DRAFT

ENVIRONMENTAL ASSESSMENT

National Oceanic and Atmospheric Administration

Office of Marine and Aviation Operations

Marine Operations Center-Pacific

Proposed Ketchikan Port Facility Recapitalization Project

Ketchikan, Alaska

Prepared for:

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EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) proposes to recapitalize its property and facilities currently operated by the Office of Marine and Aviation Operations (OMAO) at the existing Marine Operations Center-Pacific (MOC-P) Ketchikan Port Facility. The facility is at 1010 Stedman Street in the city of Ketchikan, Alaska, and is the dedicated homeport for the NOAA Ship *Fairweather*. Due to failing and inadequate facilities, the existing NOAA homeport is unable to fully support the berthing of vessels or staging for cruises or missions carried out by the NOAA Ship *Fairweather* or other vessels. The Proposed Action would provide upgrades and replacement facilities necessary to reestablish homeport operations and maintenance functions for the NOAA Ship *Fairweather* and other vessels. The proposed recapitalization project would more effectively support NOAA missions conducted primarily in the North Pacific Ocean and the Arctic Continental Shelf.

The Proposed Action at the Ketchikan Port Facility would require demolition, disposal, and replacement of key structures and infrastructure in a 77,000-square-foot upland area and a 102,000 square foot in-water area owned by NOAA. Nearly all the existing OMAO facilities and assets at its Ketchikan Port Facility would be affected.

Proposed actions upland of the high tide line elevation include:

- Corrugated metal warehouse building (3,600 square feet)—remains in use with upgrades to replace the existing roof and to install new windows
- Prefabricated office building (1,200 square feet)—remains in use
- Aluminum-sided storage building (900 square feet)—to be removed
- Aluminum-sided electrical power vault building (383 square feet)—to be removed
- Fuel/oil spill catchment shelter (832 square feet)—to be removed, graded, and paved
- Shoreside laboratory building (1,200 square feet)—to be removed
- Asphalt paved and unpaved areas for circulation, parking and outdoor storage—to be removed, graded and paved with asphalt
- Buried remnant infrastructure (e.g., fuel pipelines and pumps and abandoned utility conduit)—to be removed
- Existing utility infrastructure—to be rerouted on site, as needed
- Fencing and gates—to be removed and replaced
- Concrete trestle abutment (20 feet by 10 feet; 6 feet below grade) cast in place (CIP)—to be added immediately above mean high water with toe protected by riprap armor
- Option to include a 2,500-square-foot single story, pre-engineered metal office building with a concrete pad to include six offices, two bathrooms, conference room, and light storage.)
- Option to add a 2,240 square foot boat launch (140 feet by 16 feet, of which 100 feet by 16 feet is CIP, and remaining 40 feet is concrete panels, each two feet by 16 feet; concrete thickness of one foot).

In addition to the proposed actions mentioned above, NOAA would install a self-contained backup power generator (estimated at 175-kilowatts) and double-walled diesel fuel supply for continuation of electrical power for emergency lighting and electronics during infrequent power outages. This unit would also be used for short periods during monthly maintenance.

The remaining grounds of the NOAA property would be regraded and paved to accommodate up to 40 parking spaces, typically used during vessel missions by NOAA personnel. A limited number of small boats or watercraft on trailers may also be temporarily parked in paved upland areas and in the warehouse building. Remnant fuel lines and upland utilities—both buried and overhead—would be removed and utility conduits would be rerouted to connect with public utility service lines immediately off site. These service lines include electrical power, potable water, sewer, and telecommunications. A buried sewer-holding tank would be relocated farther upland on the property, requiring excavation of up to 8 feet for removal and installation of a replacement tank. A drainage feature receiving surface water flows from higher elevations and culverts adjacent to and under Stedman Street emerges above ground and flows to the Tongass Narrows at the most southerly portion of the Ketchikan Port Facility property. This drainage feature outside of the existing NOAA security fence would not be altered as part of the Proposed Action. No on-site fueling of vessels would occur.

All existing in-water infrastructure at the Ketchikan Port Facility would be removed, including the following in-water and over-water structures and assets:

- Remnant pile-supported wooden access trestle and parallel utility trestle
- Main pile-supported pier structure (9,000 square feet)
- Steam plant (boiler) shed on the pier
- Concrete mooring platform (750 square feet) with connecting metal catwalk
- Three concrete-filled steel mooring dolphins
- One single pile extending above the water surface
- Floating cylindrical fendering (250 linear feet)

In-water work would be performed using equipment stationed on a floating barge or from the shore as needed. Concrete and other nonhazardous materials would be stockpiled for disposal to a regional landfill. Piles would be removed by vibratory methods; if piles incur breakage or splintering during the removal process, the pile would be cut at or about 2 feet from the bottom using a diver with an underwater cutting lance. The preferred pile installation method would apply rock socket techniques; however, the selected method will be based on information obtained during final design of the proposed pier structures.

Under the Preferred Alternative, an approximately 240-feet long and 50-feet wide (48-foot pier with 2-foot fendering) floating replacement pier is preferred; however a larger design option of 360-feet long and 50-feet wide is possible and has been evaluated as a worst-case condition. The proposed floating pier would replace the existing pier, its supporting piles and adjacent breasting dolphin. The floating pier would be secured and stabilized by 18 steel piles, each 24 inches in diameter, and accessed via a single, 144-foot long and 17-foot wide cantilever vehicle trestle. The trestle span would be supported by a bridge support float adjacent to the pier and hinged to a 20-foot by 10-foot shoreline CIP abutment. The 24-foot by 22-foot bridge support float would be secured by four of the 18 steel piles specified for the larger, optional main pier design. Replacement mooring dolphins and fenders for mooring would be installed. Ship utilities would be extended dockside attached to either trestle.

Under Alternative Action 1, instead of a floating pier, a fixed pile-supported pier would replace the existing pier and breasting dolphin. The fixed pier would have approximately the same dimensions as the floating pier design but would require 60 to 100 steel piles to support the pier deck over water and at least 10 steel piles to support the access trestle. Steel piles would be 18 to 24 inches in diameter.

Under either action alternative, an L-shape Small Boat Dock (with 100-foot and 20-foot long sections) totaling 120 feet by 16 feet wide would be installed and secured with six steel guide piles 24 inches in diameter. It would be accessed by a cantilevered gangway approximately 8-feet wide attached to the proposed abutment. In addition, a 2,240-square-foot small boat launch ramp may be installed at the northern portion of the NOAA-owned shoreline.

These two action alternatives, and a No-Action Alternative, are being evaluated by NOAA per Section 102 of the NEPA under 42 U.S. Code (U.S.C.) Section 4332, and Council on Environmental Quality Regulations for Implementing Procedural Provisions of NEPA at 40 Code of Federal Regulations (CFR) 1500-1508. This environmental assessment analyzes the potential environmental consequences of implementing either of the action alternatives, as well as effects of the No-Action Alternative. No significant effects to the resources analyzed in this EA would result from the Proposed Action. A summary of potential effects to resource areas and topics analyzed, anticipated best management practices (BMPs), and recommended mitigation measures are presented in Table ES-1. No impacts were identified in relation to any resource topic for the No-Action Alternative.

Table ES-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
Air Quality	Construction	Minor	Moderate	• Watering exposed surfaces. • Covering haul trucks transporting loose material. • Removing visible mud or dirt track-out onto adjacent public roads. • Limit vehicle speeds on unpaved roads. • Complete paving and grading work in a timely manner, and lay building pads as soon as possible after grading • Minimize idling times • Maintain construction equipment as per manufacturer's specifications	None
	Operations	Minor	Minor	• Minimize idling times • Maintain equipment as per manufacturer's specifications	None
Noise	Construction	Moderate	Moderate	• Route truck traffic away from sensitive receptors • Turn off equipment when not in use • Prohibit unnecessary idling of internal combustion engines • Locate stationary noise-generating equipment away from sensitive receptors • Equip all internal combustion engine-driven equipment with intake and exhaust mufflers	None
	Operations	Moderate	Moderate	• Prohibit unnecessary idling of internal combustion engines	None
Geologic Resources	Construction & Operations	Negligible	Negligible	• Conduct site-specific geotechnical evaluations to address any geologic hazards, such as seismic hazards and hazards of coastal erosion	None
Water Resources	Construction	Minor	Minor	• Obtain approvals under federal CWA • Implement SWPPPs and ESCPs	None

Table ES-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
				• Implement standard BMPs for sediment control and water quality during in-water construction. • Use the smallest-diameter piles practicable while still minimizing the overall number of piles. • Waste from pile work would be transported to a permitted upland location for disposal.	
	Operations	Negligible to Moderate	Negligible to Moderate	• Obtain approvals under federal CWA • Obtain APDES Multisector General Permit	None
Hazardous Materials	Construction	Negligible to Minor	Negligible to Minor	• Leachability testing of lead-based painted materials; handling and disposal of such materials in accordance with applicable regulations including Title 18 AAC, federal hazardous waste and OSHA regulations • Pile Removal and Installation Plan in accordance with NOAA's 2009 Guidelines for the use of treated wood products in aquatic environments (NOAA 2009) • Pipeline Removal Plan in accordance with Title 18 AAC • Soil and Groundwater Management Plan, which provides guidance if any contaminated soil or groundwater is found, in accordance with Title 18 AAC 75 and federal hazardous waste regulations pertaining to OSHA requirements • Site-specific Health and Safety Plan in accordance with 29 CFR 1910.120 and AKOSH requirements	None
	Operations	Negligible	Negligible	None	None
Wetlands	Construction & Operations	Minor	Minor	• Implement standard BMPs for in-water construction	None
Floodplains	Construction & Operations	Minor	Minor	None	None
Biological Resources	Construction	Minor	Minor	Marine fish, EFH, marine mammals, and TES: • Coordinate with NMFS regarding whether to implement bubble curtains or other sound attenuation	None

Table ES-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
				devices (e.g., cushion block and isolation casings) to reduce the acoustical footprint • Should impact pile driver be required based on a final pier design, a soft start for impact drivers would be implemented • In coordination with the NMFS, hydroacoustic monitoring may be conducted to determine the extent at which certain nose thresholds presented in Appendix B would be met, and to be able to mitigate underwater noise as needed Birds protected under MBTA: • Coordinate with USFWS if an active MBTA or BGEPA-protected bird nest is observed on site during construction • Apply standard BMPs associated with spill prevention and hazardous materials management (see Section 4.5, Hazardous Materials)	
	Operations	Negligible	Negligible	None	None
Land Use	Construction & Operations	Negligible	Negligible	None	None
Recreational Resources	Construction	Minor	Moderate	None	None
	Operations	Minor	Minor	None	None
Utilities and Solid Waste	Construction & Operations	Minor	Minor	None	None
Transportation	Construction & Operations	Negligible	Negligible	• Prior to construction of the project, NOAA would contact the ADOT&PF to determine the need for traffic control, including permits and agency consultation, as needed	None
Socioeconomics and Environmental Justice	Construction & Operations	Minor	Minor	None	None

Table ES-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
Visual Resources	Construction	Minor	Minor	• Aesthetic treatments to structures (e.g., lighting, natural colors) may be implemented to improve project aesthetics	None
	Operations	Negligible	Negligible	None	None
Cultural Resources	Construction & Operations	Negligible	Negligible	None	No mitigation measures currently proposed, pending consultation with the SHPO under Section 106 of the NHPA.

Notes:
Due to the previously developed nature of the NOAA property and the industrialized waterfront where it is set, Coastal Zone Management Act, Farmlands and Vegetation resources were dismissed from detailed analysis. See Table 3-1 with the rationale for dismissal.
ADOT&PF = Alaska Department of Transportation and Public Facilities
AKOSH = Alaska Occupational Safety and Health
BGEPA = Bald and Golden Eagle Protection Act
BMP = Best Management Practice
CWA = Clean Water Act
EFH = Essential Fish Habitat
ESCP = Erosion and Sediment Control Plan
MBTA = Migratory Bird Treaty Act
SHPO = State Historic Preservation Office
SWPPP = Stormwater Pollution Prevention Plan
TES = Threatened and Endangered Species

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°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAC	Alaska Administrative Code
AADT	Annual Average Daily Traffic
ACM	asbestos-containing material
ADA	Americans with Disabilities Act
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AND	Anchorage Daily News
ADNR	Alaska Department of Natural Resources
ADOT&PF	Alaska Department of Transportation and Public Facilities
AECOM	AECOM Technical Services Inc.
AHRS	Alaska Heritage Resource Survey
AKOSH	Alaska Occupational Safety and Health
AMHS	Alaska Marine Highway System
APDES	Alaska Pollutant Discharge Elimination System
APE	Area of Potential Effects
AS	Alaska Statute
BFE	base flood elevation
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best management practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CIP	cast in place
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalence
COK	City of Ketchikan
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DA	Department of the Army
dB	decibels
dBA	A-weighted decibels
DD	doubling of distance
DD/dB	decibels per doubling of distance
DPS	distinct population segment
EA	environmental assessment
EDR	Environmental Data Resources, Inc.
EEZ	exclusive economic zone
EFH	essential fish habitat

EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FTA	Federal Transit Administration
FY	Fiscal Year
GCR	General Conformity Rule
GHG	greenhouse gas
GOA	Gulf of Alaska
HDPE	high-density polyurethane
HTL	high tide line
KGB	Ketchikan Gateway Borough
KVB	Ketchikan Visitors Bureau
m	meter
MBTA	Migratory Bird Treaty Act
MHW	mean high water
MHHW	mean high higher water
MLW	mean low water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MOC-P	Marine Operations Center-Pacific
mph	miles per hour
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSGP	Multi-Sector General Permit
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAD83	North American Datum of 1983
NAO	NOAA Administrative Order
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
nm	nautical mile
NMFS	National Marine Fisheries Service, also referred to as NOAA Fisheries
No.	number
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPFMC	North Pacific Fishery Management Council

NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWS	National Weather Service
NWUS	Navigable Waters of the U.S.
OMAO	Office of Marine and Aviation Operations
OSHA	Occupational Safety and Health Administration
PAH	Polyaromatic hydrocarbons
pCi/L	picocuries per liter
PL	Public Law
PM	particulate matter
PM_{10}	coarse PM, having an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	fine PM, having an aerodynamic diameter less than or equal to 2.5 microns
ppb	parts per billion
PPV	peak particle velocity
RCRA	Resource Conservation and Recovery Act
RFFA	Reasonably Foreseeable Future Action
RHA	Rivers and Harbors Act
SGCN	species of general conservation concern
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SWL	Still Water Level
SWPPP	StormWater Pollution Prevention Plan
SO_2	sulfur dioxide
SO_X	sulfur oxides
SLR	sea-level rise
TCLP	Toxicity Characteristics Leaching Procedure
TWL	Total Water Level
U.S.	United States
USC	U.S. Code
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGSA	United States General Services Administration
VdB	vibration decibels
WOUS	Waters of the U.S.
WRCC	Western Regional Climate Center
μg/m3	micrograms per cubic meter

1.0 PURPOSE AND NEED

1.1 INTRODUCTION

1.1.1 Overview

The mission of the National Oceanic and Atmospheric Administration (NOAA) Office of Marine and Aviation Operations (OMAO) is to safely deliver effective Earth-observation capabilities; integrate emerging technologies; and provide a specialized, flexible, and reliable team responsive to NOAA and the nation. In order to meet its mission, OMAO manages and operates NOAA's fleet of 16 research and survey ships and 9 aircraft.

OMAO’s research and survey ships comprise the largest fleet of federal research ships in the nation. Ranging from large oceanographic research vessels capable of exploring the world’s deepest ocean to smaller ships responsible for charting the shallow bays and inlets of the United States, the fleet supports a wide range of marine activities including fisheries research, nautical charting, and ocean and climate studies.

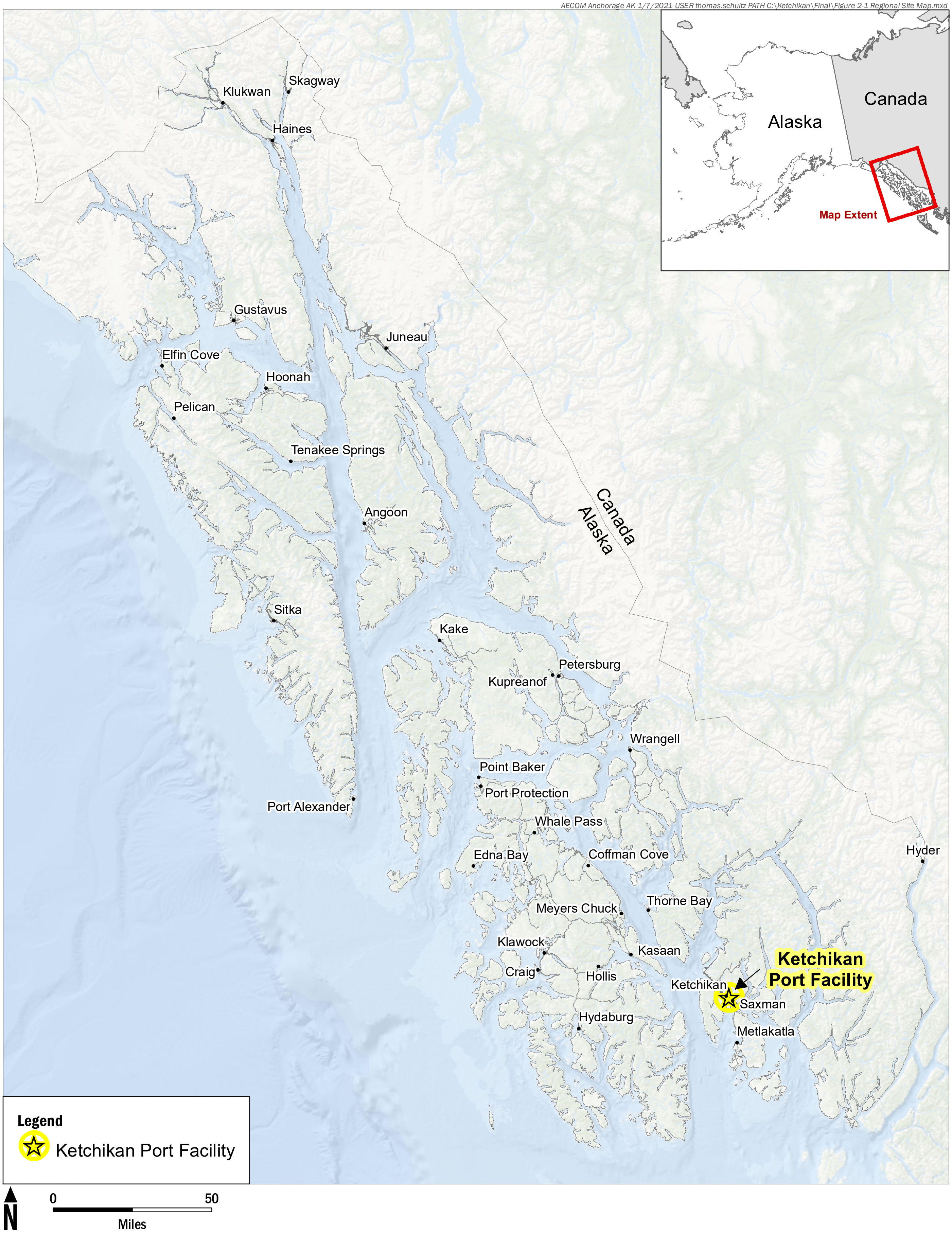
Administrative, engineering, maintenance, and logistical support for the NOAA fleet are based out of either the Marine Operations Center-Pacific (MOC-P) or the Marine Operations Center-Atlantic (MOC-A). The MOC-P is in Newport, Oregon and the MOC-A is in Norfolk, Virginia. Although a few NOAA ships are berthed at the MOC-P or MOC-A facilities, for efficiency and continuance of operation, a majority of NOAA ships are strategically berthed at locations closer in proximity to their dedicated or primary mission support areas.

NOAA proposes to recapitalize property and facilities operated by its OMAO at their MOC-P Ketchikan Port Facility in the city of Ketchikan in the southeast region of Alaska (Figure 1.1-1). The Ketchikan Port Facility is a dedicated homeport for the NOAA Ship *Fairweather* and may temporarily support other OMAO MOC-P vessels, or by arrangement, vessels managed by other agencies or entities. The existing NOAA facilities are currently unable to fully support the berthing of vessels or staging for cruises or missions carried out by OMAO. Proposed actions to recapitalize the facility are described in Section 2, Project Alternatives. NOAA has tentatively identified physical and operational design requirements for the Ketchikan Port Facility for upland and in-water environments. Prior to implementing proposed or alternative actions, NOAA will select a design/build contractor through its source selection process and award a contract in Fiscal Year (FY) 2021.

1.1.2 Background

OMAO operates and maintains its MOC-P Ketchikan Port Facility at 1010 Stedman Street in the city of Ketchikan, Alaska (Figure 1.1-2). The facility was acquired to serve as the dedicated homeport for the NOAA Ship *Fairweather* in support of its primary mission to conduct surveys to provide updates to nautical charts and other hydrographic products. This data enables accurate mapping of the continental shelf in the Arctic and bathymetry for safe navigation throughout the North Pacific. In addition to supporting marine navigation, *Fairweather*’s data is also used for marine ecosystem studies, fisheries habitat mapping, and ocean research.

Although Ketchikan Port Facility was acquired as the NOAA Ship *Fairweather*’s dedicated homeport and berthing facility, the *Fairweather* and other vessels have been unable to berth at the facility for several years due to deteriorating or obsolete upland and in-water conditions. In 2008, NOAA condemned its wooden approach trestle and wooden pier leading out to the concrete waterfront pier as unsafe due to disrepair of existing wooden pier piles and structural support members. Due to this deficiency and OMAO being unable to use the Ketchikan Port Facility as a ship berthing location, the *Fairweather* has been temporarily using the nearby Coast Guard Station Ketchikan pier when in Ketchikan. NOAA/OMAO is proposing to recapitalize the Ketchikan Port Facility by demolishing obsolete facilities, regrading upland areas, and upgrading or replacing necessary in-water, over-water, and upland structures and infrastructure.



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NOAA

Ketchikan Homeport Revitalization Project

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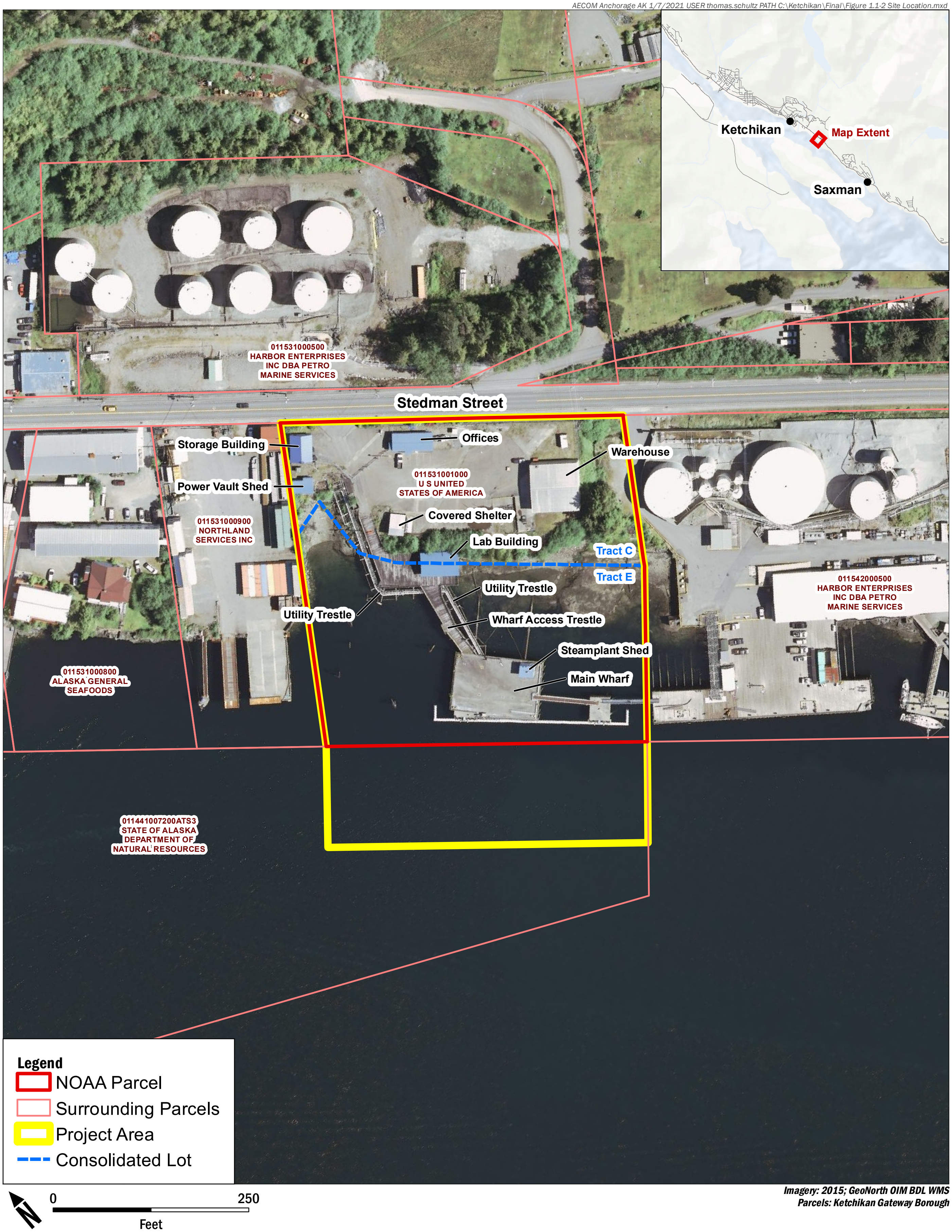
REGIONAL SITE MAP

Figure 1.1-1



Imagery: 2015; GeoNorth OIM BDL WMS
Parcels: Ketchikan Gateway Borough

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SITE LOCATION

Figure 1.1-2

As a direct federal action, NOAA is preparing this Environmental Assessment (EA) per Section 102 of the National Environmental Policy Act of 1969 (NEPA) under 42 U.S. Code (U.S.C.) §4332, and Council on Environmental Quality Regulations for Implementing Procedural Provisions of NEPA at 40 Code of Federal Regulations (CFR) 1500-1508. NOAA is guided by NOAA Administrative Order (NAO) 216-6A, Compliance with the NEPA and Executive Orders (EOs) 12114, 11988 and 13690 (Floodplain Management), and 11990 (Protection of Wetlands). This NEPA analysis and review procedures also conform to the Companion Manual for NAO 216-6A, Policy and Procedures for Compliance with the NEPA and Related Authorities.

