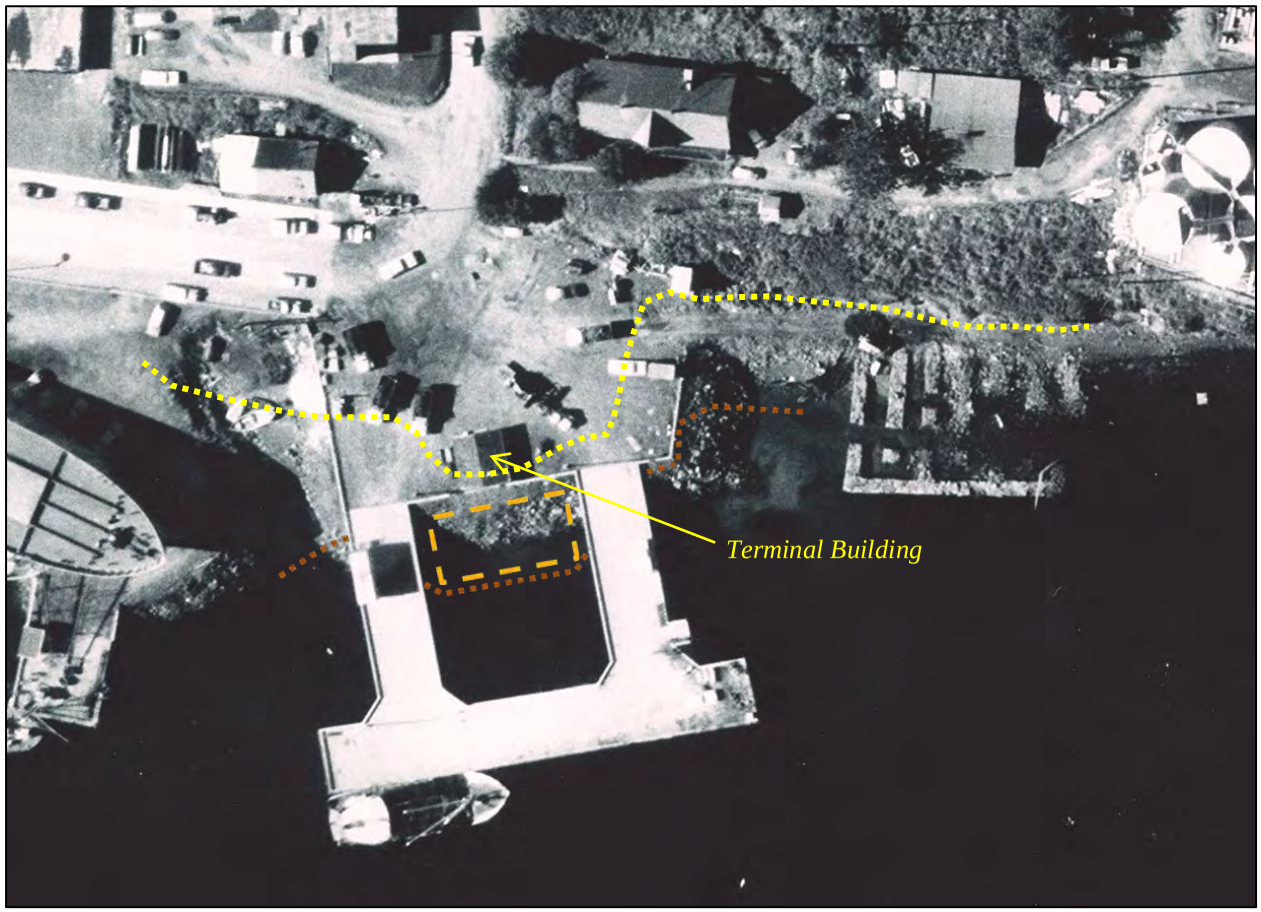


FIGURE C3: FERRY DOCK SITE CONDITIONS AT ORIGINAL CONSTRUCTION (25 AUGUST 1966, AERO-METRIC, INC.)
(yellow dot line ≈ shoreline in April 1964, shortly after the earthquake; orange dashed line ≈ present terminal building; brown dot line ≈ top of present fill area)