1.2 Proposed Action

NOAA/OMAO is proposing to recapitalize its MOC-P Ketchikan Port Facility to reestablish homeport operations and maintenance functions for the NOAA Ship *Fairweather* and other vessels. The Proposed Action would include the removal and appropriate disposal of unused or obsolete structures and infrastructure, in both a 77,000-square-foot upland area and within 102,000 square feet of in-water area, all owned by NOAA. Unnecessary upland structures and remnant infrastructure associated with prior uses of the property will be removed. Upland structures critical to OMAO include the existing office and warehouse buildings. Other areas will be razed, graded, and paved for parking and vehicle circulation. All existing in-water structures, including pier, access trestle, and mooring dolphins present above and below the water surface, are inadequate and would be removed. The in-water structures would be replaced by adequately sized and structurally sound elements necessary for berthing, preparing, and maintaining vessel operations. Details regarding NOAA's preferred and alternative actions for implementing the proposed recapitalization project are presented in Section 2 Project Alternatives.

1.2.1 Purpose and Need

The existing facilities at the Ketchikan Port Facility are inefficient to berth the Ship *Fairweather*; the in-water pier, access trestle, and mooring dolphin infrastructure are in disrepair and have been closed to berthing or staging of vessels since 2008. The existing pier is undersized with severe deterioration of timber piles; the bracing for the trestle and pier have made them unsafe for use. Consequently, the NOAA Ship *Fairweather* has been without a dedicated Alaskan homeport facility and is wintering at the MOC-P facility in Newport, Oregon.

The purpose of the Proposed Action to recapitalize the property and facilities operated by its OMAO at its existing Ketchikan Port Facility to enable OMAO to provide critical management and operational and logistical support to the NOAA Ship *Fairweather* and intermittently to other NOAA and non-NOAA vessels.

The need for the Proposed Action is to meet the congressional mandate of the Frank LoBiondo Coast Guard Authorization Act of 2018 (Public Law 115-282), including Section 1003, Homeport of Certain Research Vessels, subpart (a) Acceptance of Funds Authorized. This subpart states, as mandated:

> The Secretary of Commerce may accept non-Federal funds for the purpose of the construction of a new port facility, including obtaining such cost estimates, designs, and permits as may be necessary to facilitate the homeporting of the R/V FAIRWEATHER in accordance with Title II of the Departments of Commerce, Justice, and State; the Judiciary; and Related Agencies Appropriations Act, 2002 (Public Law 107-77; 115 Stat. 775) at a location that during such homeporting shall be under the administrative jurisdiction of the under Secretary of Commerce for Oceans and Atmosphere. Statute 775 specifically provides that the R/V FAIRWEATHER shall be homeported in Ketchikan, Alaska.

2.0 PROJECT ALTERNATIVES

2.1 PREFERRED ALTERNATIVE

2.1.1 Project Location/Setting

The Proposed Action would occur on property and facilities obtained by NOAA in 2004 and operated by OMAO as its existing Ketchikan Port Facility at 1010 Stedman Street in the city of Ketchikan, Ketchikan Gateway Borough, Alaska (see Figure 1.1-1). The geographical coordinates of the 4.11-acre property are 55° 20' 04.30" North; 131" 37' 46.89" West, based on the North American Datum of 1983 (NAD83).

The property, formerly a fuel transfer dock and warehouse area owned and operated by the Tesoro Refining and Marketing Company (Tesoro), is composed of a portion of Tract C, U.S. Survey Number (No) 1381, consisting of land above the meander line at the Tongass Narrows, and a portion of Tract E, City of Ketchikan Tidelands Subdivision, Tidelands Addition to Survey No. 1381. It is in an area zoned as Heavy Industrial with 625 linear feet of submerged water frontage.

Except for areas adjacent to and below the high tide line (HTL), about 90 percent of the upland property is covered with asphalt or cement and various structures.

2.1.2 Proposed Upland Actions

Nearly all the existing OMAO facilities and assets developed at its Ketchikan Port Facility would be affected. Proposed actions upland of the HTL elevation include:

- Corrugated metal warehouse building (3,600 square feet)—remains in use with upgrades to replace the existing roof and to install new windows
- Prefabricated office building (1,200 square feet)—remains in use
- Aluminum-sided storage building (900 square feet)—to be removed
- Aluminum-sided electrical power vault building (383 square feet)—to be removed
- Fuel/oil spill catchment shelter (832 square feet)—to be removed, graded, and paved
- Shoreside laboratory building (1,200 square feet)—to be removed
- Asphalt paved and unpaved areas for circulation, parking and outdoor storage—to be removed, graded and paved with asphalt
- Buried remnant infrastructure (e.g., fuel pipelines and pumps and abandoned utility conduit)—to be removed
- Existing utility infrastructure—to be rerouted on site, as needed
- Fencing and gates—to be removed and replaced
- Concrete trestle abutment (20 feet by 10 feet; 6 feet below grade) cast in place (CIP)— to be added immediately above mean high water with toe protected by riprap armor
- Option to include a 2,500 square foot single story, pre-engineered metal office building with a concrete pad to include six offices, two bathrooms, conference room, and light storage.
- Option to add a 2,240 square foot boat launch (140 feet by 16 feet, of which 100 feet by 16 feet is CIP, and remaining 40 feet is concrete panels, each two feet by 16 feet; concrete thickness of one foot).

In addition to the proposed actions mentioned above, NOAA would install a self-contained backup power generator (estimated at 175 kilowatts) and double-walled diesel fuel supply for continuation of electrical power for emergency lighting and electronics during infrequent power outages. This unit would also be used for short periods during monthly preventative maintenance.

The remaining grounds of the NOAA property would be regraded and paved to accommodate up to 40 parking spaces, typically used during vessel missions by NOAA personnel. A limited number of small boats or watercraft on trailers may also be temporarily parked in paved upland areas and in the warehouse building. Remnant fuel lines and upland utilities—both buried and overhead—would be removed and utility conduit rerouted to connect with public utility service lines immediately off site. These service lines include electrical power, potable water, firefighting utilities, sewer, and telecommunications. Bilge water would be separated from oily waste, which would be stored on board in a tank until it could be pumped on shore to a truck for disposal. A buried sewer-holding tank would be relocated farther upland on the property, requiring excavation of up to 8 feet for removal and installation of a replacement tank. A drainage feature receiving surface water flows from higher elevations and culverts adjacent to and under Stedman Street emerges above ground and flows to Tongass Narrows at the most southerly portion of the Ketchikan Port Facility property. This surface drainage feature within the NOAA property but outside of the existing NOAA security fence would not be altered as part of the Proposed Action. Concrete and other nonhazardous materials would be stockpiled for disposal to a regional landfill. No fueling of vessels from the NOAA property would occur, as fueling services are available locally.

2.1.3 Proposed In-Water Actions

All existing in-water infrastructure would be removed, including the following in-water and over-water structures and assets:

- Remnant wooden access trestle and parallel utility trestle
- Main pile-supported pier structure (9,000 square feet)
- Steam plant (boiler) shed on the pier
- Concrete mooring platform (750 square feet) with connecting metal catwalk
- Three concrete-filled steel mooring dolphins
- One single pile extending above the water surface
- Floating cylindrical fendering (250 linear feet); this may be saved or salvaged by contractor

In-water work would be performed using equipment based on a floating barge or from the shore, as needed. In-water concrete and other nonhazardous materials to be removed would be stockpiled for disposal to a regional landfill. An estimated 100 to 200 remnant piles would be removed by vibratory methods; if piles incur breakage or splintering during the removal process, the pile would be cut at or about 2 feet from the bottom using a diver with an underwater cutting lance.

Under the Preferred Alternative, an approximately 240-foot long and 50-foot wide (48-foot pier with 2-foot fendering) floating replacement pier is preferred; however a larger design option consisting of a 360-foot long and 50-foot wide pier is possible and is evaluated as a worst-case condition. The proposed floating pier would replace the existing pier, its supporting piles, and adjacent breasting dolphin. The floating pier would be secured and stabilized by 18 steel piles, each 24 inches in diameter, and accessed via a single, 144-foot long and 50-foot wide cantilever vehicle trestle. The trestle span would be supported by a bridge support float adjacent to the pier and hinged to a 20-foot by 10-foot shoreline CIP abutment. The 24-foot by 22-foot bridge support float would be secured by four of the 18 steel piles specified for the larger, optional main pier design. Replacement mooring dolphins and fenders for mooring would be installed. Ship utilities would be extended dockside attached to either trestle.

Under Alternative Action 1, instead of a floating pier, a fixed pile-supported pier would replace the existing pier and breasting dolphin. The fixed pier would have approximately the same dimensions as the floating pier design but would require 60 to 100 steel piles to support the pier deck over water and at least 10 steel piles to support the access trestle. Steel piles would be 18 to 24 inches in diameter.

Under either action alternative, an L-shape Small Boat Dock (with 100-foot and 20-foot long sections) totaling 120 feet by 16 feet wide would be installed and secured with six steel guide piles 24 inches in diameter. It would be accessed by a cantilevered gangway approximately 8-feet wide attached to the proposed abutment. In addition, a 2,240 square-foot small boat launch ramp may be installed at the northern portion of the NOAA-owned shoreline.

Pile installation would occur using rock socketing or vibratory hammer; however, the method will be selected based on information obtained during the geotechnical investigation and design of the proposed pier structures.

2.1.4 Proposed Utilities and Other Services

NOAA would install or upgrade the utility services and security fencing. Utility services would include water, sewer, telephone, communications/cable, electrical, waste disposal, and janitorial services. Utility services will be extended to on-site structures and to berthing stations at the large vessel pier and small craft dock.

Existing active and abandoned electric, telephone, fueling, sewer, water, and communications conduits, as well as any other obsolete improvements or fixtures (lighting and fencing), will be removed to accommodate the accepted revised layout and design. This may include demolition of existing structures or substructures.

Anticipated electrical requirements would include: two ship power receptacles for 480 volts, 400 amperes, three-phase services; at least one industrial power receptacle for three-phase, four wire 277/480 volt, 200 amperes, and three three-wire 120/240 volt 20 amperes services; and at least three 110volt AC ports for the ship service at each of the berths. Telecommunication terminals would include two telephones, four cable runs, and eight single mode fiber optic cables with dual pathways per local service provider, to provide redundancy that does not interrupt service or act as a single point of failure. Bilge water would be separated from oily waste, which would be stored on board in a tank until it could be pumped on shore to a truck for disposal. Potable water service and expanded sewer disposal infrastructure will be provided on site and extended to berthing stations and adjacent connections with local service providers along Stedman Street.

Security services and infrastructure will consist of the replacement of existing perimeter security fencing, use of electronic Common Access Card reader at the entry gate, and prearranged access for visitors and vendors. Temporary access will be provided for local construction contractors as well as those arriving from outside Southeast Alaska.

2.1.5 Proposed Homeport Operations and Maintenance

Proposed homeport operations include access to the pier by 18-wheel tractor-trailer rigs, cranes, and vehicles transporting supplies, gear and equipment for on- and off-loading berthed vessels. While the NOAA Ship *Fairweather* would be periodically berthed between missions, it is expected to remain berthed at the Ketchikan Port Facility during late fall and winter months from November through March each year. The NOAA Ship *Fairweather* is 231 feet long, with a beam of 42 feet, and a draft of 15.5 feet. Additional information regarding this vessel is provided in Appendix A: NOAA Ship *Fairweather* Specifications. Navigation to or from the OMAO Ketchikan Port Facility would not require maintenance dredging or navigational assistance for access to or from its berth.

Temporary and permanent relocation of the up to 40 NOAA personnel and wage crew would occur; for this analysis, it is assumed that as many as 20 NOAA personnel or wage crew could relocate to Ketchikan permanently. Other ships' crew would be transferred temporarily from other locations, including Southeast Alaska.

Operation of the OMAO MOC-P Ketchikan Port Facility involves regular administrative, light-industrial, security, maintenance, and maritime activities. The administrative functions expected to occur are typical for a government field office. A small contingent of contractors and grounds maintenance workers may be present periodically on site. Shop activities are typically performed in the enclosed warehouse structure and may include electronics bench work and equipment maintenance, bench welding and repair of small motors or mechanical equipment, and the fabrication of specialized sensors or mechanical assemblies.

Maritime activities would occur in secure, dedicated berthing facilities for the NOAA Ship *Fairweather* and could accommodate one additional berth for other NOAA research vessels or government vessels. NOAA vessels may range from 124 feet to 231 feet in length with a draft of less than 21 feet. Berths and navigable channels must be -24 feet mean lower low water (MLLW).

During late fall and winter months the NOAA Ship Fairweather is typically berthed for maintenance or at a commercial dry dock for major repairs and hull maintenance. NOAA may perform dockside/topside maintenance and repair at its Ketchikan Port Facility. This includes, but is not limited to, inside and outside hot work, abrasive blasting, and other inside and outside abrasive activities. Maintenance practices may also include minor sanding and spot painting of interior and exterior surfaces above the water line. Hull repairs and painting are conducted during periodic dry dock servicing approximately every 5 years (per vessel); dry dock repair services are available in Ketchikan. These include standard work instructions and best management practices focused on minimizing environmental effects of routine ship maintenance and repairs, such as potential contamination from paint and debris.

2.2 ACTION ALTERNATIVE 1

Action Alternative 1 would be similar to the Preferred Alternative (discussed above); however, instead of a floating pier, a fixed pile-supported pier would replace the existing pier and breasting dolphin. A fixed pier under Action Alternative 1 would have approximately the same dimensions as the float pier design but would require 60 to 100 steel piles to support the pier deck over water and at least 10 steel piles to support the one access trestle. Steel piles would be 18 to 24 inches in diameter.

2.3 NO-ACTION ALTERNATIVE

Analysis under NEPA requires review of a No-Action Alternative. Under the No-Action Alternative, there would be no recapitalization of facilities at the OMAO Ketchikan Port Facility. The NOAA Ship *Fairweather* would continue to be berthed and serviced from other locations in Ketchikan (e.g., at dry dock facilities or Coast Guard Station Ketchikan) or at the NOAA MOC-P homeport in Newport, Oregon.

All existing upland and in-water structures would remain, including in-water timber piles that contain creosote. The existing condemned trestle would remain unusable and continue to deteriorate. Hazardous materials or soils discovered during periodic inspections would be removed or secured in place. This alternative would not meet the purpose and need for the project.

2.4 ALTERNATIVES CONSIDERED AND REJECTED

2.4.1 Off-site Alternative

An off-site homeport alternative was determined to not be economically feasible given the current level of investment and ownership established at the existing OMAO Ketchikan Port Facility. Acquisition and redevelopment of shoreline areas in the greater Ketchikan region that would be capable of supporting larger vessels are limited and would require substantially greater investment. An off-site alternative outside of the greater Ketchikan region was not considered feasible due to the congressional mandate for a NOAA Ship *Fairweather* homeport in Ketchikan, Alaska.

2.4.2 On-site Alternative

Other on-site alternatives, such as repair or expansion of the existing facility infrastructure, were not considered feasible due to the compromised condition of the existing pier, access trestle, and mooring dolphins. This infrastructure has been closed for use since 2008 and requires replacement due to the severe deterioration of timber piles and the bracing for the trestle and pier, making them unsafe for use. Since that time, the NOAA Ship *Fairweather* has been without a functioning, dedicated Alaskan homeport facility, requiring use of local temporary berths (e.g., U.S. Coast Guard Station Ketchikan) and transit to the MOC-P headquarters in Newport, Oregon, each winter.

3.0 EXISTING ENVIRONMENT

The project location is in the city of Ketchikan, Ketchikan Gateway Borough, on Revillagigedo Island and the east shore of the Tongass Narrows waterway. The region consists of a coastal mountain range that stretches from northern British Columbia to Skagway, Alaska. The natural topography of the local area largely consists of moderately steep slopes trending toward the Tongass Narrows waterway. In this region, the Tongass Narrows is part of Southeast Alaska's Inside Passage where it splits into two channels by Pennock Island. The eastern side is bounded by Revillagigedo Island and the western side by Gravina Island. The Inside Passage is a common route for maritime traffic between the Gulf of Alaska (GOA) and Puget Sound.

As described in Section 2.1, the Proposed Action is at the existing NOAA-owned OMAO Ketchikan Port Facility in a shoreline industrial waterfront. At this location, OMAO staff currently manage a small administrative office, warehouse, electrical building, and other upland buildings, along with an existing inoperable main pier with breasting dolphin, a derelict access trestle, and individual mooring dolphin structures. The NOAA property consists of a portion of Tract C, U.S. Survey Number 1381, that includes approximately 77,000 square feet of largely paved land above the meander line at the Tongass Narrows, of which approximately 1,700 square feet consists of rocky shoreline. The NOAA property also includes an adjacent portion of Tract E, City of Ketchikan Tidelands Subdivision, Tidelands Addition to Survey Number 1381 that includes 102,000 square feet of land. It is situated in an area zoned as Heavy Industrial, with approximately 410 linear feet of submerged water frontage.

The general vegetation of the Tongass Narrows region includes forested areas of Sitka spruce (*Picea sitchensis*) and mountain hemlock (*Tsuga mertensiana*) with patches of alder (*Alnus* spp.) shoreline grasses and forbs in some locations. Except for areas adjacent to and below the HTL, about 90 percent of the property is covered with asphalt or cement. In the nearshore marine environment are rockweeds (*Fucus* spp.) and kelp (*Nereocystis* spp.).

Above the HTL, much of the underlying silty sand, gravel, and rock were removed and the facilities and pavement placed directly on schist bedrock. Most of the onshore portion of the site consists of imported shot (crushed) rock fill. No previously undisturbed native soils exist at the site. The depth to bedrock underlying the imported fill varies from 1 to 2 feet in the southern half of the site, and up to 6.5 feet in the northern half of the site. Offshore marine sediments are reported to be minimal, with sediment cover depths progressively increasing away from the shoreline. Marine sediment depths overlying bedrock reportedly range from 4 to 5 feet and consist of coarse sand, rock fragments, and shells (Bristol 2003).

Due to the previously developed nature of the NOAA property and the industrialized waterfront where it is situated, certain resources were deemed absent and therefore dismissed from detailed analysis. Resources that were dismissed from further analysis in Section 4, Affected Resources and Environmental Consequences, are listed in Table 3-1 with the rationale for dismissal.

Table 3-1: Resources Dismissed for Analysis in the EA

Resource	Rationale for Elimination
CZMA	Because there is no federal CZMA-approved state coastal program in the state of Alaska, no federal consistency provision is applicable. Therefore, there are no CZMA-defined resources that could be affected by the Proposed Action and no further analysis is required in this EA or under the CZMA.
Farmlands	The project site does not contain or provide state- or federally designated farmlands and is in a developed, industrialized area of Ketchikan with similar, non-farmland land uses. The Proposed Action would not involve the temporary or permanent disturbance or alteration of farmlands and would not result in temporary or permanent disruptions of current or planned farmlands. Therefore, farmland resources were dismissed from further analysis in this EA.
Vegetation	• The upland portion of the project area subject to disturbance is almost entirely paved or disturbed. There is no natural site vegetation present. Vegetation observed on site is limited to planted ornamentals and species that have grown since paving or disturbance activities, including those in a maintained drainage culvert on the southern side of the NOAA property. • Ornamental vegetation planted along Stedman Street include ornamental maple (*Acer* spp.), hawthorne (*Crataegus* spp.), rhododendron (*Rhododendron* spp.), and juniper (*Juniperus* spp.). • Other site species not subject to disturbance include: trees (red alder [*A. rubra*], yellow cedar [*Cupressus nootkatensis*], mountain hemlock [*Tsuga mertensiana*]); shrubs (Sitka alder [*A. viridis* spp. Sinuata], willow [*Salix* spp.], hawthorne, salmonberry [*Rubus spectabilis*], red elderberry [*Sambucus racemosa*], thimbleberry [*Rubus parviflorus*], red huckleberry [*Vaccinium parvifolium*], salal [*Gaultheria shallon*]); and grasses and forbs (reedgrass [*Calamagrostis* spp.], fescue [*Festuca* spp.], rushes [various spp.]; dandelion [*Taraxacum officinale* spp. *officinale*—non-native], oxeye daisy [*Leucanthemum vulgare*—non-native], clover [*Trifolium* spp.—non-native but a common lawn species], narrow-leaf hawksbeard [*Crepis tectorum*—non-native], foxglove [*Digitalis purpurea*, non-native but a common escaped garden ornamental], horsetail [*Equisetum* spp.], goldenrod [*Solidago multiradiata*]). There are also potentially affected patches of bryophytes (mosses) on various surfaces, and rockweeds (*Fucus* spp.) and kelp (*Nereocystis* spp.) in the marine portion. • The Proposed Action would not involve the temporary or permanent disturbance or alteration of upland vegetation and would not result in temporary or permanent disruptions of current or future vegetation. Therefore, vegetation resources were dismissed from further analysis in this EA.

Notes:
CZMA = Coastal Zone Management Act

4.0 AFFECTED RESOURCES AND ENVIRONMENTAL CONSEQUENCES

This section describes the affected resources and anticipated environmental consequences from implementation of the Preferred Alternative, Action Alternative 1, and the No-Action Alternative, including mitigation measures that would avoid, reduce, or minimize any potentially significant adverse effects of the Proposed Action.

As used in NEPA, the term “significant,” requires considerations of both *context* and *intensity* as defined below:

Context means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

Intensity refers to the severity of impact. Responsible federal officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the federal agency believes that on balance the effect will be beneficial.
- The degree to which the proposed action affects public health or safety.
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
- The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.
- Whether the action is related to other actions with individually insignificant, but cumulatively significant, impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP) or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.
- Whether the action threatens a violation of federal, state, or local law or requirements imposed for the protection of the environment.

For this analysis, the intensity of an impact is assessed in terms of change or degree of change in a resource condition. Common characterizations used include the degree of change from existing conditions or effects to managed or scarce resources, often expressed as the relative area of impact, measured units of change, differences in levels of use, etc. Terminology used for depicting the overall magnitude of impact include:

- No Effect—The proposed action would not cause a detectable change.
- Negligible—The impact would be at the lowest level of detection; the impact would not be significant.
- Minor—The impact would be slight but detectable; the impact would not be significant.
- Moderate—The impact would be readily apparent; the impact would not be significant.

- Major—The impact would be clearly adverse or beneficial; the impact has the potential to be significant.

These levels of potential effect can consider duration, geographic extent, and the potential likelihood to occur, as indicated below:

- Duration—How long the impact would be expected to occur or last, measured in length of time. Common characterizations are short-term, long-term, permanent, etc.
- Geographic extent—Where the impact would be expected to occur geographically in the project area. Common characterizations for this Proposed Action are largely local or regional in nature.
- Potential to occur (likelihood)—How probable the impact would be. Common characterizations include the likelihood of the impact if the project were to be permitted, or probability of occurrence based on the results of analysis. Common characterizations are unlikely, possible, probable, or certain to occur.

4.1 AIR QUALITY

4.1.1 Regulatory Setting

Clean Air Act

The Clean Air Act of 1970 (42 U.S.C. 7401 et seq.), as amended in 1977 and 1990, is the core federal statute governing air pollution. In addition to federal regulations, the Clean Air Act provides states with the authority to regulate air quality within state boundaries.

Provisions of the Clean Air Act and state regulations that are potentially relevant to the project include, but are not limited to:

- National Ambient Air Quality Standards (NAAQS)
- General Conformity Rule
- Mobile Source Regulations
- Visibility and Regional Haze
- Greenhouse Gas Reporting Rule
- Marine Visible Emission Standards (18 Alaska Administrative Code [AAC] 50.070)

National Ambient Air Quality Standards

The United States Environmental Protection Agency (EPA), in Title 40, Code of Federal Regulations (CFR) Chapter 50, establishes national ambient air quality standards for six principal pollutants, called "criteria" pollutants, including: particulate matter (PM), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone, and lead. Under these regulations, PM is further regulated and classified into two categories: coarse PM, having an aerodynamic diameter less than or equal to 10 microns (PM_{10}); and fine PM, having an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$). The national ambient air quality standards include two levels for each criteria pollutant: primary standards, which were developed to protect public health; and secondary standards developed to protect public welfare. While the EPA sets and regularly reviews the National Ambient Air Quality Standards (NAAQS), states are responsible for attaining and maintaining the standards.

In the state of Alaska, the agency regulating NAAQS is the Alaska Department of Environmental Conservation (ADEC). The ADEC is the implementing agency for air pollution control regulations for the State of Alaska. ADEC has created and implemented Alaska Ambient Air Quality Standards which include the six criteria pollutants and standards for two additional pollutants: ammonia, and reduced sulfur. ADEC has established Regulations specifically for Air Quality Control (Title 18 of the AAC Chapter 50) that identify, prevent, abate, and control air pollution in a manner that meets the Clean Air Act. The Proposed Action would be required to obtain all necessary permits and comply with all applicable regulations.

General Conformity Rule

The EPA has promulgated a General Conformity Rule (GCR) (Section 110 of the Clean Air Act and Title 40 CFR Part 51.853) that requires responsible federal agencies to make a determination of conformity with an affected State Implementation Plan. Any federal action in a State Implementation Plan nonattainment or maintenance area must be reviewed to determine whether it: 1) qualifies for an exemption listed in the GCR; 2) results in emissions that are below GCR de minimis emissions thresholds; or 3) would produce emissions above the GCR de minimis thresholds applicable to the specific area, requiring a detailed air quality conformity analysis.

The proposed project is in the Ketchikan Gateway Borough, which is in attainment for all the criteria air pollutants. Therefore, there are no applicable GCR de minimis thresholds for the proposed project. GCR de minimis thresholds are only applicable for nonattainment or maintenance areas.

Mobile Source Air Pollution Control Requirements

Mobile source air pollution control requirements for gasoline and diesel on-road engines are codified in 40 CFR 80, 40 CFR 85, and 40 CFR 86. Under these provisions, the EPA initially established “Tier 1,” and later “Tier 2,” emissions standards for the purpose of minimizing emissions from these sources. EPA’s Tier 2 emission standards and gasoline sulfur control program is designed to reduce emissions from passenger cars, light trucks, and large passenger vehicles (including sport utility vehicles, minivans, vans, and pickup trucks) and to reduce the sulfur content of gasoline. These more stringent emission standards have applied to the aforementioned types of motor vehicles operating on any fuel since 2004. These reductions, which are intended to provide for cleaner air and greater public health protection provisions for non-road diesel engines, are codified in 40 CFR 89 and 40 CFR 90. Starting in 1996, non-road engines became subject to EPA’s increasingly stringent Tier I through Tier 4 emissions standards, depending on model year and engine size. These requirements are imposed on the manufacturers of these mobile sources rather than on owners or operators.

The EPA’s mobile source regulations in 40 CFR 80 Subpart I (Motor Vehicle Diesel Fuel; Non-Road, Locomotive, and Marine Diesel Fuel; and United States Emissions Control Area Marine Fuel) contain provisions restricting diesel fuel sulfur content for fuel used in mobile sources to prevent damage to the emission control systems. These restrictions were phased in for highway diesel fuel starting in 2006 and for non-road diesel fuel in 2007. Alaska had a slightly different implementation schedule than the rest of the country, but as of December 1, 2010, all parts of Alaska (urban and rural) are required to use ultra-low sulfur diesel with a maximum sulfur content of 15 parts per million in on-road vehicles and non-road equipment, as is required in the other states.

The Proposed Action would include use of both on-road and non-road engines subject to mobile source regulations and associated emissions standards. Although the Proposed Action would have no direct compliance responsibility with regard to vehicles and engine emissions standards, the equipment selected could impact the total air emissions.

Visibility Protection Requirement and Regional Haze Rule

Atmospheric visibility is defined by the ability of the human eye to distinguish an object from the surrounding background. Scattering of light by aerosols is the main process limiting visibility in the troposphere (ground level to approximately 33,000 feet). Aerosols that have a diameter between 0.01-1µm scatter light most efficiently and therefore have a larger effect on visibility. The greatest reduction in visibility is at high relative humidity when the aerosols swell by uptake of water; this phenomenon is known as haze (NPS 1999).

The federal Regional Haze Rule (promulgated in 18 AAC 50.300 to 18 AAC 50.309) requires states to develop long-term plans for reducing pollutant emissions that contribute to visibility degradation, and to establish goals aimed at improving visibility in Class I areas in those plans. In Alaska, two primary sources of haze are long range transport of anthropogenic pollution from northern Europe and Russia and pollutants from Asian deserts and cities (Asian dust). Other sources are biogenic emissions from living organisms, sea salt, forest fires, and geogenic emissions from volcanoes in Alaska (ADEC 2011).

Greenhouse Gas Reporting Rule

Greenhouse gases (GHGs) are natural or anthropogenic gases that trap heat in the atmosphere and contribute to gradual average atmospheric temperature increases which is known as the greenhouse effect. In October 2009, the EPA issued the Mandatory Reporting of Greenhouse Gas Rule (EPA 2009), which required reporting of GHG data and other relevant information from large stationary sources and suppliers in the United States. In general, the rule is referred to as 40 CFR 98 (Part 98). Implementation of Part 98 is referred to as the GHG reporting program. Per 40 CFR 98 Subpart A, research and development activities are not required to report GHG emissions to the EPA (EPA 2013).

The gases covered by Part 98 are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and other fluorinated gases. Because carbon dioxide (CO_2) is the reference gas for climate change, measures of non-CO_2 GHGs are converted into CO_2 equivalent (CO_2e) based on their potential to absorb heat in the atmosphere (known as global warming potential).

Based on the operations of Ketchikan Port Facility under the Proposed Action[1], NOAA is not a producer or a supplier of industrial emissions that would require GHG reporting and is exempt from the GHG reporting program.

Marine Vessel Emission Standards

During the summer months, Southeast Alaska experiences heavy vessel traffic from cruise ships, commercial fishing, and ferries. Marine visible emission standards for all vessels are set forth in Title 18 of the Alaska Administrative Code (AAC) 50.070. Within 3 miles of the Alaska coastline, visible emissions, excluding condensed water vapor, may not reduce visibility through the exhaust effluent of a marine vessel by more than 20 percent. EPA Method 9 is used to monitor cruise ships and ferries. ADEC conducts opacity readings on large cruise ships and responds to public complaints. While unlikely, because of the size of the NOAA Ship *Fairweather*, it may be subject to Method 9 opacity readings, which are only performed by qualified observers for non-cruise ships or outside federal marine parks if a public complaint is filed to AEDC.

4.1.2 Affected Resources

Air quality at a given location is defined by pollutant concentrations in the atmosphere (generally expressed in units of parts per million, parts per billion [ppb], or micrograms per cubic meter [µg/m3]), and visibility. Air quality is affected by natural phenomena and anthropogenic factors. Weather fluctuations and climate are considered part of the air quality analysis because they control dispersion and affect ambient concentrations of air pollutants. Anthropogenic sources such as power plants, road dust, mining, oil and gas facilities, timber mills, and fuel burning vehicles throughout Alaska contribute to local and regional air pollution. In addition, Alaskan air quality is impacted by long-range transport of pollutants from global sources.

Climate

The Southeastern Alaska Intrastate Air Quality Control Region covers Southeast Alaska, consisting of several major islands, a thin strip of mainland bordering Canada on the eastern side and the Pacific Ocean on the western side, with numerous smaller islands in between. Due to the inland water passages and proximity to the North Pacific Ocean, most of Southeast Alaska has a marine climate (Geiser et al. 1994). The land area is approximately 35,000 square miles.

The southeast region is characterized by relatively small temperature variations, high humidity, high precipitation, cloudiness, and at sea level, little freezing weather (Geiser et al. 1994). The topography of the region consists of fjord-like ocean inlets and sounds throughout the region with very mountainous terrain on the island and mainland areas. The topography comprises large variations in elevation, with a maximum elevation change of 2,838 feet and an average elevation above sea level of 398 feet (WeatherSpark 2020). This topography lends itself to large variations in meteorological conditions from

[1] NOAA is not the owner or operator of a facility included in 40 CFR 98 Subpart A, Table A-3, Table A-4, or Table A-5.

one area to another. The cool, moist, maritime conditions throughout the region produce a lush forest, the Tongass National Forest, which is an extension of the rain-belt forest of the Pacific Northwest. No permafrost exists at forested elevations. High elevations support alpine vegetation, with rock, ice, and snow above (Geiser et al. 1994).

The city of Ketchikan is on Revillagigedo Island in Southeast Alaska in the Tongass National Forest. Ketchikan averages approximately 150 inches of rainfall and approximately 37 inches of snowfall annually; it is considered a temperate rainforest. October is the wettest month, averaging 22 inches of rainfall; June is the driest month, averaging 7 inches of rainfall; and January is the snowiest month, averaging 13 inches of snowfall (WRCC 2016).

The warmest month (with the highest average high temperature) is August (64.5 degrees Fahrenheit [°F]). The month with the lowest average high temperature is January (38.4°F). The month with the highest average low temperature is August (52.1°F). The coldest month (with the lowest average low temperature) is January (28.8°F) (Weather Atlas 2021).

Wind speeds are dependent on local topography, seasonal variations, and other factors. The windiest month of the year is January with approximately 9 mile per hour (mph) winds. The calmest month of the year is July with approximately 5-mph winds. Wind direction varies throughout the year; from April through November, wind typically comes from the south, while the rest of the year, wind typically comes from the east (WeatherSpark 2020).

Existing Emissions

Air quality in the Tongass National Forest and in Southeast Alaska is generally good. The prevailing winds from the Pacific Ocean, relatively small amount of industrial development and population centers, and the general lack of smoke from wildland fire all contribute to maintaining clean air in the region. However, localized air pollution from sources such as mining operations, marine vessels and cruise ships, wood-burning stoves, vehicle exhaust, diesel power and asphalt plants, incinerators, and unpaved roads all contribute to the deterioration of air quality (USDA 2007).

As mentioned above, the Ketchikan Gateway Borough is currently in attainment for all NAAQS air quality standards (EPA 2020). The closest ambient air quality monitoring location to the project site is approximately 300 miles north of the proposed project in the city and borough of Juneau; the Juneau Floyd Dryden Monitoring Station continuously monitors for PM_{10} and $PM_{2.5}$ concentrations (ADEC 2020a). The ADEC Division of Air Quality is in the process of testing and deploying several AQMesh sensor pods to locations in Southeast Alaska to assess ambient concentrations of a variety of particulate and gaseous pollutants in relation to cruise ship impacts. Data from the pods provide 1-hour average concentrations during the previous 3 hours and hourly averages over a 24-hour period (Table 4.1-1). Note that the AQMesh sensor pods are in the process of being tested; therefore, the data is not official but is the best available for the Ketchikan area.

Table 4.1-1: Hourly Average Concentrations in Ketchikan

	CO (ppb)	NO_2 (ppb)	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)	SO_2 (ppb)	NO (ppb)
1-Hour Average Concentration	260.8	6.3	36	13	-0.4	-2.7
2-Hour Average Concentration	300.3	6.8	20.8	8.4	-0.4	-1.8
3-Hour Average Concentration	266.8	6.9	21.7	7.5	-0.5	-2.1
24-Hour Maximum Concentrations	444	8.9	43.1	27.7	0.6	2.09

Source: ADEC 2020b
Notes:
ppb=parts per billion
μg/m^3=micrograms per cubic meter
Averages taken on November 23, 2020; AQMesh sensor pod is situated on Front Street north of the Cedar Street intersection in Ketchikan, Alaska, near cruise ship docks and a high traffic area; approximately 1 mile north of the Proposed Action.

The project is situated in largely industrial areas located to the northwest and southeast, a cemetery to the east, and Pennock Island to the southwest across the Tongass Narrows. The existing buildings and structures on site are mostly unused except for the office building with small administrative office, electrical building, and warehouse. Local sources of criteria air pollutants in the area include transportation sources such as vehicles, marine vessels, and aircraft.

Surrounding Uses and Sensitive Receptors

Directly southeast of the project site is the Petro Marine Services pier fuel dock and the United States Coast Guard (USCG) Station Ketchikan farther southeast just beyond Petro Marine Services. To the northwest is Northland Service Inc. and Alaska General Seafoods facilities.

Sensitive receptors typically include residential dwellings, schools, and hospitals, or other sensitive land-based uses (e.g., atmospheric research stations). Sensitive receptors near the Proposed Action include residences approximately 0.39 miles to the north, the Bayview Cemetery across Stedman Street approximately 500 feet east of the project site, and the USCG base approximately 0.17 miles to the southeast (Google 2020) that periodically has personnel staying in berthed vessels. The local hospital is approximately 2.5 miles northeast of the project site. Schoenbar Middle School is approximately 0.5 miles northeast of the project site.

Greenhouse Gases

There are six types of gases included in the U.S. Greenhouse Gas Inventory: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Emissions of these GHGs are presented using a common metric, CO_2 equivalence (CO_2e), which indicates the relative contribution of each gas to global average radiative forcing on a Global Warming Potential weighted basis (EPA 2020).

Gross emissions from anthropogenic sources during the time period from 1990 to 2015 have decreased by approximately 8 percent (3.63 million metric tons CO_2e[2] decrease in emissions). According to the Energy Information Administration and based on total energy-related carbon dioxide emissions for 2014, Alaska ranks 40th in emissions amongst states. On a per capita basis, Alaska ranks fourth highest in the nation. Alaska's GHG emissions comprise about 0.63 percent of nationwide GHG emissions and 0.09 percent of global GHG emissions (ADEC 2018).

From approximately 1995 through 2003, Alaskan GHG emissions were quite stable at approximately 50 million metric tons of CO_2e and peaked in 2005. Between 1990 and 2015, total gross GHG emissions of CO_2e have decreased by approximately 8 percent.

The industrial sector, including the oil and gas industries, produces the most GHG emissions in Alaska on an annual basis, followed by the transportation, residential and commercial, and electrical generation sectors (Figure 4.1-1). Waste, agriculture, and industrial process sectors each produce relatively small quantities of GHG in Alaska (less than 1 percent each). Emission increases have been identified in agriculture, electrical generation, waste, and residential and commercial sectors, but the increases are small. Emissions from the major emitters (point sources) have remained relatively stable since 2010.

Transportation emissions are generated from burning fuel in cars, trucks, snow machines, marine vessels, aircraft, construction equipment, and other mobile equipment. The carbon dioxide emissions are directly proportional to the quantity of fuel consumed, but the methane and nitrous oxide emissions depend on the type of equipment. In 2015, transportation contributed approximately one-quarter of Alaska's GHG emissions, about the same percentage as in 2010. See Section 4.7, Floodplains, for a discussion of sea-level rise.

[2] "Carbon dioxide equivalent" or "CO_2e" is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 that would have the equivalent global warming impact.

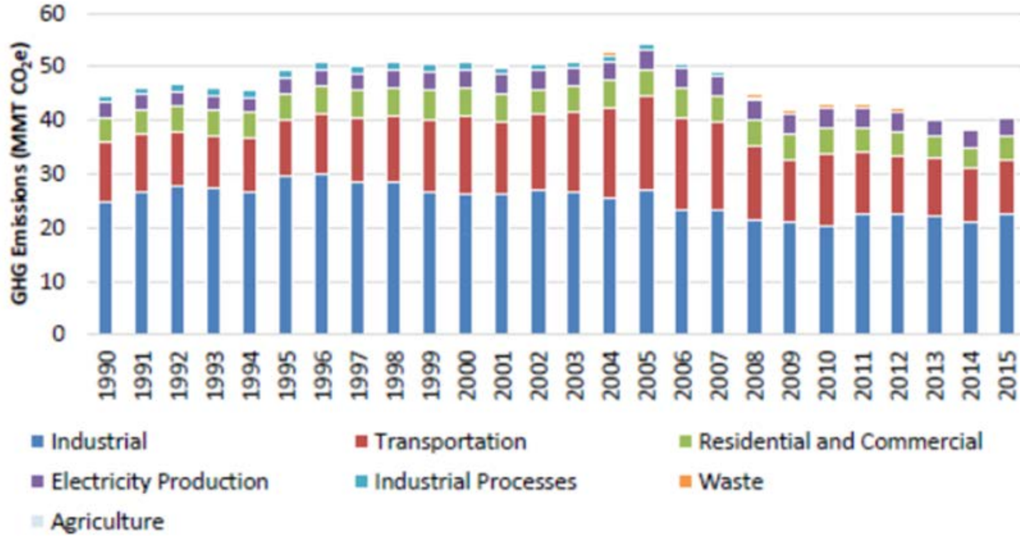


Figure 4.1-1: 1990 to 2015 Alaska Gross Annual Greenhouse Gas Emissions

4.1.3 Environmental Consequences

Preferred Alternative—Floating Pier

Construction

Construction equipment used for proposed upland activities such as demolition, paving, excavation, and prefabricated building installment may include multiple pieces of the following equipment; excavator, backhoe, dozer, roller compactor, pavement placement equipment, asphalt roller, scissors/boom lift, trench digger, flatbed trucks, dump trucks. Construction equipment used for in-water activities may include a floating barge for cranes, cutters, augers, drills and hammers, along with a shoreside crane. The number of construction workers required at the site would vary over the construction period depending on the construction phase. Construction methods and schedule for the Preferred Alternative have not yet been established at the time of this writing.

During construction, periods of elevated criteria air pollutant concentrations would result from increased tail-pipe emissions from construction equipment and fugitive dust, demolition activities upland and in-water, excavation and relocation of the sewer holding tank, and construction of a new prefabricated office building. During construction, 18 AAC 50 would be adhered to and construction criteria air pollutant and GHG emissions would be reduced. In addition, anticipated contractor best management practices (BMPs) would be employed that can help reduce construction-related air pollution and further reduce potential construction-related emissions. Due to the small construction area, it is anticipated that emissions due to construction would be minor. Therefore, the Proposed Action would have a short-term, minor adverse impact to air quality.

Operations

Long-term air quality effects pertain to the emissions associated with the operation of the existing warehouse and new office building, traffic generated by operation and maintenance of the facility, docking of the NOAA Ship *Fairweather* and other vessels throughout the year, access to the pier by trucks, cranes, and large vehicles transporting supplies, gear, and equipment for on- and off-loading berthed vessels. Operation of the Ketchikan Port Facility under the Preferred Alternative would involve administrative, light-industrial, security, maintenance, and maritime activities consistent with the current marine industrial nature of the region. Activities typical to dockside/topside ship maintenance would occur including repair work. Repair work includes, but is not limited to, inside and outside hot work, abrasive blasting, and other inside and outside abrasive activities. Maintenance practices may also include minor sanding and spot painting of interior and exterior surfaces above the water line. A backup power generator and double-walled diesel fuel supply would be installed and used during infrequent power outages and for short periods during monthly preventative maintenance.

The Proposed Action assumes the permanent relocation of up to 20 NOAA personnel or wage crew to Ketchikan, adding up 80 vehicle trips per day[3] during operations. When docked, staff would primarily stay aboard the ship except for the small number of assumed NOAA staff choosing to reside in Ketchikan. Equipment for research, maintenance, or replacement would be delivered to the Ketchikan Port Facility on a monthly basis on average[4]; delivery methods would include 18-wheel tractor-trailer rigs or other truck types. As discussed in Section 4.12, Transportation, it is anticipated that any increase in traffic volumes from operation of the Proposed Action would have minor long-term adverse air quality impacts.

The Preferred Alternative would result in limited criteria air pollutant and GHG emissions. Operations are limited to relatively low staffing, temporary officer and crew on-board lodging while in port, maintenance, and vehicle usage, resulting in a minor net increase of air emissions. Consistent with the industrial nature of the region and the application of standard construction BMPs for the control of air emissions, the Proposed Action would be limited to minor short- or long-term adverse air quality effects.

Action Alternative 1—Fixed Pile-Supported Pier

Action Alternative 1 is similar to the Preferred Alternative with the exception of the replacement pier design. Action Alternative 1 proposes the construction of a fixed pier design which would require 10 piles to support access trestle and up to 100 piles to support the pier. Piles would be steel and up to 24 inches in diameter. All impacts would be similar to the Preferred Alternative however the significant increase in piles would increase the duration of construction and potential air emissions. BMPs would also be applied under this alternative to ensure air quality impacts due to pile driving activities would be reduced. Therefore, Action Alternative 1 would have a short-term moderate adverse air quality impact during short term construction.

Operational impacts of Action Alternative 1 are the same as described for the Preferred Alternative.

No-Action Alternative

Under the No-Action alternative, no facilities would be upgraded or constructed for the project. The NOAA Ship *Fairweather* would continue to be operated from the NOAA MOC-P in Newport, Oregon or alternative locations in Ketchikan. Under this alternative, no change to the physical environment would occur. Because there would be no construction activities or changes to operations, there would be no new construction or operational emissions. Therefore, no impacts to air quality would occur under the No-Action Alternative.

4.1.4 Mitigation Measures

No mitigation measures are required to reduce project-related effects to air quality. Standard industry BMPs and compliance with federal regulations pertaining to air pollution control would be implemented and may include:

- Application of water to exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved areas)
- Covering haul trucks transporting soil, sand, or other loose material
- Removing visible mud or dirt track-out onto adjacent public roads using wet power vacuum street sweepers, or equivalent
- Limit vehicle speeds on unpaved roads to 15 mph
- Complete paving and grading work in a timely manner, and lay building pads as soon as possible after grading
- Minimize idling times by either shutting equipment off when not in use or by reducing the maximum idling times

[3] It is assumed two round trips would be taken per employee per day: the daily commute to/from the project site from the worker's residence, and one lunch time round trip.
[4] Assuming an average of one monthly truck delivery, approximately 24 truck trips are anticipated per year.

- Maintain construction equipment and keep properly tuned in accordance with manufacturer's specifications

4.2 NOISE

4.2.1 Regulatory Setting

Noise Control Act and Quiet Communities Act

The EPA has historically coordinated federal noise control activities through its Office of Noise Abatement and Control. In 1981, the EPA phased out funding of the office as part of a federal policy to transfer the primary responsibility for regulating noise to state and local governments. However, Congress did not rescind the federal Noise Control Act of 1972 and the Quiet Communities Act of 1978, and these laws remain in effect today.

Fundamentals of Noise and Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to typical environmental noise exposure levels is annoyance. The responses of individuals to similar noise events are diverse and influenced by many factors including the type of noise, the perceived importance of the noise, its appropriateness to the setting, the time of day, the type of activity during which the noise occurs, and noise sensitivity of the individual.

Decibels (dB) are the standard unit of measurement of the sound pressure generated by noise sources and are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale for earthquake magnitudes. A doubling of the energy of a noise source (such as doubling of traffic volume) would increase the noise level by 3 dB and a halving of the noise energy would result in a 3 dB decrease (Caltrans 2013).

Typical sound levels of familiar settings are depicted in Figure 4.2-1 and include the approximate decibel levels of commonly known sound sources. The range of audible sound levels for humans is generally considered from 0 to 130 A-weighted decibels (dBA). Note that the decibels are logarithmic and a difference of 10 dB is perceived as a doubling or halving of loudness. Sound sources in Figure 4.2-1 that have no associated distance listed are indicative of typical referenced environments.

LEVELS OF NOISE In decibels (dB)

PAINFUL & DANGEROUS	Use hearing protection or avoid	140	· Fireworks · Gun shots · Custom car stereos (at full volume)
		130	· Jackhammers · Ambulances
UNCOMFORTABLE	Dangerous over 30 seconds	120	· Jet planes (during take off)
VERY LOUD	Dangerous over 30 minutes	110	· Concerts (any genre of music) · Car horns · Sporting events
		100	· Snowmobiles · MP3 players (at full volume)
		90	· Lawnmowers · Power tools · Blenders · Hair dryers
Over 85 dB for extended periods can cause permanent hearing loss.			
LOUD		80	· Alarm clocks
		70	· Traffic · Vacuums
MODERATE		60	· Normal conversation · Dishwashers
		50	· Moderate rainfall
SOFT		40	· Quiet library
		30	· Whisper
FAINT		20	· Leaves rustling

Source: Karnataka State Law University 2020.

Figure 4.2-1: Typical Sound Levels

For a stationary point source of sound, sound typically attenuates at a rate of 6 dB per doubling of distance (DD) (dB/DD) (i.e., 6 dB at 50 feet, 12 dB at 100 feet, 18 dB at 200 feet). Atmospheric conditions such as wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound traveling over an acoustically absorptive surface such as forest or fresh snow attenuates at a greater rate than sound traveling over a hard surface such as pavement or ice. The increased attenuation caused by acoustical air and ground absorption is typically in the range of 1–2 dB/DD. Barriers such as buildings and topography that block the line of sight between a source and receiver increase the attenuation of sound over distance.

4.2.2 Affected Resources

The Proposed Action along the eastern shore of the Tongass Narrows is at the southern portion of the city of Ketchikan. Ambient noise in this vicinity is typical for a marine industrial environment. Delivery yards, storage tanks, warehouses, processing facilities, office buildings, wharves, and piers are present along this section of shore and on adjacent properties accessed by the primary coastal route of Stedman Street, which becomes the South Tongass Highway. Hillsides and steep slopes limit development further inland. Other sources of ambient noise include vehicle and vessel traffic, landing and takeoffs of seaplanes, and vessel operations (e.g., loading, fueling and maintenance) at adjacent waterfront locations. Other periodic regional activities include land clearing, quarry work, and the operation of pumps or generators periodically at certain industrial facilities. An airport is approximately 2.6 miles to the northwest and a seaplane base is approximately 1.3 miles to the northwest.

The surrounding noise sources include traffic along Stedman Street, a two-lane road with a speed limit of 30 mph. A bus stop is nearby (Google 2020). The USCG operates a small arms range 0.3 miles southeast of the NOAA property. Prior noise measurements indicate a typical highway traffic noise level of 58.0 dBA along South Tongass Highway with a noise level of 60 dBA during peak hour traffic volume (ADOT&PF 2013).

Sensitive noise receptors typically include residential dwellings, schools, and hospitals, or other noise-sensitive land uses. Sensitive receptors nearest to the Ketchikan Port Facility include residences approximately 0.4 miles to the north, the Bayview Cemetery across Stedman Street approximately 500 feet east of the project site, and the USCG base approximately 0.2 miles to the southeast, which periodically includes personnel lodging in berthed vessels. The hospital is approximately 2.5 miles northeast and Schoenbar Middle School is approximately 0.5 miles northeast of the project site. See Section 4.8, Biological Resources for hydroacoustic noise considerations affecting marine species.

4.2.3 Environmental Consequences

Preferred Alternative—Floating Pier

Construction

Construction of upland areas would include typical equipment for demolition, paving, and potentially prefabricated building installment, such as excavator or backhoe loader, crane, grader, trucks, and pavers. Construction equipment used for in-water activities would generate terrestrial noise and may include a floating barge, barge crane, shoreside crane, and pile removal/installation equipment (e.g., rock socket pile driving rigs, vibratory pile removal). Due to the current conceptual level of design for the proposed in-water demolition and construction, this analysis considers use of a worst-case pile installation scenario associated with the use of an impact hammer; however, it is anticipated that rock socket installation drilling and setting is preferred with the potential for limited, low-power hammer proofing strikes. The actual installation method (and associated equipment used) depends on site-specific geotechnical characteristics, which would be determined during design. Vibratory pile removal, achieved by clamping the vibratory hammer to the pile and operating the hammer while using a crane to pull the pile upward, is also assumed for this analysis.

Drilling and other equipment used for a rock socket pile installation and vibratory hammer or similar pile removal would result in limited periods of increased noise. Construction activities would also result in short-term and intermittent elevated noise levels along truck routes for the delivery of construction materials and hauling of construction debris (such as demolition debris).

To further assess a worst-case scenario conditions, this analysis assumes that the loudest equipment operates simultaneously for 1 hour from a single acoustic point representing the geographic center of the construction area, and that onshore and in-water construction activities would occur simultaneously. The reference noise levels at a distance of 50 feet for the types of equipment to be used are 101.0 dBA for a pile driver and 85 dBA for a paver (FTA 2018). Assuming a worst-case scenario, construction noise would be 81.5 dBA at 500 feet, approximately 76.4 dBA at 897 feet, and approximately 69.2 dBA at 2,052 feet (FTA 2018).

The nearest sensitive terrestrial receptor in the project vicinity is the cemetery approximately 500 feet away. The nearest sensitive human receptor is at the USCG base approximately 0.17 miles away (897 feet) and the residential uses to the north approximately 0.39 miles (2,052 feet). Noise generated by construction of the Preferred Alternative would be moderate at these receivers. BMPs identified in Section 4.2.4 would further reduce potential noise effects to adjacent properties and nearby sensitive receptors.

Noise during construction would be discernible from the neighboring commercial seaplane and marina development; construction noise would be short term and consistent with industrial and marine operations in the area. BMPs would reduce construction noise impacts to these neighboring operations. In addition, construction noise would occur primarily during normal working hours, would dissipate with distance from the source, and would occur intermittently during the construction period only. Workplace-related noise concerns would be mitigated through the use of proper hearing protection. Therefore, short-term construction noise impacts from the Proposed Action would have a short-term moderate adverse noise impact.

Vibration

The Preferred Alternative would generate construction vibration from the use of heavy earthmoving equipment for demolition, excavation, and pile removal. Using reference vibration levels, the operation of a small bulldozer and loaded trucks would be 18.97 and 86 vibration decibels (VdB) at a distance of 25 feet, respectively, and 0.003 and 0.076 inches per second [in./sec] peak particle velocity [PPV] at a distance of 25 feet (FTA 2018). Pile driving would generate vibration levels of approximately 112 VdB (1.518 in/sec PPV) at a distance of 25 feet (FTA 2018).