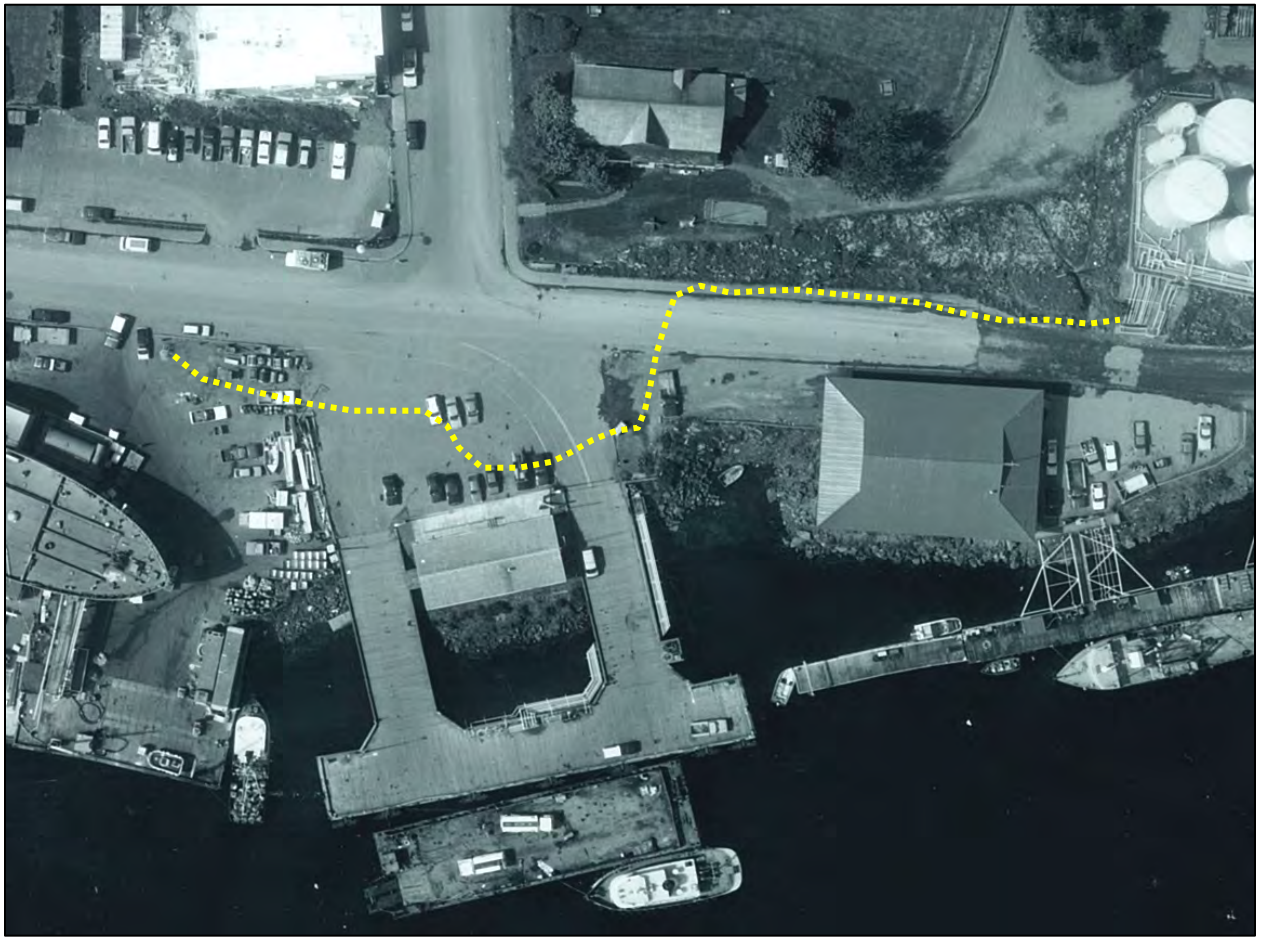


FIGURE C4: PRESENT FERRY DOCK SITE CONDITIONS (1 AUGUST 1988, AERO-METRIC, INC.)
(yellow dot line ≈ shoreline in April 1964, shortly after the earthquake)