With respect to human perception and annoyance due to construction vibration activities, the FTA's Transit Noise and Vibration Impact Assessment technical manual provides human response and perception levels for ground-borne vibration (FTA 2018): human response is barely perceptible for vibration levels of 65 VdB; barely perceptible and distinctly perceptible for vibration levels of 75 VdB; and typical human response to vibration levels of 85 VdB is tolerable only if daily events are infrequent (FTA 2018). As the construction method and schedule are not established, this analysis assumes the worst-case scenario where impact pile driving will be used. Assuming a worst-case scenario, construction-related vibration would be 72.97 VdB at 500 feet during pile-driving activities (FTA 2018), which would create a barely perceptible vibration impact under a worst-case condition associated with pile-driving activities. Therefore, the Proposed Action would have a short-term negligible impact to nearby sensitive receptors due to construction vibration.

With respect to potential structural damages due to construction-related vibration, the FTA's Transit Noise and Vibration Impact Assessment technical manual provides criteria for ground borne vibration impacts (FTA 2018). According to FTA guidelines, a vibration-damage criterion of 0.20 in/sec PPV should be considered for non-engineered timber and masonry buildings. Furthermore, structures or buildings constructed of reinforced concrete, steel, or timber have a vibration-damage criterion of 0.50 in/sec PPV (FTA 2018). The distance between these activities and the closest vibration-sensitive uses would be the existing warehouse approximately 100 feet away from in-water pile-driving activities and within 25 feet of upland construction activities. The short-term project construction vibration level at existing warehouse would be approximately 0.076 in/sec PPV for upland construction activities and 0.189 in/sec PPV for in-water pile driving activities. This level of vibration is below the FTA guidelines established threshold of significance and would not likely be perceptible. Therefore, the Proposed Action would have a short-term negligible impact to nearby structures due to construction vibration.

Project operations would not result in excessive ground borne vibration levels.

Operations

Operation of the Preferred Alternative would produce intermittent sources of noise at the project site associated with the Proposed Action. Operations include access to the pier by trucks, cranes, and large vehicles transporting supplies, gear, and equipment for on- and off-loading berthed vessels. Operation of the Ketchikan Port Facility would involve regular administrative, light-industrial, maintenance, and maritime activities consistent with the historic marine industrial uses at the site (except for fueling). Shop activities would be typically performed in the enclosed warehouse structure. Equipment for research, maintenance, or replacement would be delivered on a monthly basis on average; delivery methods would include 18-wheel tractor-trailer rigs. Activities typical to dockside/topside ship maintenance would occur including repair work. Repair work includes, but is not limited to, inside and outside hot work, abrasive blasting, and other inside and outside abrasive activities. Maintenance practices may also include minor sanding and spot painting of interior and exterior surfaces above the water line.

During operation, infrequent high-impact noise activities associated with the marine industrial nature of actions proposed at the site and in surrounding areas may occur; however, with implementation of anticipated BMPs, the potential effects of high-impact operational noise levels would be reduced. Consistent with the surrounding uses and industrial nature of the site, distance to off-site sensitive receptors, and implementation of BMPs, these activities would produce noise levels similar to existing surrounding industrial uses at off-site sensitive receptor locations. Therefore, the Proposed Action would have long-term moderate adverse noise impacts.

Action Alternative 1—Fixed Pile-Supported Pier

Effects similar to the Preferred Alternative (with the exception of those for fixed-pier pile installations) would occur. A fixed-pier design would require at least 10 steel piles to support access trestle and up to 100 steel piles to support the pier; piles would be up to 24 inches in diameter. All impacts would be similar to the Preferred Alternative; however, the significant increase in piles would increase the duration of construction. Like the Preferred Alternative, BMPs would be implemented to ensure noise impacts during construction are minimized. Therefore, Action Alternative 1 would have a short-term moderate adverse noise impact during short-term construction.

Operations of Action Alternative 1 are the same as the Preferred Alternative.

No-Action Alternative

Under the No-Action Alternative, no facilities would be upgraded or constructed for the project. The NOAA Ship *Fairweather* would continue to be operated from the NOAA MOC-P in Newport, Oregon. Under this alternative, no change to the physical environment would occur. Because there would be no construction activities or changes to operations, there would be no changes in noise generated at the site. Therefore, no impacts with regard to noise would occur under the No-Action Alternative.

4.2.4 Mitigation Measures

No mitigation measures are required to reduce project-related effects related to noise. Standard construction industry BMPs would be implemented and may include:

- Route truck traffic away from residential areas and sensitive receptor locations such as schools or parks
- Turn off equipment when not in use and prohibit unnecessary idling of internal combustion engines
- Locate stationary noise-generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors
- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that in are in good condition and appropriate for the equipment

4.3 Geological Resources

4.3.1 Regulatory Setting

Federal Land Policy and Management Act

The Federal Land Policy and Management Act of 1976 (PL 94-579) requires that the public lands be managed in a manner that protects the “quality of scientific” and other values, which includes paleontological resources, such as fossils. Paleontological resources may also be protected by the Antiquities Act or the Archaeological Resources Protection Act.

4.3.2 Affected Resources

This section describes geological resources and potential project-related effects, as well as any geological hazards that could be exacerbated by the Proposed Action. Geological resources consist of geography, topography, geology, and soils, as well as mineral resources or protected geological or paleontological features.

Topography, Soils, and Mineral Resources

Ketchikan is in the Alexander Archipelago on Revillagigedo Island in a coastal mountain range that stretches from northern British Columbia to Skagway, Alaska (USCG 2013). The regional area is in the Taku terrane, which is an assemblage of deformed and metamorphosed strata (Berg 1998). Units are Mesozoic or Paleozoic metavolcanic rocks with the probable presence of hornfels. The unit in the southwest portion of Revillagigedo Island consists primarily of phyllite, semischist, and schist (Berg 1988). Bedrock outcroppings near the site are characterized as low-grade metamorphic materials consisting of chloritic schist and garnet schist, which are highly weatherable (SRI International 2003).

The city of Ketchikan has several mineral deposits that were explored in the early twentieth century. There are no previous prospects that have been identified in or adjacent to the project area. Substantial mineral resource areas identified in the Tongass Narrows area on Gravina Island, northwest of Ketchikan (Hoadley Creek), and southeast beyond the city of Saxman (Maas et al 1995 and Bittenbender et al 1993). There are no protected geological features in or near the project area.

The Society of Vertebrate Paleontology has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys. Areas where fossils have been previously found are considered to have a high sensitivity and a high potential to produce fossils. Areas that are not sedimentary in origin and that have not been known to produce fossils in the past typically are considered to have low sensitivity. Areas consisting of high-grade metamorphic rocks (e.g., gneisses and schists) and plutonic igneous rocks (e.g., granites and diorites) are considered to have no sensitivity. The project area lacks sedimentary geological units, and therefore has low to no paleontological sensitivity (Society of Vertebrate Paleontology 2010).

The natural topography of the local area largely consists of a moderately steep shoreline and topography sloping toward the Tongass Narrows. For this reason, most of the onshore portion of the site consists of imported shot (crushed) rock fill. No previously undisturbed native soils exist at the site. The depth to bedrock underlying the imported fill varies from 1 to 2 feet in the southern half of the site, and up to 6.5 feet in northern half of the site (Bristol 2003). Fill material depths were reported to be as great as 15 to 18 feet along portions of the site closest to the shoreline (AECOM 2015). This fill material has not been identified as a potential source of liquefaction or erosion (Lemke 1975).

Offshore marine sediments are reported to be minimal, with sediment cover depths progressively increasing away from the shoreline (USCG 2013). Marine sediment depths overlying bedrock reportedly range from 4 to 5 feet, and consist of coarse sand, rock fragments, and shells (Bristol 2003).

The shallow, transient, or deeper groundwater that may exist below the site is not currently being used and may not be potable, based on proximity to the ocean (ADEC 2000). Surface water and groundwater flow would generally coincide with topographic trends from northeast (upslope) to the Tongass Narrows (southwest). Discharge is anticipated to occur through surface water runoff or via seeps at or below the coastline.

Geologic Hazards

The geologic hazards of the area are earthquakes, tsunamis, and landslides.

Earthquake

In Southeast Alaska, seismic activity is primarily from the Fairweather-Queen Charlotte fault system, the Chatham Strait section of the Denali fault, and the eastern end of the Transition fault. These faults are considered capable of producing major destructive earthquakes with magnitudes as high as 7 or 8.25 likely to occur within 50 years (Hansen and Combellick 1998). The Fairweather-Queen Charlotte fault system is the closest of these faults to Ketchikan, approximately 140 miles from the project site. It forms the boundary between the Pacific and North American plates. It is oriented in a northwest/southeast direction and is west of the Alexander Archipelago. The Tongass Narrows fault is adjacent to Ketchikan in Tongass Narrows. The relative seismic activity and seismic potential of this fault is unknown (Koehler 2018). The Federal Emergency Management Agency (FEMA) categorizes the Ketchikan area as Seismic Design Category “B” (the second lowest of five categories), which means the area could experience shaking of moderate intensity (FEMA 2020a).

Tsunami

Due to its maritime location and the local seismic activity of Southeast Alaska, Ketchikan is subject to wave run-up from tsunamis. The maximum run-up height due to seismic activity has been modeled as 3.3 feet in Ketchikan. Subaerial or submarine landslide-generated tsunamis are also possible near Ketchikan due to the submarine layers of glacial sediments and steep fjord sidewalls of the general area that are prone to collapse, especially during shaking from earthquakes. Existing tsunami hazard assessments of Ketchikan do not account for tsunamis generated by subaerial or submarine landslide (Suleimani 2019). Tsunami run-up potential at the project area from subaerial and submarine landslides is anticipated to be higher than 3.3 feet.

Landslide

The combination of steep slopes and high rates of precipitation in and around Ketchikan cause a potential for a high number of landslides. Periods of high precipitation can quickly saturate soils, destabilizing slopes. Earthquake activity has also contributed to numerous historic and recent landslides in and around Ketchikan. Evidence of dozens of historic to recent landslides can be observed across the mountain slopes within 5 miles of Ketchikan (NWS 2020).

From the project site, the land slopes upward away from the shoreline, with very steep slopes 0.4 miles inland of the project site. There are at least five identified historic landslides within 1.5 miles of the project site (NWS 2020; ADN 2020). A landslide (debris avalanche) occurred approximately .5 miles inland from the project site in 1985, directly upslope of the nearby Coast Guard station (NWS 2020). In February of 2020, a grocery store 0.35 miles northwest of the project site on Stedman Street was heavily damaged from a landslide and had to be demolished (ADN 2020). There is potential for landslides to directly affect the project area.

4.3.3 Environmental Consequences

Project-related effects to geologic resources could occur if existing protected geologic features or access to existing resources (e.g., mineral resources) are affected by the project, or if the project results in a health and safety hazard due to development in geologic hazards areas. Some geological hazards can be reduced or mitigated by engineering, design or modified construction practices, but other geological hazards are unavoidable because of the need for facilities to be functionally located in the water or on the adjacent shoreline or because of the steep topography of the area.

Preferred Alternative—Floating Pier

The Preferred Alternative would have no adverse impact to geological resources. All activities and new facilities would occur primarily in the footprint of the existing facilities. The Preferred Alternative would take place in an area with known or potential geologic hazards of earthquake, tsunami, and landslide. These hazards would mostly be mitigated or minimized through project design, following regulated design criteria, and BMPs; however, some hazards are inherently characteristic with the functional need for the project to occur adjacent to and in the water, as well as the general steep topography of the area.

No protected geological features or paleontological resources are known to be present in the project area, and the upland portion of the project site is primarily on fill. Therefore, no effects are expected to these resources.

No mineral resources have been identified in or adjacent to the project area. Therefore, this alternative is not expected to affect access to mineral resources. In addition, the Preferred Alternative would not result in changes to access to or availability of the substantial mineral resources that have been identified in other locations of the Tongass Narrows area.

All proposed upgraded or new upland and in-water facilities would be designed to meet industrial standards, such as those in the International Building Code. Following industrial standards would ensure that site-specific geotechnical evaluations would occur to determine site-specific geologic hazards, and project design and construction would address any determined geologic hazards such as seismic hazards and hazards of coastal erosion. Industrial design standards would also be followed for pier designs. Following industrial design standards would result in minimizing the potential short-term (during construction) and permanent effects of implementing the Proposed Action to health and safety, infrastructure, and the existing geology related to site-specific geologic hazards.

There is potential for the proposed in-water facilities and upland facilities to be affected by wave runup from tsunamis caused by earthquake, subaerial landslide, and/or submarine landslide. Maximum run-up is anticipated to be greater than 3.3 feet. The specific effects of this geologic hazard, if a tsunami were to occur, would be based on the water surface elevation at the time of the incident. As described in Section 4.7, Floodplains, there is a greater than 15-foot difference between the tide level at mean higher high water and mean lower low water with higher water elevations experienced during flood events. If a tsunami were to impact the project area during the time of a low tide, the wave run-up would likely not affect or inundate any upland facilities in the project area. However, if a tsunami occurs during high tide and/or during a 1 percent annual chance flood event, facilities located at the shoreline, or immediately landward of the shoreline would be affected. The probabilistic frequency of such an event occurring has not been calculated.

A sudden increase in the water level as a result of a tsunami impacting the project area could result in effects to the proposed in-water facilities similar to waves or ship wakes, or could have more severe effects; a tsunami could affect ships and boats moored at the facility resulting in ships and boats becoming unmoored and displaced against the shoreline or in-water facilities. Functionally, in-water facilities need to be situated in the water and are generally designed to withstand some wave action; however, damage could be sustained from a tsunami to all in-water facilities and moored boats and ships. Section 4.7, Floodplains, provides several recommendations to reduce the risk of flooding and flood damage. The implementation of these measures would also reduce the severity of damage that could occur as a result of a tsunami.

There is potential for a landslide to directly affect the project area, compromise health and safety, and damage any of the proposed above-ground facilities, in-water facilities, and moored boats and ships. The general topography of the entire Ketchikan area includes steep slopes above the developed shoreline areas. No recent landslides have been recorded in the immediate project area, but several landslides have occurred nearby. Landslides have not occurred at high frequency in the city of Ketchikan; the most recent landslide was in February 2020 and in 1985 prior to that. Currently, landslides have not been identified as a specific hazard in the building code for the city of Ketchikan requiring development or building design methods to mitigate the potential effects of landslides, and specific landslide hazard areas have not been identified. The proposed facilities are required for the operation and maintenance of NOAA's vessel and functionally need to be situated near the shoreline. It is not practical for them to be relocated to an alternative site away from the shoreline and outside a potential landslide hazard area in Ketchikan.

Because the Proposed Action would be designed and constructed following industrial design standards, it would have a direct, short-term (during construction), and permanent negligible impacts on geologic resources. Because of potential geologic hazards that are a functional practicality of the project area location (e.g., tsunami, landslide), the Proposed Action would have an indirect, permanent, and unavoidable moderate impact related to the susceptibility of the project area being affected by existing geologic hazards.

Alternative 1—Fixed Pile-Supported Pier

For geologic resources, there is no substantial difference between this alternative and the Preferred Alternative. Similar design criteria would be followed to address seismic earthquake hazards; the potential geologic hazards related to tsunami and landslides would be the same because this alternative would situate facilities at the same location. In addition, the measures described in Section 4.7, Floodplains, would also reduce the severity of damage that could occur as a result of a tsunami.

Because the Action Alternative 1 would be designed and constructed following industrial design standards, it would have direct, short-term (during construction), and permanent negligible impacts on geologic resources. Because of potential geologic hazards that are a functional practicality of the project area location (e.g., tsunami, landslide), the Action Alternative 1 would have an indirect, permanent, and unavoidable moderate impact related to the susceptibility of the project area being affected by existing geologic hazards.

No-Action Alternative

The No-Action Alternative would not result in new facilities in the project area. The existing facilities would be subject to the same geologic hazards described above for the Preferred Alternative. The existing facilities may be more susceptible to damage from earthquakes because they were constructed to meet an older building code design standard. The deteriorated state of the existing in-water facilities would likely result in greater damage from tsunami. Because no boats or ships use the current in-water facilities, there would be no damage to boats from tsunami in the project area, but these boats could be damaged if they are moored at other locations in Ketchikan during a tsunami. The potential damages from a landslide would be the same as under the Preferred Alternative. The No-Action Alternative would result in no effect to geologic resources; however, the No-Action Alternative would have an indirect, permanent, moderate impact related to the susceptibility of the project area to be affected by existing geologic hazards.

4.3.4 Mitigation Measures

No mitigation measures are recommended to reduce effects associated with geologic resources. Project design would include construction industry standards to reduce impacts associated with geological conditions, including the use of site-specific geotechnical evaluations to address any geologic hazards such as seismic hazards and hazards of coastal erosion.

4.4 Water Resources

4.4.1 Regulatory Setting

Clean Water Act

The Clean Water Act (CWA) is a 1977 amendment to the Federal Water Pollution Control Act of 1972 (U.S.C. Title 33), which established the basic structure for regulating pollutant discharges to navigable waters of the United States. The CWA sets forth procedures for effluent limitations, water quality standards and implementation plans, national performance standards, and point source (e.g., municipal wastewater discharges) and nonpoint source programs (e.g., stormwater). The CWA also establishes permits for dredged or fill material under Section 404, certifications that activities meet water quality standards under Section 401, the National Pollutant Discharge Elimination System (NPDES) under Sections 402, and allows for a list of impaired water bodies under Section 303(d) that can assist in improving water quality in impaired water bodies. The State of Alaska has established water quality standards pursuant to the CWA and state regulations. Relevant water quality standards for marine waters from industrial sources relevant to the Proposed Action are provided in Table 4.4-1.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 U.S.C. 403) establishes a program to regulate all work or structures in or affecting the course, condition, location, or capacity of jurisdictional wetlands. Jurisdictional wetlands include waters that are subject to the ebb and flow of the tide and/or are presently used or where used in the past or may be susceptible for use to transport interstate or foreign commerce. Also see Section 4.6, Wetlands and Other Waters.

Activities requiring Department of the Army (DA) permits under Section 10 of RHA include structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the jurisdictional wetlands.

Table 4.4-1: Relevant ADEC Water Quality Standards for Marine Waters for Industrial Uses

Parameter	Water Quality Standards
Petroleum, hydrocarbons, oils, and grease	May not make the water unfit or unsafe for the use.
pH	May not be less than 5.0 or greater than 9.0.
Floating solids, debris, sludge, deposits, foam, scum, or other residues	Residues are not allowed in surface waters of the state, in concentrations or amounts that have the following effects: • May impair designated uses • Cause nuisance or objectionable conditions • Result in undesirable or nuisance species • Produce objectionable odor or taste
Temperature	May not exceed 25°C.
Turbidity	May not cause detrimental effects on established levels of water supply treatment.

Source: ADEC 2020

Authorization from the U.S. Army Corps of Engineers (USACE) is required under Section 10 of the Rivers and Harbors Act and Section 404 of the CWA prior to discharge of dredged or fill material into Waters of the U.S. (WOUS), including special aquatic sites such as wetlands. Activities such as pier removal and installation in WOUS require this authorization. See Section 4.6, Wetlands and Other Waters, for additional details related to Section 404 of the CWA.

Section 401 of the CWA provides the State of Alaska with the legal authority to review an application or project that requires a federal license or permit (e.g., CWA 404 permit from USACE) that would result in a discharge into a WOUS. The applicant must apply for and obtain a Certificate of Reasonable Assurance from the ADEC to conduct a regulated activity. ADEC has the authority to provide a certification for a project that meets federal and state water quality standards, to stipulate conditions on the applicant to ensure that water quality standards are met, or to deny an application.

Section 402 of the CWA created the NPDES Program. The NPDES program requires that pollutant discharges to surface water, including marine waters, be authorized by permit. This permitting program pertains to stormwater discharges from industrial facilities and construction activities. At the project area, the NPDES program is administered by ADEC, and is known as the Alaska Pollutant Discharge Elimination System (APDES) Program. The APDES Program includes a Storm Water Program that consists of permitting stormwater discharges from construction and industrial activities. NPDES permits often include conditions that influence site runoff and design, reporting, fees, and renewals.

Section 303(d) of the CWA requires States to develop lists of impaired water bodies where CWA-required pollution controls are not sufficient to attain or maintain applicable water quality standards. States are also required to develop total maximum daily loads (TMDLs) thresholds for the impaired water bodies with the goal to reduce pollution and meet water quality standards. TMDLs are implemented through the NPDES permitting system.

4.4.2 Affected Resources

Surface water in the project area consists of Tongass Narrows, the waterway inland from the Pacific Ocean in Southeast Alaska. Intertidal areas consist of impermeable rocky shores with exposed bedrock and outcrops. The shoreline in the project area includes several dozen dock ramp support pilings and exposed pipes formerly used for petroleum transfer from the dock. See Section 4.7, Floodplains, and Section 4.16, Cumulative Effects, for more thorough description on the hydrological characteristics of the waters of the Tongass Narrows in the project area.

There is a drainage system on the southern side of the NOAA property that conveys stormwater from the upper hillside (outside of the property) through culverts under the highway and along a drainage channel to the Tongass Narrows. The drainage channel is on the NOAA property but outside of the fenced area where earthmoving activities are proposed. Other upland portions of the project area, such as the paved areas where the warehouse and office building are situated, discharge stormwater directly into Tongass Narrows or into the drainage channel.

The portion of Tongass Narrows that is in and adjacent to the project area is not listed in the Alaska 303(d) Impaired Waters List. There is a small (i.e., 0.5 acre) area in Tongass Narrows approximately 0.25 miles from the project area that is classified as an impaired water due to “seafood residues, seafood processing wastes,” which is said to have “an approved alternative plan; expected to meet standards in a reasonable time period” (ADEC 2020c).

The shallow, transient, or deeper groundwater that may exist below the site is not currently being used and may not be potable (ADEC 2000). Surface water and groundwater flow would generally coincide with topographic trends from northeast (upslope) to the Tongass Narrows (southwest).

4.4.3 Environmental Consequences

This analysis addresses the potential effects of each alternative to water quality and hydrologic processes. Analyses related to the effects of the Proposed Action on wetlands and other waters of the U.S. is included in Section 4.6, Wetlands and Other Waters; an analysis of the effect to floodplain resources is included in Section 4.7, Floodplains; and, an analysis related to sea level rise is included in Section 4.16, Cumulative Effects.

Preferred Alternative—Floating Pier

The Preferred Alternative would result in effects to surface water quality from demolition and construction, as well as the operation of the Ketchikan Port Facility. The upland area of the project site is almost entirely paved; therefore groundwater infiltration and groundwater discharge from the project area site into Tongass Narrows or the adjacent drainage swale is anticipated to be negligible. This groundwater condition would not change under the Preferred Alternative.

Demolition and Construction

Construction-related impacts associated with demolition and removal of certain existing infrastructure and installation of new upland and in-water infrastructure are expected to temporarily increase the turbidity and suspended sediment and particulates in marine waters. There is potential that material (such as rock socket drill cutting discharge) would be released into the marine environment. This may include releases during the removal of creosote-treated pilings (containing polycyclic aromatic hydrocarbons [PAHs]) and installation of new piles into potentially PAH-contaminated sediments. With the use of standard BMPs for in-water construction, the extent of impacts to Navigable Waters of the U.S. (NWUS) and water quality would be limited to the nearshore environment in the project area. Suspended sediments and particulates would dissipate within a single tidal cycle. These activities would be completed under the purview of Sections 401 and 404 of the CWA, and authorizations would be obtained from ADEC and USACE, respectively. These authorizations may include conditions that must be met to minimize construction-related effects to water quality. Construction activities would not involve placement of fill in the area of the drainage swale.

In the upland portions of the project area, the demolition and removal of structures and other above- and below-grade items, as well as regrading and paving activities, could result in temporarily exposing soils to the erosive forces of wind, rain, and stormwater runoff; this could cause the release of construction-generated sediment to the adjacent drainage channel and Tongass Narrows. Stormwater runoff could also be contaminated with chemicals used during construction (e.g., fuels, oils, and solvents) through the transportation, storage, and use of these materials. These potential runoff-related water quality effects would cause temporary, direct impacts to the water quality as they would cease after construction has concluded, and these effects can be minimized with the implementation of construction BMPs.

While a site design has not been developed, ground disturbance would likely be equal to or greater than 1 acre. For a construction disturbance area equal to or greater than 1 acre, an APDES Construction General Permit would be required to comply with Section 402 of the CWA. A Stormwater Pollution and Prevention Plan (SWPPP) would be prepared and implemented to obtain coverage under the APDES Construction General Permit. The SWPPP would specify the BMPs to be used to minimize wind- and water-related soil and sediment discharges from the work area, minimize potential contamination of stormwater and non-stormwater discharges, and prevent hazardous material spills. The contractor would implement these BMPs during construction.

If construction would result in the disturbance of less than 1 acre, use of a Multi-Sector General Permit (MSGP) for Stormwater Discharges associated with Industrial Activity could be applicable. Applicability of the MSGP is further discussed under the “Operations” section below. The MSGP includes coverage for stormwater discharges associated with construction activities that could be appropriate for the Proposed Action. If construction is covered by the MSGP, a SWPPP related to construction would be prepared, similarly to a SWPPP for coverage under the APDES Construction General Permit described above, that would specify the BMPs that would need to be used to minimize effects to water quality.

Effects to water quality as a result of construction would be temporary and limited to the time period that construction would occur. These effects would be localized to the drainage channel and the portion of Tongass Narrows immediately adjacent to the project site, and they would be relatively minor due to the relatively small size of the upland portion of the project area. With the implementation of BMPs or through an ADPES permitting nexus described above, construction of the Preferred Alternative would have a direct, temporary, minor impact on water quality.

Operations

Operation and use of the facility would result in added effects to water quality due to the following:

- Increase turbidity and concentrations of suspended solids resulting from vessel traffic
- Increase potential for unintentional fuel spills from berthed vessels
- Increase concentrations of suspended sediments and water turbidity via propeller wash from the NOAA Ship *Fairweather* and related support vessels in the Tongass Narrows
- Resuspended sediment from the use of smaller vessels in shallow water with soft sediment bottoms
- Release of incidental amounts of oil and grease as a result of use of vessels ballasts, engine cooling, and other vessel systems
- Release of hydrocarbon through incidental spills related to maintenance or ship restocking activities

The frequency and severity of the effect to water quality would be dependent on the usage of the piers, and it could range from negligible to moderate. The effects would be localized to the project area and waters immediately adjacent to the project area. These are commonly managed water quality impacts associated with marine industrial activities in the Ketchikan region. Major maintenance and repairs to the NOAA Ship *Fairweather* would occur at a dry dock facility and not at the project area.

The amount of upland ground surface covered with pavement and structures is not expected to change substantially under the Preferred Alternative, and therefore long-term runoff, erosion, and sediment transport are not expected to increase or further degrade water quality. However, depending on the final design, operation of the facility could be subject to the industrial facility regulatory requirements of the APDES Program. Any required water quality controls and conditions under an industrial APDES permit would result in a reduction of uncontrolled discharges to water bodies compared to current conditions and an improvement of water quality over an extended period of time. An industrial APDES permit for operating the facility would be authorized under an individual permit or use of an MSGP. These permits would authorize discharge of pollutants in stormwater to protect water quality and human health. They would establish control measures and BMPs that must be used to control the types and amounts of pollutants that can be discharged into water bodies.

In summary, operations of the facility under the Preferred Alternative would result in long-term, direct, negligible to moderate adverse effects to the water quality of the portion of Tongass Narrows in and immediately adjacent to the project area due to vessel operation, deck and vessel maintenance. It will have a long-term, indirect, beneficial impact to water quality due to the increased control of discharges from the upland portion of the project area from compliance with an APDES operating permit.

Alternative 1—Pier-Supported Dock

The water quality effects for Alternative 1 would be greater than those described for the Preferred Alternative. Higher turbidity would be expected for Action Alternative 1 due to an increased number of piles associated with the traditional pile-supported structure. Both alternatives would result in the same upland construction activities and the same facility operation activities. The implementation of both standard BMPs and conditions of an ADPES permit would result in direct, temporary, minor effects to water quality. Operations of the facility under Alternative 1 would result in long-term, direct, negligible to moderate adverse effects to the water quality of the portion of Tongass Narrows in and immediately adjacent to the project area due to vessel operation and deck and vessel maintenance. Long-term, indirect, beneficial impacts to water quality would occur due to the increased control of discharges from the upland portion of the project area from compliance with an APDES operating permit.

No-Action Alternative

The No-Action Alternative would result in no changes to water quality than what is currently experienced at the project area, including the continuation of presumed leaching of PAH from creosote-containing piles. There would be no effects to water quality from construction. With no vessels using the dock and piers, there would be no water quality impacts due to vessel use or repair and maintenance activities. The upland portions of the project area would continue to discharge into the drainage channel and Tongass Narrows without water quality controls in place, resulting in no change in water quality from the existing condition.

4.4.4 Mitigation Measures

No mitigation measures are required for anticipated effects to water resources. NOAA would implement BMPs and comply with federal laws and applicable regulations designed to reduce impacts to the environment. These water quality control measures include:

- Obtain appropriate approvals under the federal CWA
- Implement SWPPPs and Erosion and Sediment Control Plans (ESCPs), as required
- Apply standard BMPs for sediment control and water quality during in-water construction (e.g., floating boom with absorbent pads, silt curtain, conducting work during low tide)
- Use the smallest-diameter piles practicable while still minimizing the overall number of piles
- Objects discharged during pile work (rock socket drilling or torch lance cutting) would be collected on a barge and transported to a permitted upland location for disposal
- Prepare a Pile Removal and Installation Plan to implement procedures for in-water pile installation and removal in accordance with NOAA's 2009 Guidelines for the use of treated wood products in aquatic environments (NOAA 2009)

4.5 Hazardous Materials

4.5.1 Regulatory Setting

Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act

The EPA is responsible for implementing and enforcing federal laws and regulations pertaining to hazardous materials. The primary legislation includes the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act and the Emergency Planning and Community Right-to-Know Act. Hazardous materials storage and reporting requirements, known as Tier II Requirements, have been delegated to the states by the EPA.

Occupational Safety and Health Act

The Occupational Safety and Health Administration (OSHA) of the U.S. Department of Labor is responsible for implementing and enforcing federal laws and regulations that address worker health and safety. OSHA requires training for those using or otherwise handling hazardous materials or involved in the investigation and/or clean up of contaminated sites. Training is to include procedures for personal safety, hazardous materials storage and handling, and emergency response.

Code of Federal Regulations, Titles 29 and 40

Regulations in Code of Federal Regulations (CFR) Title 29 include requirements to manage and control exposure to lead-based paint and asbestos-containing materials. OSHA is the agency responsible for ensuring worker safety in the workplace, including safety during construction activities that may result in exposure to hazardous materials. Federal OSHA also has an asbestos survey requirement under Title 29 CFR, which requires facilities to take all necessary precautions to protect employees and the public from exposure to asbestos.

The removal and handling of asbestos-containing materials is governed primarily by EPA regulations under CFR Title 40. The regulations require that the appropriate state agency be notified before any demolition, or before any renovations, of buildings that could contain asbestos or asbestos-containing materials above a specified threshold.

Title 8 Alaska Administrative Code

Alaska Occupational Safety and Health (AKOSH) performs regulatory compliance and enforcement duties in relation to asbestos-containing materials (ACMs). Due to the potential health risks associated with ACMs, special training, certification, and protection plans are required for asbestos removal workers, in accordance with 8 AAC 61. Notifications are required for any demolition projects, or for renovation projects that will disturb ACM above the EPA regulatory threshold. Even though a project may not require notification, health and management standards still apply.

4.5.2 Affected Resources

Chemicals and Hazardous Materials

The project site and adjacent parcels are zoned for heavy industrial activities (Sidwell 2020) and have historically supported industrial services including bulk fuel storage with commercial distribution and freight services. No hazardous waste is currently generated at the site. The site is currently used for general (nonhazardous) storage, with little to no hazardous materials currently used or stored on site, except as noted below:

- A double-walled, aboveground storage tank, containing diesel, is present near the northeast corner of the warehouse building.
- An empty 4,000-gallon self-diked aboveground storage tank is present just south of the fuel/oil spill catchment shelter.
- Historically, the site contained four aboveground storage tanks in the northern portion of the site on unpaved ground (Bristol 2003), which are thought to have been removed in the 1960s.
- An unregulated underground storage tank was reported to the north of the “Business Office/Oil Storage/Garage Building” and was recommended for removal (Bristol 2004). That building was removed from the site (the prefabricated NOAA office building is now in its approximate location); however, no tank removal record or closure documentation have been provided.
- A 500-gallon heating oil underground storage tank was installed in 1958 (EDR 2020) immediately north of the fuel/oil spill catchment shelter (described as the “pump house building” in Bristol 2003). It is unknown whether this tank is still present.
- A 2004 topographic survey map indicates the presence of fuel pumps and a bulk fuel loading rack near the center of the project site and buried fuel lines leading from Stedman Street through the northwest side of the upland portion of the project site, then extending out to the main dock on a raised utility trestle (NOAA 2004). A Phase I ESA conducted in 2003 reported that the on-site pipelines were drained of petroleum products when Tesoro closed their terminal facility, but that some residual petroleum product is likely to remain in the surface and subsurface piping systems (Bristol 2003). The bulk fuel loading rack and other surface infrastructure have since been removed, but it is unclear if the underground features remain. No closure documentation has been ascertained.

- An underground sewage holding tank is reportedly present near the center of the site between the shoreside laboratory building and fuel/oil spill catchment shelter.
- NOAA staff also indicated that a tank under the pier may have hazardous material/contamination (NOAA, personal communication 2020).

Hazardous Building Materials

The storage building (former spill response equipment storage building), power vault building, fuel/oil spill catchment shelter, and shoreside laboratory building were constructed in the late 1950s to early 1960s (Bristol 2003); therefore, these structures are of an age when hazardous building materials such as lead-based paint and asbestos-containing materials were commonly used in construction. Pressure-treated lumber may also be present. The warehouse building was constructed in 1993, which is after the period when lead-based paint, asbestos-containing materials, or other hazardous building materials ceased being used in construction and is not anticipated to contain such materials. The office building is a prefabricated structure that was installed after NOAA use of the property in or about 2004.

A 2004 survey of on-site structures, including sampling of suspected asbestos-containing materials and lead-based paint, confirmed the presence of lead at concentrations exceeding the regulatory level of 0.5 percent by weight in a sample collected from yellow paint on the treated wooden curb on the wharf access trestle (NOAA 2004). Lead was also detected in the other paint samples suspected of being lead-based, which were collected from the storage building as well as the office building and former operations booth (no longer extant[5]); however, concentrations in those samples did not exceed regulatory levels. The only asbestos-containing materials detected during the 2004 survey were in structures that have since been removed from the site.

A comprehensive hazardous materials survey is planned for spring 2021 for the buildings/structures that will be renovated, moved, removed, and/or demolished during the recapitalization project. The findings will be used to manage, transport, and dispose of the identified hazardous materials in accordance with applicable federal, state, and local laws and regulations in accordance with the Soil and Groundwater Management Plan, which would be written in compliance with 18 AAC 75.

Existing Soil, Sediment, and Groundwater Conditions

AECOM reviewed public databases (ADEC 2020i; EDR 2020) as well as previous environmental reports prepared for the project site and vicinity (Bristol 2003, 2004; AECOM 2017) to determine existing conditions pertaining to soil, marine sediments, and groundwater.

ADEC's Contaminated Sites Program maintains a database of known contaminated sites and leaking underground storage tanks throughout Alaska. The database provides information regarding the type of contaminant released to the environment, the type(s) of media (air, water, soil, rock) affected by the contaminant, the potential responsible party for cleaning up the documented release, and the location where the release occurred (ADEC 2016). Known or identified sites (Bristol 2003, 2004) would be reported to the program.

The following site history and description of existing conditions is based on information reviewed.

Project Site

The project site (1010 Stedman Street) is not listed in the ADEC contaminated sites database (ADEC 2020i), but is listed in the SPILLS and ERNS database, due to documented past releases of hazardous materials at the NOAA facility or by previous site operators (Tesoro and Unocal), as summarized in Table 4.5-1.

[5] Note that the "main office building" discussed in the 2004 sampling report is no longer extant having been removed and replaced with the current prefabricated NOAA office building. The 2004 report also found asbestos-containing materials (chrysotile fibers at a concentration of up to 3 percent) in the main office building.

Table 4.5-1: Summary of Known Environmental Releases

Date	Contaminant	Reported Volume	Spill Type/Details
1991	Gasoline	10 gallons	Release from pipeline during maintenance pressure test, to site soils.
1995	Gasoline	0.5 cups	Release from open pipeline valve during drainage, to water
1995	2-D fuel oil	50 gallons	Pipeline cap failure, release to water
1995	Kerosene	1 teaspoon	Release from cargo line to water
1999	2-D fuel oil	5 gallons	Overflow from containment during drainage of 3-inch diesel line, to water.
2007	Bilge oil	10 gallons	Bilge discharge
2007	Bilge water	1 gallon	Leaking transfer hose, to water (causing 4-inch by 4-inch sheen)
2008	Hydraulic oil	1 gallon	Hydraulic oil line failure
2008	Hydraulic Oil	1 gallon	Release from sump to water, due to hose leak

Source: EDR 2020

Previous soil sampling and investigations at the project site have encountered petroleum hydrocarbons in site soils, sediments and marine waters, as indicated in Table 4.5-2.

Table 4.5-2: Summary of Previous Environmental Site Investigations and Observations

Date	Investigation Type & Location	Constituents Encountered	Concentration
1981	Drilling in offshore area, associated with construction of wharf modifications	Black petroleum staining observed at up to 18 inches depth	Not determined
1990	Pit sampling in crushed rock fill material in southern half of project site	Diesel Heavy Oil	Up to 400 mg/kg Up to 460 mg/kg
1997	Hand auger sampling of crushed rock fill material near northeast corner of project site	Gasoline Diesel Heavy Oil	Up to 56 mg/kg Up to 1,250 mg/kg Up to 716 mg/kg
2003	Phase I Environmental Site Investigation	Petroleum staining observed on surface soil and paving Light petroleum sheen observed in water	Not determined Not determined
2004	Phase II Environmental Site Investigation (handheld geoprobe sampling between 6 and 64 inches bgs)	Gasoline Range Organics Diesel Range Organics Residual Range Organics	Up to 74 mg/kg Up to 9,700 mg/kg Up to 3,900 mg/kg

Sources: EDR 2020; Bristol 2003, 2004

In addition, existing timber pilings at the Ketchikan Port Facility are known to be creosote-treated. Creosote, a coal tar product used as a wood preservative, contains PAHs that are known to be harmful to humans and marine organisms. Many studies indicate that PAHs from creosote-treated piles can leach into the surrounding waters and accumulate in marine sediments (Perkins 2008). Although no site-specific testing for PAHs in marine sediments has been conducted, the presence of PAH-contaminated sediments in the immediate vicinity of the pilings is considered likely.

Based on the information above, on-site soil contamination is anticipated in the vicinity of a tank reportedly under the pier and near the overflow spill containment vault (NOAA, personal communication, 2020). During construction activities, if contaminated soils/sediments are encountered, they would be addressed and managed on a case-by-case basis, which may include, but not be limited to, their testing and/or removal. All of these activities will be performed in accordance with federal, state, and local laws and regulations, and per the Soil and Groundwater Management Plan.

Adjacent Properties

Several adjacent and nearby properties listed in the ADEC Contaminated Sites Database are summarized in Table 4.5-3. Environmental releases from current and/or historic operations at these sites may have impacted soils and sediments at the NOAA property.

Table 4.5-3: ADEC Contaminated Sites Database

Site Name (Hazard ID#)	Site Address	Distance and Direction from Project Site	Status[1]	Contaminants of Concern
Ketchikan Tank Farm (902)	4 Mile Stedman Street	Approx. 50 feet to the north	Cleanup Complete - Institutional Controls, per facility's contingency plan.	Diesel range organics
Petro Marine Ketchikan (3888)	1100 Stedman Street	Immediately adjacent to the southwest	Cleanup Complete - Institutional Controls, including restriction to industrial or commercial land use, ongoing monitoring, and advance approval for transportation of soil or groundwater offsite.	Petroleum hydrocarbons
USCG Ketchikan Base (1184)	1 mile South Tongass Highway	Approx. 750 feet to southwest	Active. Risk to the ecological community in the subtidal area was determined to be low. Final CERCLA Proposed Plan was publicly notified in January 2020.	Petroleum hydrocarbons, gasoline range organics, metals, PCBs, chlorinated solvents
USCG Ketchikan Firing Range (3293)	1300 Stedman Street	Approx. 1,000 feet to southwest	Cleanup Complete - Institutional Controls, including prohibition of residential use or access to site by children and residents, warning signage, and advance approval for disturbance or transportation of soil or groundwater, prohibition of drinking water wells.	Lead

Notes:
[1] The ADEC contaminated sites database has four different rankings of site status: Open (characterization or remediation ongoing), Cleanup Complete, Cleanup Complete with Institutional Controls, and Informational. Institutional Controls may include: maintenance of physical or engineering measures to limit an activity that might interfere with clean up or that might result in exposure to a hazardous substance at the site; restrictive covenants, easements, deed restrictions, or other measures that limit site use or conditions over time, or provide notice of any residual contamination; and, zoning restrictions or land use planning by a local government with land use authority.
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

Source: ADEC 2020d, e, f, g

In addition to the anthropogenic sources of contamination discussed above, the following naturally occurring contaminants could also be present at the project site, although no site-specific testing has been conducted.

- Naturally occurring asbestos: The project site and surrounding areas along the shoreline of the Tongass Narrows are identified by the Department of Geological and Geophysical Survey as having medium potential for naturally occurring asbestos (Solie and Athey 2015). Disturbance of rocks and soil containing naturally occurring asbestos can impact human health through inhalation of asbestos fibers.
- Radon: Ketchikan Gateway Borough is in Radon Zone 3, which has indoor average levels of less than 2 picocuries per liter (pCi/L). More than 50 radon test results have been reported for the Borough, of which, more than 86 percent of results were less than 0.5 pCi/L. In the zip code of the project site, radon levels in basements averaged 0.318 pCi/L, and in first floor areas averaged

0.232 pCi/L (EDR 2020). Radon is a radioactive gas that comes from the natural decay of uranium in soils, which can increase rates of lung cancer. The EPA recommends actions to reduce radon if indoor levels exceed 4 pCi/L (EPA 2012).

4.5.3 Environmental Consequences

Preferred Alternative—Floating Pier

Chemical Use, Storage, and Disposal

Construction of the Preferred Alternative would involve decommissioning of the existing structures on site (except the office building and warehouse) prior to their demolition and removal. Any existing chemicals and hazardous materials, if any are currently stored and used in the existing structures, would be removed prior to demolition, and either stored elsewhere on site until construction is complete or disposed of in accordance with applicable hazardous waste regulations. Residual petroleum products or other hazardous materials in remnant fuel piping on site could also be released to the environment or result in construction worker exposure during demolition if the piping is not appropriately cleaned and capped prior to removal.

As with all of Ketchikan's solid waste, conventional waste from proposed demolition activities would be disposed of at the Roosevelt Regional landfill in Roosevelt, WA.

Construction of the Preferred Alternative would also involve the use of typical quantities of construction-related hazardous materials, such as fuel, oil, lubricants, and adhesives. Any unused construction-related hazardous materials would be removed from the NOAA property after completion of construction and disposed pursuant to applicable federal, state, and local regulations. Hazardous waste from demolition activities would need to be sorted and shipped out of state by barge and be disposed of in accordance with the RCRA and/or the Toxic Substances Control Act. Hazardous waste would be packaged and shipped according to existing standards to a port in the contiguous 48 states for disposal in an approved Class I or Class II landfill. Typical ports used for delivering these types of waste are through the Port of Seattle or Port of Tacoma in Washington State. Separately, asbestos-containing materials (if present) would be removed, managed, and disposed of in accordance with EPA Asbestos National Emission Standards for Hazardous Air Pollutants requirements as well.

Operation of the Preferred Alternative would include use of hazardous materials such as fuels, oil, lubricants, and paints for minor boat maintenance and workshop activities in the existing warehouse or dockside/topside; however, no major boat maintenance would be conducted at the site. Improper handling, storage, or disposal during minor maintenance activities could result in accidental spills during construction or operation that could adversely impact the environment, particularly if the spills occur in or flow to reach marine waters.

The Preferred Alternative also includes the installation of a 175-kilowatt backup power generator, with a double-walled diesel fuel supply. The size of the diesel tank would not exceed 1,000-gallons capacity and therefore would not be regulated by ADEC or the EPA.

NOAA employees and their contractors would be required to comply with all relevant statutes and regulations (including RCRA and Alaska Department of Transportation and Public Facilities (ADOT&PF) regulations) related to the transport, use, storage, or disposal of hazardous materials/waste, as well as OSHA regulations to protect workers through hazard communication and provision of adequate training.

The quantities of hazardous substances used during construction or operation of the Preferred Alternative would not exceed quantities used at typical construction sites or at other facilities undertaking minor boat maintenance activities and would not exceed the State of Alaska Tier II reporting threshold. Adherence to applicable laws and industry-standard BMPs would reduce the likelihood of accidental spills or mishandling of hazardous materials. Therefore, the Proposed Action would have a negligible adverse impact relating to the use and handling of hazardous materials.

Disturbance of Hazardous Building Materials

The Preferred Alternative would require demolition and removal of wooden curbs on the wharf trestle that are known to contain lead-based paint (Bristol 2004). Representative composite samples of the wooden curbs on the wharf trestle and other identified materials or buildings/structures with lead-based paint will be tested per the Toxicity Characteristics Leaching Procedure (TCLP) test methodology to determine if their waste(s) or demolition debris would be characterized as a solid (non-hazardous) or hazardous waste. Based on its TCLP test result, each material will be managed, transported, and disposed in accordance with all federal, state, and local regulations.

Lead-based paint can cause human health impacts if disturbance during demolition or construction activities causes contaminated dust particles to be ingested or inhaled. OSHA regulations require certain worker health and safety measures to be undertaken when working with lead-based painted materials, which would reduce the potential for exposure of construction workers to ingestion or inhalation hazards. As required by federal hazardous waste regulations, materials known to contain lead-based paint will be further tested using TCLP to determine leachability, and that such materials be handled and disposed of in accordance with applicable regulations depending on the concentrations of leachable lead.

A comprehensive hazardous materials survey is planned for spring 2021 for the buildings/structures that will be removed, renovated, or demolished during the recapitalization project. The findings will be used to manage, transport, and dispose of the identified hazardous materials in accordance with applicable federal, state, and local laws and regulations in accordance with the Soil and Groundwater Management Plan.

With adherence to applicable worker safety regulations and BMPs outlined in Section 4.5.4, the Proposed Action would have a negligible adverse impact relating to hazardous building materials.

Disturbance of Contaminated Soils, Sediments, Groundwater, or Soil-Gas

Construction of the Preferred Alternative would involve site preparation and grading activities in areas of known (Bristol 2003, 2004) or suspected contamination, including the removal of creosote-treated pilings (which have likely leached PAHs into surrounding marine sediments), installation of new piles into potentially PAH-contaminated sediments, and excavation of soils contaminated with gasoline-, diesel-, and residual-range organics. The Preferred Alternative would also involve the removal of remnant fuel pipes, which could contain residual product, and/or have resulted in contamination of surrounding soil that could be remobilized during construction activities. Impacts relating to radon gas are not anticipated, because the project area is not known to have levels of radon exceeding EPA guidance action levels, and no new habitable structures are to be constructed at the site.

Ground-disturbing activities associated with construction of the Preferred Alternative therefore have the potential to expose construction workers and the public to hazardous conditions through disturbance, transportation, or disposal of contaminated soils, sediments, groundwater, and/or soil-gas; or to re-mobilize contaminants to stormwater, surface water, groundwater, or air. In particular, the removal of piles, installation of piles, excavation, earthwork, and utility removal/installation have the potential to expose construction workers and possibly the general public to levels of contaminants that could cause health impacts if contaminated materials are not appropriately handled, stored, and disposed of. Construction activities at the project site could also have the potential to generate soils or groundwater with contaminant levels that exceed federal or State thresholds for hazardous waste, and therefore require special handling to avoid or minimize impacts on the environment, the public, and construction workers. Excavation and removal of remnant subsurface piping could also result in the discovery of additional areas of contamination, and/or heavy construction equipment could damage/puncture these features causing a release of hazardous materials or other safety hazards.

With adherence to applicable state, federal, local regulations, and BMPs outlined in Section 4.5.4, the Preferred Alternative would have a direct, temporary, minor adverse impact relating to disturbance of contaminated soils, sediments, or groundwater.

Action Alternative 1—Fixed Pile-Supported Pier

Action Alternative 1 would have similar impacts described for the Preferred Alternative, as the same structures and site features would be demolished and removed from the site, the use of hazardous materials during construction and operation would be the same under both alternatives, and the operations of the facility would be the same. Therefore, regulations and BMPs described for the Preferred Alternative would also be applicable to Action Alternative 1.

However, because Action Alternative 1 would include a fixed pile-supported pier rather than a floating pier, this alternative would pose a greater potential risk for contaminants in shallow sediments to be pushed down to deeper sediments and groundwater during the driving of piles to support the dock structure, due to the larger number of in-water piles that would be installed under this alternative.

With adherence to applicable state, federal, and local regulations, and the implementation of BMPs outlined in Section 4.5.4, the Preferred Action would have a direct, temporary, minor adverse impact relating to disturbance of contaminated soils, sediments, or groundwater.

No-Action Alternative

Under the No-Action Alternative, there would be no demolition and removal of existing site features, no excavation, and no construction. Because no construction activities would occur, there would be no potential for accidental spills of construction-related hazardous materials, and no disturbance of lead-based paint or contaminated sediments that could potentially expose construction workers or the public to hazardous materials. There would also be no beneficial action to clean up existing contamination, as would occur under the Preferred Alternative (existing contamination is not an impact under the No-Action Alternative).

Effects under the No-Action Alternative would be identical to existing operations and no new impacts related to hazardous materials would occur.

4.5.4 Mitigation Measures

No mitigation measures are required to reduce project-related effects pertaining to hazardous materials. Industry-standard BMPs and compliance with federal regulations pertaining to the use, handling, storage, transportation, and disposal of hazardous materials and hazardous wastes would be implemented and may include:

- NOAA would perform a hazardous materials survey to include a TCLP test for leachability to determine if waste(s) or demolition debris would be characterized as a solid (non-hazardous) or hazardous waste. Handling and disposal of such materials in accordance with applicable regulations depending on the concentrations of leachable lead, in accordance with Title 18 AAC, federal hazardous waste and OSHA regulations.
- Pile Removal and Installation Plan Preparation: implement procedures for in-water pile installation and removal in accordance with NOAA's 2009 Guidelines for the use of treated wood products in aquatic environments (NOAA 2009).
- Pipeline and Tank Removal Plan Preparation: implement procedures for the safe decommissioning and removal of remnant fuel pipelines or other oil-containing features (e.g., underground storage tank, oil/water separator) that might be discovered during site development, in accordance with Title 18 AAC.
- Soil and Groundwater Management Plan Preparation: implement procedures for sampling and analysis, excavation, dust control, stockpiling, loading, and disposal of potentially contaminated soils and sediments excavated during construction, including decontamination procedures and management of residual materials, in accordance with Title 18 AAC 75 and federal hazardous waste regulations pertaining to OSHA requirements; implement procedures for handling, storage, and disposal of contaminated and uncontaminated perched groundwater potentially generated during excavation for utility lines or tank removal, if required, in accordance with the APDES and Ketchikan publicly owned treatment works requirements.

- Site-specific Health and Safety Plan Preparation: implement procedures developed by the contractor to protect worker health and safety during all site development and construction activities, in accordance with 29 CFR 1910.120 and AKOSH requirements.

4.6 Wetlands and Other Waters

4.6.1 Regulatory Setting

Executive Order 11990

EO 11990, Protection of Wetlands, requires federal agencies to avoid, to the extent practicable, the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative.

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions (33 CFR 328.3[b]). Wetlands support hydrophytic vegetation, have wetland hydrology, and contain hydric soils.

Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344) establishes programs to regulate the discharge of dredged or fill material into WOUS, including wetlands. WOUS include surface water systems such as streams, lakes, ponds, and adjacent wetlands if they meet certain criteria. Jurisdictional wetlands, regulated through permitting by USACE under Section 404, must possess wetland indicators for hydrology, vegetation, and soils. The general limits of USACE's jurisdiction under Section 404 of the CWA are depicted in Figure 4.1-1.

Activities in WOUS regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a DA permit from USACE before dredged or fill material may be discharged into WOUS, unless the activity is exempt from Section 404 regulation.

Section 404(b)(1) of the CWA (40 CFR Part 230) requires that USACE permit only the least environmentally damaging practicable alternative. In addition, USACE conducts a public interest review (33 CFR Part 320) and weighs various environmental, economic, and social concerns before deciding whether to grant a permit. USACE has very specific requirements for mitigation, including a sequence of: 1) impact avoidance; 2) minimization; and 3) compensatory mitigation for unavoidable impacts under their jurisdiction, as determined on a case-by-case basis. Compensatory mitigation for unavoidable impacts may be required to ensure that activities requiring a permit comply with Section 404(b)(1) Guidelines. Compensatory mitigation is the restoration (reestablishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources to offset unavoidable adverse impacts. Compensatory mitigation may be achieved by purchasing credits through mitigation banks or in-lieu fee programs, permittee-responsible mitigation, or a combination of the three.

Section 10 of the Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 U.S.C. 403) establishes a program to regulate all work or structures in or affecting the course, condition, location, or capacity of NWUS. NWUS are waters that are subject to the ebb and flow of the tide and/or are presently used or where used in the past, or may be susceptible for use to transport interstate or foreign commerce. The extent of USACE's jurisdiction under Section 10 of the RHA is shown in Figure 4.6-1.

Activities requiring DA permits under Section 10 of RHA include structures (e.g., piers, wharfs, breakwaters, bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the NWUS.

Clean Water Act Section 401 Certification

Under Section 401 of the CWA, a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into WOUS unless a Section 401 water quality certification is issued, verifying compliance with water quality requirements, or certification is waived. States and authorized tribes where the discharge would originate are generally responsible for issuing water quality certifications. CWA 404 permits and RHA Section 10 permits, summarized above, are subject to Section 401 certification.

In making decisions to grant, grant with conditions, or deny certification requests, certifying authorities consider whether the federally licensed or permitted activity will comply with applicable water quality standards, effluent limitations, new source performance standards, toxic pollutants restrictions, and other appropriate water quality requirements of state or tribal law.

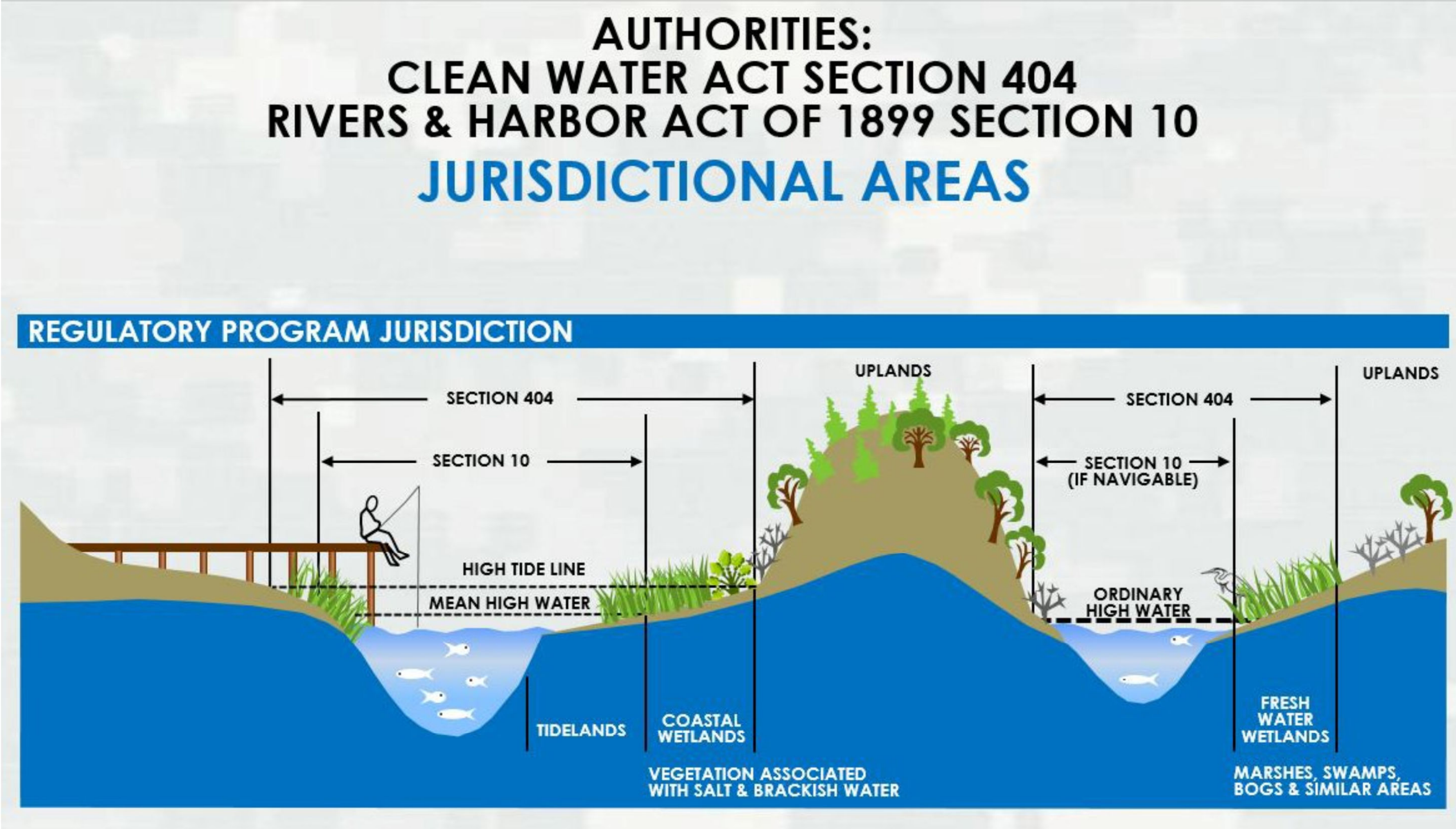
4.6.2 Affected Resources

This section summarizes the nature and extent of WOUS, including wetlands, and NWUS that would potentially be affected by the Proposed Action. General observations of the existing environment are based on observations from a site visit in October 2020, unless otherwise specified and cited.

Waters of the U.S.

Coarse-scale National Wetlands Inventory (NWI) mapping of the project area does not identify WOUS, including wetlands, in the onshore area of the Ketchikan homeport. NWI data for this area was developed by the U.S. Fish and Wildlife Service (USFWS) using color infrared satellite imagery dating from 1979 at a scale of 1:60,000 (USFWS 1985). Figure 4.6-2 shows NWI mapping overlain on aerial photography from 2015.

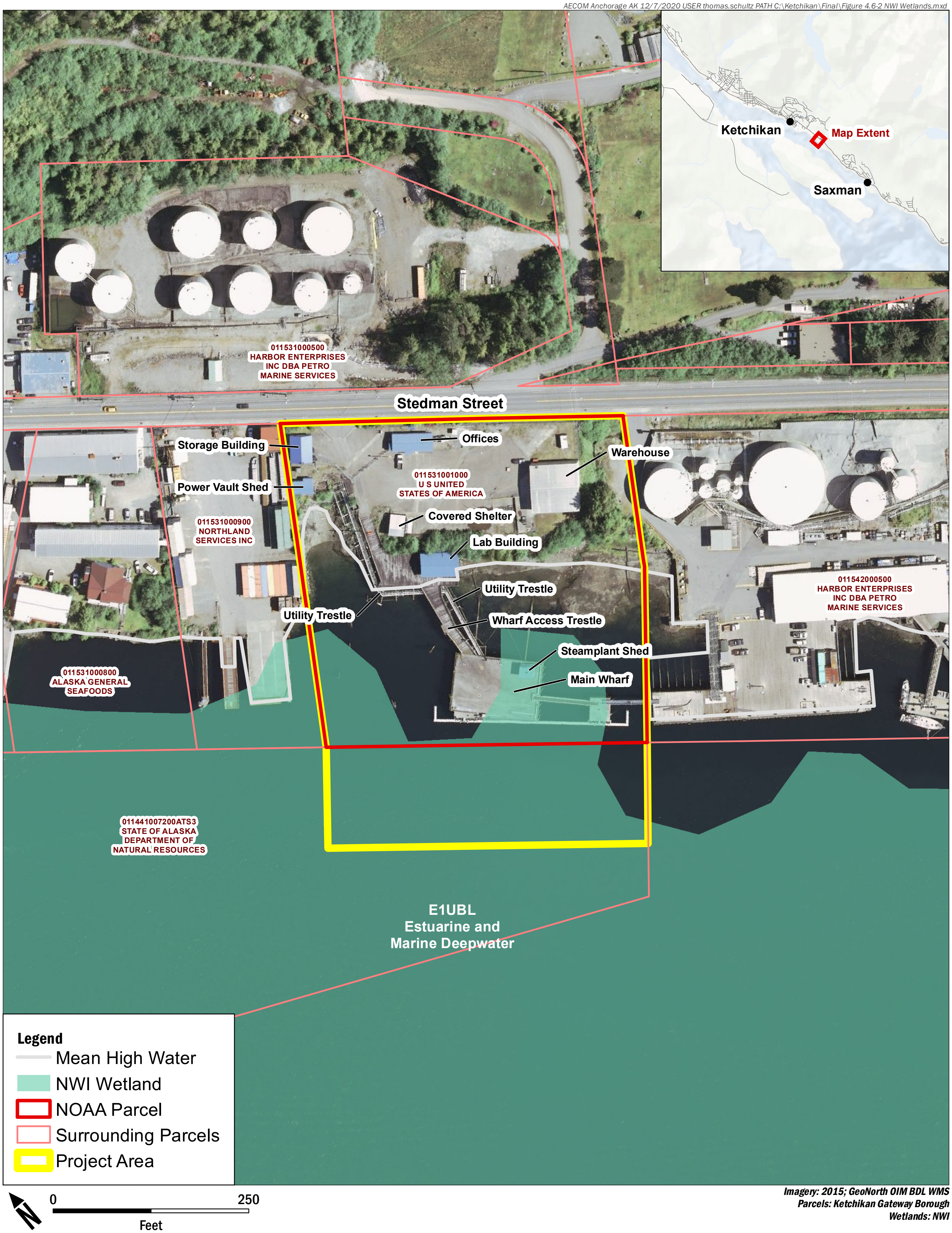
Most of the project area above the High Tide Line (HTL) is graded and paved with asphalt (Figure 4.6-2). Ornamental vegetation and remnant native vegetation occurs along the roadside and sparsely around the graded/paved area. A drainage system runs through the southern side of the Ketchikan homeport site conveying stormwater from the upper hillside (outside of the project area) through Stedman Highway culvert(s) and along a drainage channel to the Tongass Narrows. The drainage is outside of the fenced area of the homeport site. Dominant vegetation is described in Section 3, Existing Environment (Table 3.1-1). A wetland delineation to support a jurisdictional determination has not been completed for the drainage channel; however, proposed construction activities associated with upland homeport facilities would not occur outside of the fenced area.



Source: https://www.poa.usace.army.mil/Missions/Regulatory/Jurisdictional-Determinations/Limits-of-Jurisdiction/

LIMITS OF USACE'S REGULATORY JURISDICTION

Figure 4.6-1



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NWI WETLANDS MAPPING

Figure 4.6-2

Navigable Waters of the U.S.

The Tongass Narrows is NWUS regulated under Section 10 of the RHA up to the limits of mean high water (Figure 4.6-1). NWI mapping (USFWS 1985) classifies the Tongass Narrows as open water estuarine and marine deepwater habitat.

Intertidal areas consist of impermeable rocky shores with exposed bedrock and outcrops. The shoreline in the project area includes several dozen dock ramp support pilings and exposed pipes formerly used for petroleum transfer from the dock. The existing pier, access trestle and mooring dolphin infrastructure that has been closed to vessels since 2008 due to unsafe conditions remain offshore.

4.6.3 Environmental Consequences

Preferred Alternative—Floating Pier

Construction of the Preferred Alternative would involve pile and pier removal work and placement of structures in the Tongass Narrows, which would result in direct impacts to NWUS. Table 4.6-1 summarizes the worst-case direct impacts to NWUS associated with the Preferred Alternative.

Table 4.6-1: Preferred Alternative—Estimate of Direct Impacts to NWUS from Proposed Structures

Structures	Fill Material	Pile Quantity	Fill Volume (cubic feet)	Seafloor Footprint (square feet)	Over-Water Footprint (square feet)
Floating Pier	Steel piles, 24-inch diameter, depth of 35 feet below substrate	18	1,979	57	18,000
Cantilever Access Trestle	N/A	N/A	N/A	N/A	2,448
Trestle Support Float	N/A	N/A	N/A	N/A	528
Abutment Armoring	Riprap	N/A	270	90	N/A
Mooring Dolphins	Steel or fiber reinforced polymer piles, 36-inch diameter, depth of 50 below substrate	2	707	14	400
Suspended Gangway/Catwalk to Mooring Dolphins	N/A	N/A	N/A	N/A	480
Small Boat Dock	Steel piles, 24-inch diameter, depth of 35 below substrate	6	660	19	1,920
Suspended Gangway to Small Boat Dock	N/A	N/A	N/A	N/A	480
Small Boat Launch Ramp	Concrete	N/A	2,240	2,240	N/A
Total		26	5,856	2,420 (0.06 acres)	24,256 (0.56 acres)

Notes:
Data in this table are AECOM estimates and were calculated using maximum quantities and dimensions.
N/A = not applicable

The in-water components of the floating pier have the potential to alter water circulation and likely patterns of erosion and sedimentation in the nearshore environment. However, the nearshore environment of the Tongass Narrows is presumed to be naturally dynamic due to tidal influence, and subject to regular redistribution of substrate through littoral transport, storm surge, and ice scour. Construction-related impacts associated with demolition of the existing and installation of new in-water infrastructure are expected to temporarily increase the turbidity and suspended particulate in marine waters. Although no site-specific testing for PAHs in marine sediments has been undertaken, the presence of PAH-contaminated sediments in the immediate vicinity of the pilings is considered likely. With use of standard BMPs for in-water construction (Section 4.4, Water Resources), the extent of impacts to NWUS are expected to be limited to the nearshore environment in the project area.

Construction of the Preferred Alternative would involve installation of up to 26 pilings and in-water fill associated with abutment armoring and the small boat launch ramp, resulting in impacts to approximately 0.06 acres of marine substrate (see Table 4.6-1). Proposed in-water infrastructure would have an estimated over-water footprint of approximately 0.6 acres. These structures would remain present through operations of the NOAA Ketchikan port (20 to 50 years) and would be removed according to industry standards at the time of decommissioning, unless continued for future use. These direct impacts would be partially offset by removal of existing dilapidated in-water structures, of which approximately 100 to 200 pilings and approximately 0.4 acres of over-water infrastructure would be removed.

With adherence to applicable state, federal, and local regulations, as well as implementation of BMPs, the Preferred Action would have a direct, long-term, minor adverse impact to NWUS relating to construction of proposed in-water infrastructure.

Action Alternative 1—Fixed Pile-Supported Pier

Action Alternative 1 would have similar impacts as those described for the Preferred Alternative. Total direct impacts would be slightly more for Action Alternative 1 due to an increased number of piles associated with a fixed, pile-supported pier structure. Construction of Action Alternative 1 would involve installation of up to 118 pilings and in-water fill associated with abutment armoring and the small boat launch ramp, resulting in impacts to approximately 0.06 acres of marine substrate. Proposed in-water infrastructure would have an estimated over-water footprint of approximately 0.7 acres. These structures would remain present throughout OMAO operations at the Ketchikan Port Facility (estimated at 20 to 50 years) and would be removed according to industry standards at the time of decommissioning, unless continued for future use. These direct impacts would be partially offset by removal of existing dilapidated in-water structures, as described above for the Preferred Alternative. Table 4.6-2 summarizes worst-case direct impacts to NWUS associated with Action Alternative 1.

Table 4.6-2: Action Alternative 1—Estimate of Direct Impacts to NWUS from Proposed Structures

Structures	Fill Material	Pile Quantity	Fill Volume (cubic feet)	Seafloor Footprint (square feet)	Over-Water Footprint (square feet)
Fixed Pier	Steel piles, 24-inch diameter, depth of 35 feet below substrate	100	10,996	314	24,000
Access Trestle	Steel piles, 24-inch diameter, depth of 35 feet below substrate	10	1,100	31	1,120
Trestle Support Float	N/A	N/A	N/A	N/A	528
Abutment Armoring	Riprap	N/A	270	90	N/A

Table 4.6-2: Action Alternative 1—Estimate of Direct Impacts to NWUS from Proposed Structures

Structures	Fill Material	Pile Quantity	Fill Volume (cubic feet)	Seafloor Footprint (square feet)	Over-Water Footprint (square feet)
Mooring Dolphins	Steel or fiber reinforced polymer piles, 36-inch diameter, depth of 50 below substrate	2	707	14	400
Suspended Gangway/Catwalk to Mooring Dolphins	N/A	N/A	N/A	N/A	480
Small Boat Dock	Steel piles, 24-inch diameter, depth of 35 below substrate	6	660	19	1,920
Suspended Gangway to Small Boat Dock	N/A	N/A	N/A	N/A	480
Small Boat Launch Ramp	Concrete	N/A	2,240	2,240	N/A
Total		118	15,972	2,709 (0.06 acres)	28,928 (0.66 acres)

Note:
Data in this table are AECOM estimates and were calculated using maximum quantities and dimensions.
N/A = not applicable

With adherence to applicable state, federal, and local regulations, as well as implementation of BMPs, Action Alternative 1 would have a direct, long-term, minor adverse impact to NWUS relating to construction of proposed in-water infrastructure.

No-Action Alternative

Under the No-Action Alternative, there would be no demolition and removal of existing site features, no excavation, and no construction. Because no construction activities would occur in WOUS, there would be no potential for impacts to wetlands and other waters. There would also be no beneficial action to remove condemned structures and related creosote-treated pilings within the Tongass Narrows at the Ketchikan homeport site, as would occur under the action alternatives.

4.6.4 Mitigation Measures

Other than BMPs, industry standards, and compliance with laws and regulations designed to reduce impacts to the environment (see Section 4.4, Hydrologic Processes), no mitigation measures are proposed in relation to wetlands and other waters. The placement of fill, demolition and installation of in-water infrastructure, and all other construction activities in the Tongass Narrows, requires a permit from USACE under Section 404 and Section 10 of the CWA. As part of their permit decision, USACE may ascribe conditions for preventing or minimizing aquatic resource losses.

4.7 FLOODPLAINS

4.7.1 Regulatory Setting

Executive Order 11988 Floodplain Management

EO 11988, dated May 24, 1977, regulates new development within existing floodplains “to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities.” Specifically, the EO outlines an eight-step process to first determine if a proposed federal project is in an existing floodplain and subsequent exploration of alternatives and mitigation if so. If the proposed project is not in an existing floodplain, then no additional action is required.

The eight steps include: 1) determining if the project is in a floodplain; 2) notifying the public; 3) identifying and evaluating practical location alternatives; 4) identifying potential impacts; 5) evaluating measures to reduce impacts; 6) reevaluating alternatives; 7) final determination of best alternative; and 8) implementing the proposed action. This EO applies to all NOAA facilities and NOAA has developed guidance on how to ensure compliance with EO 11988 (NOAA 2012).

4.7.2 Affected Resources

The NOAA guidance recommends first reviewing the FEMA databases and maps to determine if a particular site is in a floodplain. FEMA produces maps of floodplains for communities participating in the National Flood Insurance Program (NFIP). These maps display both coastal and riverine floodplains for the 1 percent annual chance (i.e., 100-year flood) and 0.2 percent annual chance (i.e., 500-year flood) events.

The Ketchikan Port Facility is situated along the heavily developed eastern shoreline of the Tongass Narrows, directly across the channel from Pennock Island. The immediate shoreline is generally at risk due to coastal flood processes including elevated coastal water levels, local wind-driven waves, wave overtopping (FEMA 2020b), and potentially tsunamis (Alaska Earthquake Center 2020). Tidal data published for the NOAA Ketchikan tide gauge (NOAA Station # 9450460) are listed in Table 4.7-1 and show that the area has relatively large tide ranges with a Great Diurnal Range (mean high higher water [MHHW] - MLLW) of 15.45 feet and a Mean Range of Tide (mean high water [MHW] – mean low water [MLW]) of 12.97 feet. Because the shoreline is relatively protected from the Alaska open coast, it is generally not at risk to larger, open coast waves. The shoreline is likely more vulnerable to local, wind-driven waves along fairly limited fetch lengths. A review of publicly available aerial photography shows that the fetch length directly across the channel from the NOAA facility to Pennock Island is approximately 0.3 miles. Wind-waves generated along this fetch, with winds approaching from the west, would likely be small with relatively short periods. There are larger fetch lengths to the southwest (approximately 0.5) miles and northwest (approximately 2.9 miles), although waves generated along these fetch lines would refract and decrease in height when approaching the shoreline at the NOAA facility.

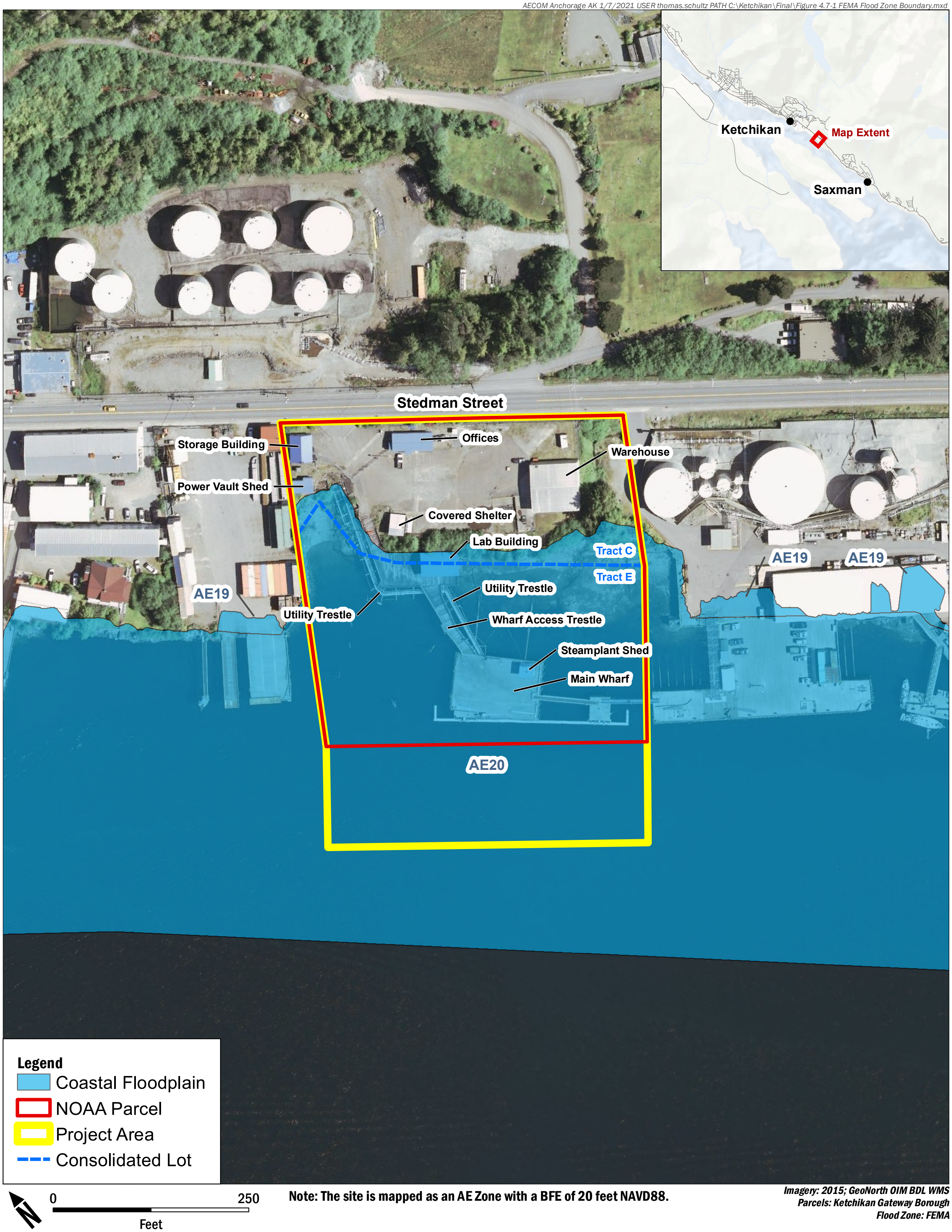
Table 4.7-1: Tidal Datums and Coastal Flood Elevations for the NOAA Ketchikan Facility

Tidal Datum	Elevation (ft MLLW)	Elevation (ft NAVD88)
FEMA Preliminary BFE	23.72	20.00
Highest Observed Tide	21.31	17.59
Highest Astronomical Tide	19.72	16.00
MHHW	15.45	11.73
MHW	14.55	10.83
Mean Sea Level	8.07	4.35
NAVD88	3.72	0.00
MLW	1.57	-2.15
MLLW	0.00	-3.72
Lowest Astronomical Tide	-4.55	-8.27
Lowest Observed Tide	-5.27	-8.99

Notes:
BFE = base flood elevation
MHHW = mean higher high water
MHW = mean high water
MLLW = mean lower low water
MLW = mean low water
NAVD88 = North American Vertical Datum of 1988
Sources: FEMA 2020; NOAA 2020; ADNR 2020

The City of Ketchikan participates in the NFIP and there are effective and preliminary flood maps for the community. Effective flood maps have completed all reviews, are finalized, and are regulatory. Preliminary maps have more up-to-date information, but have not yet completed all reviews and, while highly informative, are not yet regulatory. The shoreline is currently mapped in a Flood Insurance Rate Map (FIRM) that became Effective on April 16, 1990 (FIRM Panel # 020003 0002 B – FEMA 1990). Parts of the shoreline at the Ketchikan Port Facility are mapped in a coastal floodplain as Zone A, which is in a coastal floodplain, but no specific Base Flood Elevation (BFE) has been calculated (FEMA 1990). The FEMA Preliminary Flood Insurance Study (FIS) indicates that the shoreline is relatively steep in Ketchikan; therefore, the coastal floodplain is relatively narrow and the dominant coastal flood hazards are wave setup, run-up, and associated wave overtopping at steep coastal barriers (e.g., revetments, embankments, sheet pile walls). This is in contrast to relatively flat shorelines where the coastal floodplain is broad and the dominant flood hazards are that of large-scale coastal inundation and overland wave propagation (FEMA 2020b).

FEMA recently completed a preliminary coastal flood study to determine specific BFEs for areas of the Ketchikan shoreline (FEMA 2020b). The preliminary FIRM panels are not effective at the time of this writing. They were approved as preliminary on August 28, 2020; however, it is assumed that they will be finalized and will replace the effective maps. It is important to consider the preliminary FIRM Panel (FIRM Panel #02130C0229C) for this EA as it includes more up-to-date flood hazard information. The map shows the shoreline mapped as Zone AE, which are flood zones in a coastal floodplain that have BFEs calculated, and where the wave or wave run-up heights are less than 3 feet (Figure 4.7-1). AE Zones are flooded from coastal water sources but have low wave energy and are distinct from VE Zones. VE Zones are also flooded from coastal water sources but have high wave energy and velocities that are capable of damaging structures (wave or wave run-up heights greater than or equal to 3 feet). The mapped BFE at the project area is 20 feet NAVD88 and limited near the shoreline (FEMA 2020b). The map indicates that the existing dock and dockside facilities are in the mapped AE Zone, while the warehouse and office building are not in the AE Zone.



Note: The site is mapped as an AE Zone with a BFE of 20 feet NAVD88.

Imagery: 2015; GeoNorth OIM BDL WMS
Parcels: Ketchikan Gateway Borough
Flood Zone: FEMA

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FEMA FLOOD ZONE BOUNDARY

Figure 4.7-1

The Preliminary FIS report shows that one coastal transect was analyzed in this area (Transect #9017) and that wave setup, run-up, and overtopping values were calculated. Preliminary flood elevations for this transect are shown in Table 4.7-2. Still water levels (SWLs) are coastal flood elevations that do not include wave effects, and generally include astronomical tides, storm surge, and nearshore oceanographic processes. Total water levels (TWLs) are coastal flood elevations that include the Still Water Level (SWL) and wave setup and run-up. The 1 percent annual chance TWL of 19.9 is displayed on the preliminary FIRM (rounded to 20 feet NAVD88). Very roughly, this implies that there will be approximately 2.6 feet of wave run-up (difference between the 1-percent-annual-chance SWL and TWL) at the site during the 1 percent annual chance storm event.

Table 4.7-2: FEMA (2020) Preliminary Flood Elevations

Still Water Level (SWL)	Elevation (ft NAVD88)
10-Percent-Annual Chance	16.7
2-Percent-Annual Chance	17.0
1-Percent-Annual Chance	17.2
0.2-Percent-Annual Chance	17.3
Total Water Level (TWL)	
1-Percent-Annual Chance	19.9

Sea Level Rise

In addition to flooding from storm events, astronomical tides, and wave run-up, it is also important to consider the risk of flooding due to future sea-level rise (SLR). Future SLR is generally expected to increase coastal flooding and expand coastal floodplains globally.

NOAA maintains a network of tide gauges and calculates an observed global rate of SLR as well as observed rates of SLR at many tide gauges around the world. Currently, NOAA calculates a global rate of SLR of 3.6 millimeters per year. Due to oceanographic effect and vertical land motion (uplift or subsidence), SLR is not uniform around the globe and it is important to consider the local, relative rate of SLR at a particular project site.

NOAA maintains a tide gauge in Ketchikan (NOAA gauge #9450460) and has calculated that sea level is currently decreasing there at a reported rate of -0.39 millimeters/year (Figure 4.7-2). It is likely that there is vertical uplift in Ketchikan that has historically outpaced SLR; therefore, sea level is currently decreasing relative to the shoreline in this area.

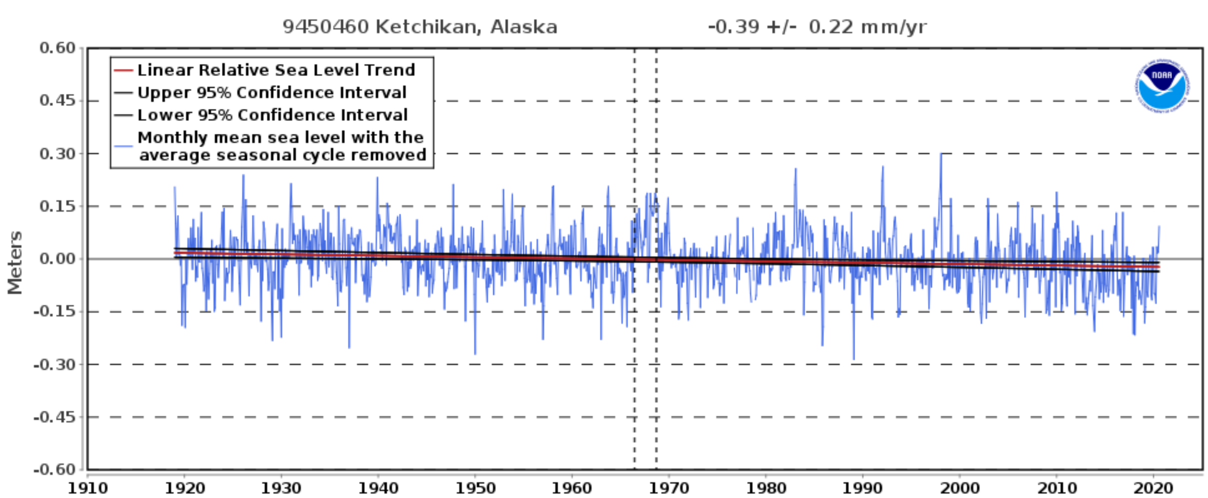

Figure 4.7-2: Observed SLR at the NOAA Ketchikan Tide Gauge (NOAA gauge #9450460)

SLR rates are generally expected to increase and there is a range of future SLR predictions. If future SLR begins to outpace the local vertical uplift, then local sea levels will begin to rise relative to the shoreline. NOAA (2017) developed a range of future global SLR scenarios that can be used for coastal engineering and planning purposes. The scenarios include Low (the future rate of SLR is the constant global rate of 3.6 millimeters per year) and five scenarios where the pace of SLR increases: Intermediate-Low, Intermediate, Intermediate-High, High, and Extreme. The SLR scenarios increase in severity based on global models of climate change and greenhouse gas emission. The SLR scenarios can be adjusted with the local, observed rate of SLR to develop future projections by year for Ketchikan (Figure 4.7-3). The future projections in Figure 4.7-3 range from 0.1 to 2.0 feet by 2050 and 0.2 to 8.5 feet by 2100.

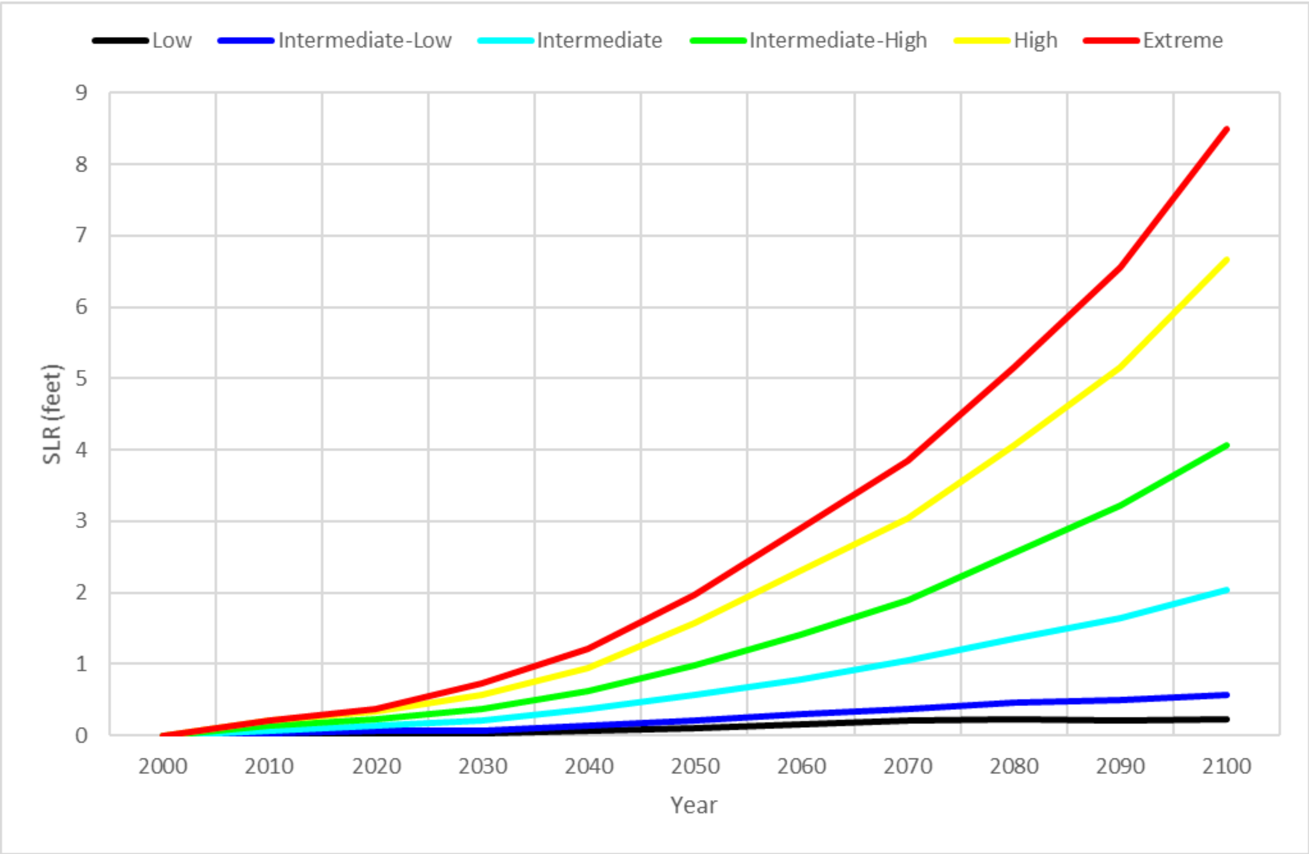

Figure 4.7-3: NOAA (2017) future SLR projections, adjusted for local, relative SLR in Ketchikan

The NOAA (2017) future SLR projections are developed by running multiple numerical models with different global greenhouse gas emission scenarios. NOAA (2017) also developed probabilities of occurrence (i.e., an estimate of likelihood) for each SLR scenario under each Reciprocal Concentration Pathway, which is a future global greenhouse gas emission scenario (Table 4.7-3). In the table, RCP2.6 represents low greenhouse gas emissions, RCP4.5, represents moderate greenhouse gas emissions, and RCP8.5 represents high greenhouse gas emissions.

Generally, Table 4.7-3 shows that low amounts of SLR are likely while more extreme amounts of SLR are less likely, depending on future greenhouse gas emissions. With higher greenhouse gas emission scenarios like RCP8.5, higher amounts of SLR become more likely. Under RCP8.5, there is an estimated 100 percent chance that there will be 0.2 feet of SLR by 2100 and a 96 percent chance of 0.6 feet of SLR by 2100. There is also a 17 percent chance of 2.0 feet by 2100. Higher amounts of SLR have a 1.3 percent or lower chance of occurrence.

Table 4.7-3: Estimated Probabilities of Occurrence for Each SLR Scenario Under Each Global Reciprocal Concentration Pathway Scenario

NOAA (2017) SLR Scenario	Global Greenhouse Gas Emission Scenario		
	RCP2.6	RCP4.5	RCP8.5
Low (0.2 ft by 2100)	94.00%	98.00%	100.00%
Intermediate-Low (0.6 ft by 2100)	49.00%	73.00%	96.00%
Intermediate (2.0 ft by 2100)	2.00%	3.00%	17.00%
Intermediate-High (4.1 ft by 2100)	0.40%	0.50%	1.30%
High (6.7 ft by 2100)	0.10%	0.10%	0.30%
Extreme (8.5 ft by 2100)	0.05%	0.05%	0.10%

Figure 4.7-1 shows that flooding is currently restricted to areas immediately landward of the shoreline. For planning purposes, it is useful to consider approximately when SLR might begin to impact areas of the NOAA property that are setback farther from the shoreline. A simple approach is appropriate; looking at the elevation of a particular area of interest on the site and then calculating the freeboard (difference between this elevation and a flood elevation) and the amount of time that sea level is projected to increase by the freeboard amount. A topographic survey map of the site (NOAA 2004) shows that the seaward edge of the existing warehouse is at approximately 33 feet MLLW (29.3 feet NAVD88). The difference between this elevation and the flood elevations from the FEMA FIS are calculated as freeboard for each flooding scenario and shown in Table 4.7-4. The table shows that the freeboard amounts range from 9.4 feet for the 1-percent-annual-chance TWL to 12.6 feet for the 10 percent annual chance SWL. This implies that sea level would need to rise over 9 feet before the warehouse would be subject to wave splash overtopping from the 100-year flood event. Sea level would need to rise approximately 12 feet before the warehouse would be subject to inundation from SWL flooding.

Table 4.7-4: Freeboard for FEMA FIS Flood Scenarios

Flood Source	Return Period	Flooding Type	Elevation (ft NAVD88)	Freeboard (ft)[1]
Still Water Level				
10-Percent-Annual Chance	10 Years	Inundation	16.7	12.6
2-Percent-Annual Chance	50 Years	Inundation	17.0	12.3
1-Percent-Annual Chance	100 Years	Inundation	17.2	12.1
0.2-Percent-Annual Chance	500 Years	Inundation	17.3	12.0
Total Water Level				
1-Percent-Annual Chance	100 Years	Wave Splash Overtopping	19.9	9.4

Notes:
[1] Freeboard is calculated as the difference between the warehouse elevation (29.3 feet NAVD88) and each particular flood elevation.

The SLR curves in Figure 4.7-3 show that no SLR projection is expected to increase by these amounts by the end of the century. Even the Extreme SLR scenario, which is conservative and has a 0.10-percent chance of occurring under the high greenhouse gas emissions scenario, is only projected to reach 8.5 feet by 2100. This suggests that it is not likely that SLR will increase flooding of the warehouse, or facilities at similar elevations, during this century.

4.7.3 Environmental Consequences

Preferred Alternative—Floating Pier

Information from both the Effective and Preliminary FEMA flood studies, including the flood zone boundaries shown in Figure 4.7-1, indicates that only portions of the Proposed Action at the shoreline, or immediately landward of the shoreline, will be in the 1 percent annual chance (i.e., 100-year) coastal floodplain. Note that FEMA flood maps and the NFIP typically do not apply seaward of the 0 foot NAVD88 contour. Therefore, they generally do not apply to marine structures, ships, dolphins, and other mooring structures that functionally need to be situated in the water and are designed for these conditions. This includes the proposed in-water replacement pier, trestle, and dolphin structures.

Figure 4.7-1 shows that the existing warehouse and office building are not in the mapped floodplain and the SLR evaluation in Section 4.7.2 indicates that these facilities will not be impacted by future flooding due to SLR until the next century. With no other new facilities planned in the uplands area of this site, flood impacts for the Preferred Alternative are expected to be minor. These proposed facilities are required for the operation and maintenance of NOAA's vessel and functionally need to be situated near the shoreline. It is likely not practical for them to be relocated to an alternative site.

Alternative 1—Fixed Pile-Supported Pier

A fixed pile-supported pier would be subject to the same flood hazards as the Preferred Alternative, a floating pier. Only portions of the NOAA facility upgrade placed at the shoreline, or immediately landward of the shoreline, will be in the 1-percent annual chance (i.e., 100-year) coastal floodplain. The NFIP would not apply to any facilities seaward of the 0 foot NAVD88 contour. From a flood hazard perspective, there is no substantial difference between this alternative and the Preferred Alternative. Flood impacts for this alternative are expected to be minor.

No-Action Alternative

In the absence of maintenance or removal, the existing condemned and deteriorating pier access trestle and the pier piles and near-shore structures that exist would be at risk.

4.7.4 Mitigation Measures

No mitigation measures are proposed to reduce impacts of implementing the Preferred Alternative or Action Alternative 1.

4.8 BIOLOGICAL RESOURCES

Biological resources assessed in this section include fish and aquatic resources, essential fish habitat (EFH), terrestrial wildlife, birds, and marine mammals. Vegetation was dismissed from further analysis due to the paved, disturbed nature of the site. A general description of the existing environment is provided in Section 3, Existing Environment. For information on wetlands, see Section 4.6, Wetlands and Other Waters.

4.8.1 Regulatory Setting

Fish, Aquatic Resources and Essential Fish Habitat

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) governs protection of EFH. NMFS (also known as NOAA Fisheries) is responsible for protecting habitats important to federally managed marine species, which includes anadromous Pacific salmon. Federal agencies must consult with NMFS concerning any action that may adversely affect EFH. EFH includes habitats necessary to a species for spawning, breeding, feeding, or growth to maturity, which includes marine and riverine migratory corridors, spawning grounds, and rearing areas of the Pacific salmon species.

Birds

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone without a permit issued by the Secretary of the Interior from taking bald eagles, including their parts, nests, or eggs. The BGEPA is administered by USFWS. The act provides criminal penalties for persons who, "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703) is enforced by USFWS and prohibits ”take” of migratory birds, their eggs, feathers, or nests. “Take” includes hunting, pursuing, wounding, killing, possessing, or transporting any migratory bird, nest, egg, or part thereof. The MBTA does not distinguish between intentional and unintentional take. Under the MBTA, takings are prohibited unless expressly authorized or exempted. In Alaska, all native birds except grouse and ptarmigan (which are protected by the State of Alaska) are protected under the MBTA.

To help comply with the MBTA, the USFWS provides timing recommendations to avoid land disturbance and vegetation clearing during nesting seasons (USFWS 2020b). If construction cannot be conducted during the recommended timeframes, consultation with USFWS may be necessary to determine other potential avoidance measures.

Terrestrial Wildlife

No applicable regulations.

Marine Mammals

Endangered Species Act

The ESA (16 U.S.C. Section 1536) provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The USFWS and NMFS implement the ESA and direct all federal agencies on the conservation of endangered and threatened species. Federal agencies must ensure that proposed actions do not jeopardize the continued existence of any endangered or threatened species or cause the destruction or adverse modification of their habitat. If listed species or designated critical habitat are present and could be affected by the proposed action, a biological assessment must be prepared to analyze the potential effects of the proposed action on listed species and critical habitat and make a determination of effect.

Under provisions of Section 7(a)(2) of the ESA, a federal agency that carries out, permits, licenses, funds, or otherwise authorizes activities that may affect a listed species must consult with the USFWS and/or NMFS to ensure that its actions are not likely to jeopardize the continued existence of any listed species.

Marine Mammal Protection Act

All marine mammals are federally protected under the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361 et seq.). USFWS and NMFS have regulatory authority for implementing the MMPA. With some exceptions, the MMPA prohibits the “take” of marine mammals—including harassment, hunting, capturing, collecting, or killing—in U.S. waters and by U.S. citizens on the high seas. Incidental take (e.g., unintentional take) may be authorized through a permit application process for non-fishing activities, including construction projects.

4.8.2 Affected Resources

Threatened and Endangered Species

The humpback whale (*Megaptera novaeangliae*) is the only threatened and endangered species (TES) protected by the ESA that is known to occur in or near the project area. This marine mammal species is under the jurisdiction of NMFS (NOAA 2020a) and is discussed in the "Marine Mammals" section below.

There are no plant, fish, avian, or terrestrial wildlife species or designated critical habitats for these resources protected by the ESA that are known to occur in the project area (NOAA 2020a; USFWS 2020a).

Fish and Aquatic Resources

Five species of Pacific salmon, pink (*Oncorhynchus gorbuscha),* chum (*O. keta*), sockeye (*O. nerka*), coho (*O. kisutch*), and Chinook salmon (*O. tshawytscha*), occur in the project area. Local and nearby bays and coves provide a protected habitat for Dungeness crabs (*Cancer magister*), red king crab (*Paralithodes camtschaticus*), and tanner crab (*Chionoecetes bairdi*). Other invertebrates found in the area include shrimp (numerous species), pinto abalone (*Haliotis kamtschatkana*), and geoduck clam (*Panopea generosa*).

Anadromous fish streams draining to the Tongass Narrows waterway support runs of pink, chum, coho, Chinook, and sockeye salmon, as well as steelhead trout (*Oncorhynchus mykiss*) typically between March 15 and June 15. Ketchikan Creek, closest to the project area (approximately 0.7 miles northwest), contains populations of chum, coho, Chinook, pink, and sockeye salmon, as well as cutthroat (*Oncorhynchus clarki clarki*) and steelhead trout (Johnson and Litchfield 2015; Alaska Department of Fish and Game [ADF&G] 2020a). Salmon fry and Pacific herring (*Clupea pallasii*) use nearshore marine areas in spring and summer; these areas are particularly important to migrating juvenile salmon moving from freshwater to saltwater. Along steep beaches, such as those present along the Tongass Narrows and in the project area, salmon tend to aggregate (in greater numbers compared to shallower gradient shores) and may school with other species (Wertheimer et al. 1994). This behavior can be attributed to greater exposure to predators in adjacent deepwater areas. Juvenile salmonids prefer shallow gradient shorelines.

Inshore areas of the Tongass Narrows also provides habitat for other marine fish species including Atka mackerel (*Pleurogrammus monopterygius*), Pacific cod (*Gadus macrocephalus*), arrowtooth flounder (*Atheresthes stomias*), walleye pollock (*Gadus chalcogrammus*), dusky rockfish (*Sebastes variabilis*), shortraker rockfish (Sebastes borealis), rougheye rockfish (*Sebastes aleutianus*), yelloweye rockfish (*Sebastes ruberrimus*), Pacific ocean perch (*Sebastes alutus*), dover sole (*Microstomus pacificus*), flathead sole (*Hippoglossoides elassodon*), Greenland turbot (*Reinhardtius hippoglossoides*), rex sole (*Glyptocephalus zachirus*), rock sole (*Glyptocephalus zachirus*), yellowfin sole (*Limanda aspera*), sablefish (*Anoplopoma fimbria*), eulachon (*Thaleichthys pacificus*), sand lance (*Anarhichas orientalis*), skates (*Raja* and *Bathyraja* spp.), and sculpin species (various genera) (ADF&G 2020a).

A marine reconnaissance study using intertidal observational surveys and subtidal video transects in the area of the USCG site (within 0.25 miles to the south of the NOAA site) identified tidal zone assemblages in rock, riprap, and boulder environments (Pentec Environmental 2000). In the upper tidal zone, above +8.0 feet MLLW, typical assemblages include limpets (e.g., *Tectura persona* or *Lottia digitalis*), littorina snails (*Littorina sitkana*), and barnacles (e.g., *Balanus glandula* and *Semibalanus balanoides*). Deeper than the attached fauna is typically half to full coverage of rockweed (*Fucus gardneri*) with tufts of red algae (typically *Gloiopeltis furcata* and *Endocladia muricata*). The middle tidal zone, between 4.0 feet MLLW and 8.0 feet MLLW, included most of the upper tidal zone species, though limpets are replaced by smaller lottiids. Rockweed abundance has been reduced by grazers and Pacific blue mussel (*Mytilus trossulus*) density is lowered from predation by sea stars (e.g., *Leptasterias epichlora*) or drills (e.g., *Nucella lamellosa*). The lower tidal zone, +4.0 to -4.0 feet MLLW, is more dominated by subtidal species, such as smaller algae, remnant kelp (various genera), sea lettuce (*Ulva fenestrata*), coralline algae (Corralling *frondescence*), and grazers, especially chiton (*Tonicella* spp.). Segments of the lower tidal zone include mud bottoms may support littleneck (*Protothaca staminea*), butter clams (*Saxidomus giganteus*), and possibly eelgrass (*Zostera marina*), although no eelgrass was observed during the marine reconnaissance. Eelgrass beds are an important habitat for fish and prey species; they are infrequent in waters adjacent to the city of Ketchikan and south of the entrance to Thomas Basin Marina north of this site area. Eelgrass beds can be highly productive and function as nursery areas for juvenile salmon and Dungeness crab.

Essential Fish Habitat

EFH is defined and established under the MSFCMA (50 CFR part 600) and composed of the waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1802 Section 3[10]). Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish. Substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

EFH for species occurring in the project area includes Alaska stocks of Pacific salmon and the groundfish Dover sole (*Microstomus pacificus*) (Table 4.8-1). These five species of Pacific salmon are also listed in ADF&G's Wildlife Action Plan (ADF&G 2015) as species of general conservation concern (SGCN) in Alaska, including the Southeast Alaska bioregion.

Table 4.8-1: EFH in the Project Area

Species	Life Stages	Habitat Description
Chinook Salmon	Marine juveniles, marine immature and maturing adults	• Marine juveniles: all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the GOA. • Marine immature and maturing adults: marine waters off the coast of Alaska to depths of 200 m and ranging from the mean higher tide line to the 200-nm limit of the EEZ including the GOA.
Chum Salmon	Marine juveniles, marine immature and maturing adults	• Marine juveniles: all marine waters off the coast of Alaska to approximately 50 m in depth from the mean higher tide line to the 200-nm limit of the EEZ, including the GOA. • Marine immature and maturing adults: Same as Chinook salmon.
Coho Salmon	Marine juveniles, marine immature and maturing adults	• Marine juveniles: same as Chinook salmon. • Marine immature and maturing adults: same as Chinook salmon.
Pink Salmon	Marine juveniles, marine immature and maturing adults	• Marine juveniles: same as Chinook salmon. • Marine immature and maturing adults: same as Chinook salmon.
Sockeye Salmon	Marine juveniles, marine immature and maturing adults	• Marine juveniles: same as chum salmon. • Marine immature and maturing adults: same as Chinook salmon.
Dover Sole	Late juveniles, adults	• Late juveniles: lower portion of the water column along the middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the GOA wherever there are substrates consisting of sand and mud. • Adults: same as for late juveniles.

Notes:
EEZ = Exclusive Economic Zone
GOA = Gulf of Alaska
nm = nautical mile
m = meter(s)

Source: NPFMC 2018; 2020; NOAA 2020c

Birds

There is limited habitat in the industrial, developed Ketchikan waterfront in the project area for avian roosting, nesting, and foraging.

The NOAA site manager indicated in October 2020 that birds commonly observed at the site include bald eagle (*Haliaeetus leucocephalus*), crows and raven (*Corvus* spp.), small songbirds, shorebirds, and gulls (NOAA personal communication 2020). Other birds observed at the project site include great blue heron (*Ardea herodias*) and Canada geese (*Branta canadensis*) that occasionally come through the site from the cemetery across the street.

The Ketchikan Gateway Borough supports at least 264 species of birds, including 63 breeding species and nine probable breeders (Juneau Audubon Society 2009). Although there is limited avian habitat in the project area, many species of land birds, shorebirds, and seabirds common in the Ketchikan area may occur in the shoreline habitat or in the nearshore marine waters.

Terrestrial Wildlife

The ADF&G Wildlife Action Plan (ADF&G 2015) lists species of SGCN by bioregion. There are several terrestrial SGCN identified for the southeast bioregion; however, because there is limited suitable habitat in the project area, none of the terrestrial SGCNs listed in the plan are expected to occur for an extended amount of time at the project site.

NOAA personnel have indicated that wildlife observed near the site include black bear (*Ursus americanus*) and Sitka black-tailed deer (*Odocoileus hemionus*) (NOAA, personal communication, 2020).

Marine Mammals

Assessment of marine mammals includes those species listed under the ESA and those species protected under the MMPA that may occur in the vicinity of the project area. Table 4.8-2 provides a list and description of protected marine mammal species that may occur in the vicinity of the project area.

On a site visit in October 2020, the NOAA site manager indicated that marine mammals commonly observed at the site include sea lions (*Otariinae spp*.), harbor seals (*Phoca vitulina*), and humpback whales (NOAA, personal communication, 2020).

ESA-Listed Species

As noted above, the only ESA-listed species that may be impacted by the project is the humpback whale. The project area is in the broad summer feeding area of the Mexico Distinct Population Segment (DPS). This DPS is listed as Threatened as of 2016; the Hawaii DPS, which also has feeding areas in coastal Alaska, was delisted that same year (81 Federal Register 62259). The Mexico DPS breeds along the Pacific coast of Mexico and the Revillagigedo Islands, transits the Baja California Peninsula, and feeds across a broad range from California to the Aleutian Islands (NOAA 2020b). No other marine mammal species or critical habitat protected by the ESA are known to occur in the project area (USFWS 2020a; NOAA 2020a).

MMPA-Protected Species

As noted above, all marine mammal species are protected under the MMPA. Table 4.8-2 provides a list and description of protected marine mammal species that may occur in the vicinity of the project area.

Table 4.8-2: Protected Marine Mammal Species that may occur in the Project Area

Species	Description
Humpback Whale (*Megaptera novaeangliae*)	Humpback whales occur in all major ocean basins, migrating from tropical breeding areas to polar or subpolar feeding areas (Clapham 2009). Those near Ketchikan are primarily thought to be from the Central North Pacific stock, which winter in the Hawaiian Islands and migrate to northern British Columbia/Southeast Alaska, the GOA, and the Bering Sea/Aleutian Islands to feed from spring through fall. The Central North Pacific Stock is listed as MMPA depleted (NOAA 2020a). Humpback whales are known to feed off the north end of Pennock Island in the narrows between Ketchikan and Gravina Island. When feeding, humpbacks occur in areas where upwelling concentrates prey near the surface. Humpback whales feed on euphausiids and various schooling fishes, including herring, capelin, sand lance, and mackerel (Clapham 2009). They often feed in shipping lanes which makes them susceptible to mortality or injury from ship strikes (Douglas et al. 2008).
Killer Whale (*Orcinus orca*)	There are three recognized ecotypes of killer whales in the North Pacific Ocean: residents, transients, and offshores (Krahn et al. 2004). Resident killer whales forage primarily for fish in relatively large groups in coastal areas. Transient killer whales primarily hunt marine mammals (Herman et al. 2005; Krahn et al. 2004; Baird et al. 1992). Transient pods are usually fewer in number than resident pods, and they typically have different dorsal fin shapes and saddle patch pigmentation than resident pods. Less is known about offshore killer whales, but their groupings are large, they range from Mexico to Alaska, and their prey includes fish, particularly sharks (Ford et al. 2000; Krahn et al. 2004; Ford et al. 2014). Killer whales found in waters near Ketchikan include the Northern Resident Stock and the West Coast Transient Stock.
Dall's Porpoise (*Phocoenoides dalli*)	Dall's porpoises are found in temperate waters of the North Pacific, along the continental shelf and in inland and coastal waters of the GOA and Bering Sea/Aleutian Islands areas. There are seasonal inshore-offshore and north-south movements, but these movements are poorly understood (Jefferson 2009). The Alaska stock is currently the only stock recognized in Alaska waters where it occurs in the GOA (including Ketchikan and the Inside Passage), Bering Sea, and Aleutian Islands areas (Muto et al. 2018).
Harbor Porpoise (*Phocoena phocoena*)	Harbor porpoises inhabit shallow, coastal temperate and subarctic waters; in Alaska, harbor porpoises are found from Point Barrow along the Alaska coast (including the Aleutian Islands) down through Southeast Alaska (ADF&G 2020b). Harbor porpoises are often found in fjords, bays, harbors, estuaries, and large rivers, usually with depths of less than 300 feet, but will occasionally travel to deeper offshore waters in the winter. They feed on cod, herring, pollock, sardines, and whiting, squid and octopus.
Gray Whale (*Eschrichtius robustus*)	Gray whales found near Ketchikan belong to the Eastern North Pacific population. Most spend the summer in the shallow waters of the northern and western Bering Sea and in the adjacent waters of the Arctic Ocean; however, some remain throughout the summer and fall along the Pacific coast as far south as southern California. Gray whales are the most coastal of all the large whales and inhabit primarily inshore or shallow, offshore continental shelf waters (Jones and Swartz 2009). Gray whales are suction-feeders and prey primarily on benthic amphipods, decapods, and other invertebrate species.

Table 4.8-2: Protected Marine Mammal Species that may occur in the Project Area

Species	Description
Steller Sea Lion (*Eumetopias jubatus*)	Steller sea lions range across the North Pacific Ocean from northern Hokkaido, Japan, through the Kuril Islands and Sea of Okhotsk, across the Aleutian Islands, Bering Sea, GOA, and Southeast Alaska to central California (NMFS 2013). Two DPSs of Steller sea lions are recognized in U.S. waters: an eastern stock, which ranges from California to Prince William Sound, Alaska; and a western stock, which includes animals at and west of Cape Suckling (Loughlin 1997). Steller sea lions near Ketchikan are from the eastern stock. Steller sea lions breed from late May to early July throughout their range at rookeries located on remote islands and rocks. Although Steller sea lions occur in the Tongass Narrows and are seen in Ketchikan harbor, there are no rookeries or haulouts in the project area vicinity. The closest haulouts are on Grindall Island, across from Behm Canal on the east side of Prince of Wales Island, on Easterly Island to the north in Ernest Sound, and to the south on West Rock and near the mouth of Clarence Strait (Fritz et al. 2015; NMFS 2013).
Harbor Seal (*Phoca vitulina*)	The five recognized subspecies of harbor seals occur along the west coast of North America (Burns 2009); the Clarence Strait stock of harbor seals occurs in the Ketchikan area. None of these stocks is considered “depleted” under the MMPA or listed under the ESA. Harbor seals are widespread in temperate and arctic waters of the North Atlantic and North Pacific Oceans. They primarily occur near shore and use intertidal sand bars and mudflats in estuaries, intertidal rocks and reefs, sandy, cobble, and rocky beaches, islands, log-booms, docks, and floats in all marine areas of the state to rest or haulout (Burns 2009).
Northern Sea Otter (*Enhydra lutris kenyoni*)	The northern sea otter range extends from the Aleutian Islands in southwestern Alaska to the coast of Washington state. Once exploited to near extinction, northern sea otters in Alaska have reoccupied most of their known range since coming under protection under the International Fur Seal Treaty in 1911. Three DPSs have been identified within Alaska: southwest, southcentral, southeast. The Southeast Alaska stock occurs in the Ketchikan area. Northern sea otters are typically found in shallow water areas that are near the shoreline, and primarily feed in water less than 330 ft in depth. As water depth is generally correlated with distance to shore, sea otters typically inhabit waters within 0.6-1.2 mi of shore (Riedman and Estes 1990). Otters tend to be non-migratory, moving relatively short distances between breeding and foraging areas. Sea otters feed on benthic invertebrates, including sea urchins, mussels, clams, chitons, and crabs.

Notes:
GOA = Gulf of Alaska
ft = feet

4.8.3 Environmental Consequences

<u>Preferred Alternative—Floating Pier</u>

Fish and Aquatic Resources and EFH

Potential impacts to marine ecosystem fish and aquatic resources and EFH during construction and operations are summarized in Table 4.8-3 along with significance levels, duration of potential impact, and magnitude of the potential impact.

Table 4.8-3: Summary of Potential Impacts to Marine Ecosystem Fish and EFH

Impact	Significance Level	Duration	Magnitude
In-Water Noise and Vibration during **construction** (pile removal and installation): • Degradation of habitat due to the introduction of noise • Avoidance or behavioural changes due to noise and vibration • Injury from noise or vibration	• None / Negligible: assumed sound / vibratory levels are met; and no managed species are present • Minor: assumed sound / vibratory levels are met; managed species leave the area, but return after activities cease • Moderate: assumed sound / vibratory levels are met; managed species may experience behavioural impacts prior to leaving the area, but return after activities cease • Major: managed species experience injury as assumed sound / vibratory levels are exceeded; or managed species do not return after activities cease	• **Short-term** (during removal and installation) • Injury caused by noise/vibration may be **temporary** or **permanent**	Minor, considering: • Adherence to applicable BMPs • EFH conditions would return to normal shortly after the noise /vibration generating activity ceases
Habitat alteration/loss (fill associated with **construction** of in-water infrastructure): • Physical alteration and loss of habitat from removal of existing in-water infrastructure and installation or proposed in-water infrastructure. • Risk of injury or mortality due to construction activities	• None / Negligible: no habitat loss or altered, no managed species displaced • Minor: less than one percent of habitat lost or altered, managed species temporarily displaced but return after activities cease • Moderate: between one percent and 10% of habitat lost or altered, managed species temporarily displaced but return after activities cease • Major: more than 10% of habitat lost or altered, managed species may not return after activities cease	• Displaced/ removed habitat and any mortality caused by construction activities would be **permanent** • Habitat disturbance from construction activities outside the footprint of fill would be **short-term**	Minor, considering: • Adherence to applicable BMPs • Habitat loss is minimal relative to areas that would remain undisturbed (maximum approximately 0.06 acres disturbed of 2.3 acres total; less than 2% disturbed) • Managed species may be displaced from construction areas but are expected to return to normal after construction activities have ceased or habitats have recovered • Further details on specific areas impacted by demolition activities and construction of new structures are described in Section 4.4, Water Resources

Table 4.8-3: Summary of Potential Impacts to Marine Ecosystem Fish and EFH

Impact	Significance Level	Duration	Magnitude
Water Quality during **construction** (changes in water quality due to increased turbidity, and disturbance of marine sediments potentially containing PAHs): • Potential increases in turbidity and sedimentation • Potential that PAHs from creosote-treated piles can leach into the surrounding waters and accumulate in marine sediments and sediment disturbance can impact water quality	• None / Negligible: Turbidity and sedimentation levels do not increase; no PAH are present; or no managed species are present • Minor: Turbidity and sedimentation levels increase for short periods of time, and any PAH present are flushed; managed species have left the area prior to any injury or mortality • Moderate: Turbidity and sedimentation levels increase for extended periods of time, or any PAH present remain in the ecosystem for longer than anticipated; managed species may be exposed to PAH prior to leaving the area; managed species return after activities cease • Major: Turbidity and sedimentation levels or PAH levels cause injury or mortality; or managed species do not return after activities cease	• **Short-term** (during removal and installation)	Minor, considering: • Effects of turbidity and sedimentation on EFH would be minimized through implementation of required stormwater management plans and BMPs • The persistence of turbidity and contaminants near the proposed pier is not expected because of tidal water movement at the site • Further details on water quality, including BMPs, are described in Section 4.4, Water Resources
Contaminant release (incidental spills of petroleum lubricants and fuel) during **construction** and **operations**: • Potential incidental spills of petroleum lubricants and fuels in EFH, which are toxic to fish resulting in potential injury or mortality	• None / Negligible: No incidental spills occur • Minor: Any incidental spills that occur are small and promptly cleaned prior to any exposure of managed species • Moderate: Any incidental spills that occur are promptly cleaned, but managed species may be exposed causing injury or mortality • Major: Incidental spill are not cleaned promptly, causing injury and mortality to agency-managed species	• **Not Applicable**, as release would be accidental	Negligible, considering: • Compliance with applicable laws and regulations related to fuel transfers • Implementation of appropriate spill prevention control measures. • Petroleum lubricants and fuel spills would be promptly cleaned up • The persistence of turbidity and contaminants near the proposed pier facility is not expected because of the open-water location • Further details on release including BMPs are described in Section 4.5, Hazardous Materials

Notes:
BMPs = best management practices
EFH = Essential Fish Habitat
PAH =
Source: Appendix B: Underwater Noise Technical Memorandum

Due to the conceptual level of design for the in-water structures, including the replacement pier, this analysis considers the use of rock socket, vibratory and impact pile installation methods assuming worst-case conditions. While rock socket installation methods are preferred, vibratory and impact hammer techniques may become necessary temporarily to final plumb positioning and to proof the pile in place, respectively; however, the actual installation method (and associated equipment used) depends on site-specific geotechnical characteristics, which would be evaluated during the design. Appendix B includes an Underwater Noise Technical Memorandum prepared for installation/removal of piles at Ketchikan. The memorandum describes underwater noise fundamentals, applicable noise criteria, protected species, an estimation of pile driving noise, and a discussion on potential effects of rock socket drilling and down-hole hammer, vibratory pile driving, and impact pile driving noise on fish and marine mammals. Distances of criteria level exceedance for noise, for different types of piles installed by different methods at different depths, are shown in the tables presented in this memorandum.

Sounds and vibration during vibratory pile removal and dismantling of existing in-water structures, as well as during installation of in-water structures may have impacts to fish and aquatic resources and EFH. There is limited information on the effects of rock socket drilling, vibratory extraction or other pile installation methods and related anthropogenic sounds on fishes (Popper and Hastings 2009); however, research suggests that juvenile coho salmon exposed to even the most severe sounds (e.g., pile driving) do not experience prolonged impacts or mortality (Ruggerone et al. 2008; Hart Crowser 2009).

Unless proposed best management practices for underwater noise attenuation or reduction are applied during construction, the removal and installation of pilings and associated pier facilities would temporarily alter fish habitat and fish migration in the immediate vicinity of construction activities, and may temporarily cause injury—or in extreme cases mortality—to nearby fish from physical movement of in-water structures and operation of in-water construction equipment. During construction, affected individuals are expected to move to adjacent similar habitat. Removal of existing structures would cause permanent mortality to other aquatic resources such as sessile marine invertebrates and plants; however, after construction of new facilities, these types of organisms would be expected to recolonize. Proposed infrastructure would cause a small amount of physical benthic habitat and EFH to be filled with concrete and pilings or other infrastructure elements. The actual area of affected EFH would be small (less than 0.1 acres; see Section 4.6, Wetlands and Other Waters) and would have a negligible effect on the total EFH in the vicinity of the project area.

During operations, there would be periodic increases in human presence and activity and vessel movement in the project area, which could cause an increase in disturbance to fish and aquatic resources and EFH. However, the site's current location in a developed, industrial area of Ketchikan is unlikely to cause detectable changes to these resources during operations. There is potential of injury or mortality during construction or operations due to accidental fuel spills.

With implementation of standard industry BMPs and compliance with federal regulations, the Proposed Action would have a direct, temporary, minor adverse impact on fish and aquatic resources and EFH during construction activities. Impacts during operations would be similar to existing conditions in the project area and would have a negligible effect.

Birds and Terrestrial Wildlife

Birds and terrestrial wildlife species may incidentally use the site for perches while foraging or for cover while passing through the site. Potential impacts to birds during construction and operations include alteration or loss of marginal habitat, avoidance due to noise, and a remote risk of injury or mortality from vessel traffic or accidental spills. Potential impacts to terrestrial wildlife include alteration or loss of habitat, and risk of injury or mortality from accidental spills.

During construction, noise from the increased human activity, particularly the use of mechanical equipment, may temporarily cause birds and terrestrial wildlife to avoid the project area. Affected individuals are expected to move to adjacent or nearby similar habitat. Existing marginal habitat would be disturbed or removed during dismantling activities of current site infrastructure. While unlikely, temporary injury or mortality to individuals may result from physical removal of structures and operation of in-water construction equipment. Installation of pilings and associated pier facilities has the potential to cause temporary injury—or in rare instances mortality—to individuals.

During operations, there would be an increase in human presence and activity and vessel movement in the project area, resulting in potential increased disturbance. However, the site's current location in a developed, industrial area of Ketchikan is unlikely to cause additional detectable impacts to biological resources during operations. There is also potential for injury or mortality to individuals during construction or operations due to accidental fuel spills (see Section 4.5, Hazardous Materials).

As discussed above, there are no birds listed under the federal ESA known to occur at the site. If active bird nests, eggs, or nestlings for MBTA-protected species are observed during construction, USFWS would be contacted for guidance to avoid mortality (take), which may include stopping work seasonally until the birds have fledged, or other avoidance measures. Similarly, active bird nests, eggs, or nestlings for eagle species protected under the BGEPA are observed during construction, USFWS would be contacted for guidance to avoid mortality (take).

With implementation of standard industry BMPs and compliance with federal regulations, the Proposed Action would have a direct, temporary, minor adverse impact on birds and terrestrial wildlife during construction activities. Impacts during operations would be similar to existing conditions in the project area and would have a negligible effect.

Marine Mammals

Potential impacts to marine mammals during construction and operations are summarized in Table 4.8-4 along with significance levels, duration of potential impact, and magnitude of the potential impact.

Due to the conceptual level of design for the replacement pier, this analysis considers use of impact pile-driving technology as a worst-case condition, which involves higher ground vibrations and noise levels compared to preferred rock socket pile installation or vibratory pile removal technology. The actual installation method (and associated equipment used) depends on site-specific geotechnical characteristics, which would be evaluated during the design. As mentioned above, Appendix B includes an Underwater Noise Technical Memorandum prepared for installation/removal of piles at Ketchikan.

Unless proposed best management practices for underwater noise attenuation or reduction are applied during construction, noise from pile installation, including drilling activities, may mask marine mammal vocalizations or cause deflection or avoidance of the area (Hastie et al. 2015; Russell et al. 2016; Tougaard et al. 2009; Würsig et al. 2000). The propagation distance of anthropogenic noise in a marine environment varies by ocean bottom type; water depth can also impact distance of sound propagation (Hildebrand 2009).

The risk of marine mammals colliding with vessels during construction and operations is expected to be very low due to the small number of marine mammals present in the project area and the slow speed of the vessels. NOAA applies conservation measures to its vessel operations to mitigate for collision risk (NOAA 2020d). This unlikely occurrence is not listed with the potential effects summarized in Table 4.8-4.

Table 4.8-4: Summary of Potential Impacts to Marine Mammals

Impact	Significance Level	Duration	Magnitude
Avoidance due to construction activities (removal of existing structures and installation of new structures) • Avoidance due to in-water construction activities • Risk of injury or mortality due to construction activities	• None / Negligible: no managed species are present • Minor: managed species leave the area, and return after activities cease • Moderate: managed species avoid the area for a longer period of time after activities cease • Major: managed species experience injury or mortality, or do not return after activities cease	• Avoidance caused by construction activities would be **short-term** • Any mortality caused by construction activities would be **permanent**	Minor, considering: • Adherence to applicable BMPs • Managed species may be displaced from construction areas but are expected to return to normal after construction activities have ceased • Low potential for risk of injury or mortality due to site's location in a developed, industrial area and low numbers of individuals present
Effects due to in-water noise and vibration (pile removal and installation): • Disturbance of normal behaviours (e.g., feeding, resting, social interactions) • Hearing impairment • Disruption of echolocation capabilities • Masking • Avoidance • Injury from noise or vibration	• None / Negligible: no managed species are present • Minor: assumed sound / vibratory levels are met; managed species leave the area with no effects, but return after activities cease • Moderate: assumed sound / vibratory levels are met; managed species may experience temporary behavioural impacts / disruptions / impairments prior to leaving the area, but experience no long-term effects and return after activities cease • Major: managed species experience injury as assumed sound / vibratory levels are exceeded; or managed species do not return after activities cease	• Noise/vibration impacts and avoidance during construction activities would be **short-term** • Injury caused by noise/vibration may be **temporary** or **permanent**	Minor, considering: • Adherence to applicable BMPs • Conditions would return to normal shortly after the noise / vibration generating activity ceases

Table 4.8-4: Summary of Potential Impacts to Marine Mammals

Impact	Significance Level	Duration	Magnitude
Injury or mortality due to water quality issues during construction (changes in water quality due to increased turbidity, and disturbance of marine sediments potentially containing PAHs): • Potential increases in turbidity and sedimentation • Potential that PAHs from creosote-treated piles can leach into the surrounding waters and accumulate in marine sediments and sediment disturbance can impact water quality	• None / Negligible: Turbidity and sedimentation levels do not increase; no PAH are present; or no managed species are present • Minor: Turbidity and sedimentation levels increase for short periods of time, and any PAH present are flushed; managed species have left the area prior to any injury or mortality • Moderate: Turbidity and sedimentation levels increase for extended periods of time, or any PAH present remain in the ecosystem for longer than anticipated; managed species may be exposed to PAH prior to leaving the area; managed species return after activities cease • Major: Turbidity and sedimentation levels or PAH levels cause injury or mortality; or managed species do not return after activities cease	• **Short-term** (during removal and installation)	Minor, considering: • Effects of turbidity and sedimentation would be minimized through implementation of required stormwater management plans and BMPs • The persistence of turbidity and contaminants near the proposed pier is not expected because of tidal water movement at the site • Further details on water quality, including BMPs, are described in Section 4.4, Water Resources, and Section 4.5, Hazardous Materials
Vessel strike during **in-water construction** or **operations** • Potential injury or mortality	• None/Negligible: no managed species are present • Minor: vessel operations follow practices to avoid managed species; managed species avoid the area when vessels are present • Moderate: vessel operations follow practices to avoid managed species; vessels suspend operations if managed species remain in the area • Major: managed species experience injury or mortality due to a strike if practices are not followed	**Short-term** (during vessels employed during construction, or during operations)	Minor, considering: • Adherence to applicable BMPs to avoid vessel strikes

Table 4.8-4: Summary of Potential Impacts to Marine Mammals

Impact	Significance Level	Duration	Magnitude
Contaminant Release (incidental spills of petroleum lubricants and fuel) • Potential incidental spills of petroleum lubricants and fuels in managed species habitat, which may be toxic to marine mammals and cause injury or mortality	• None/Negligible: No incidental spills occur • Minor: Any incidental spills that occur are small and promptly cleaned prior to any exposure of managed species • Moderate: Any incidental spills that occur are promptly cleaned, but managed species may be exposed causing injury or mortality • Major: Incidental spill are not cleaned promptly, causing injury and mortality to managed species	• **Not Applicable**, as release would be accidental	Negligible, considering: • Compliance with applicable laws and regulations related to fuel transfers • Implementation of appropriate BMPs, including spill prevention control measures. • Petroleum lubricants and fuel spills would be promptly cleaned up • The persistence of turbidity and contaminants near the proposed pier facility is not expected because of the open-water location • Further details on release including BMPs are described in Section 4.5, Hazardous Materials

Notes:
BMPs = best management practices
EFH = Essential Fish Habitat
PAH = polyaromatic hydrocarbons

Source: Appendix B: Underwater Noise Technical Memo; NOAA 2020d

With implementation of standard industry BMPs and compliance with federal regulations, the Proposed Action would have a direct, temporary, minor adverse impact on marine mammals including TES during construction activities. NOAA has preliminarily determined through this analysis that the Preferred Alternative “may affect, but is unlikely to adversely affect” the TES-listed population of humpback whales. While “take” is unlikely during the pile removal and installation, standard industry BMPs and compliance with federal regulations are expected to reduce the potential for adverse impacts to marine mammals to “discountable.” Impacts during operations would be similar to existing conditions in the project area and would have a negligible effect.

Action Alternative 1—Fixed Pile-Supported Pier

While Action Alternative 1 would require installation of a greater number of piles in the project area, the impacts to biological resources would be similar to the Preferred Alternative for construction and operations. As a greater number of piles would be installed, in-water construction would be expected to be of longer duration.

No-Action Alternative

Under the No-Action Alternative, there would be no new impacts to biological resources.

4.8.4 Mitigation Measures

No mitigation measures are required to reduce project-related effects to biological resources. NOAA employees and their contractors would comply with all relevant statutes and regulations, including the MSFCMA, MBTA, BGEPA, MMPA, and ESA. NOAA will consult with the appropriate federally designated regulatory agencies prior to construction and any conditions of approval would be incorporated into the decision document for this EA.

Standard industry BMPs and compliance with federal regulations pertaining to biological resources would be implemented and may include the following.

Marine fish, EFH, marine mammals, and TES:

- Coordinate with NMFS regarding the need to implement actions to attenuate sound for any potential pile removal and installation techniques if sound levels exceed thresholds, such as using attenuation devices (e.g., cushion block, bubble curtain and isolation casings), to reduce the acoustical footprint.
- Should impact pile driver be required based on a final pier design, a soft start for impact drivers would be implemented that requires contractors to provide an initial set of strikes at reduced energy followed by a 30-second waiting period; this procedure is then repeated two additional times. A soft start[6] would be implemented before pile driving begins each day and any time following the cessation of pile driving for a period of 30 minutes or longer.
- In coordination with the NMFS, hydroacoustic monitoring may be conducted to determine the extent at which certain nose thresholds presented in Appendix B would be met, and to be able to mitigate underwater noise as needed.

Birds protected under MBTA:

- Coordinate with USFWS to determine the most appropriate course of action if an active MBTA or BGEPA-protected bird nest is observed on the NOAA site during construction.

Standard BMPs associated with spill prevention and hazardous materials management are summarized in Section 4.5, Hazardous Materials.

[6] A “soft start” is a ramp up of pile-driving activities to keep marine mammals away from the activity. A lower hammer energy level is used to start the pile-driving process, and then the force of pile driving is gradually increased. A soft start method is not required during vibratory pile driving activities, which is NOAA’s anticipated installation method.

4.9 LAND USE

4.9.1 Regulatory Setting

Public Buildings Amendments

The Public Buildings Amendments of 1988, 40 U.S.C. 3312 requires a federal agency to comply with a nationally recognized model building codes and consideration of state and local zoning laws. Applicable national standard codes, such as electrical, life safety, and plumbing codes are required to be implemented when constructing or altering any federal property. The code also requires federal agencies to consider state or local zoning, consult with appropriate officials, and make plans available on request. State and local governments may make recommendations and the federal agency should give due consideration to those recommendations and local conditions (USGSA 2020). While the federal government is not required to follow local regulations under the Public Building Amendments of 1988 (PL 100-678), they strive to assess potential effects of projects and conform to local requirements to the extent practicable.

Alaska Statute 29.40.030 Comprehensive Plan

Alaska State's Comprehensive Plan, Alaska Statute (AS) 29.40.030 provides guidance to local municipalities to create and adopt plans that includes an anthology of policy, standards, maps, and goals for guiding the physical, social, and economic development of both private and public entities. A comprehensive plan may include plans regarding transportation, community facilities planning, and land use planning. The Ketchikan Comprehensive Plan was prepared in 1959, and the Ketchikan Gateway Borough Comprehensive Plan was prepared in 2009.

Alaska Statute 29.40.040 Land Use Regulation

Alaska State's Land Use Regulation, AS 29.40.040, functions in accordance with Statute 29.40-030. The Land Use Regulation statute provides provisions regarding land use such as zoning regulations, land use permit requirements, and measures to fulfill goals set forth in the comprehensive plan.

City of Ketchikan and Ketchikan Gateway Borough Comprehensive Plans

The comprehensive plan for Ketchikan, Alaska provides land use planning goals for the city of Ketchikan and nearby areas (COK 1959). The plan clarifies residential, business, waterfront-related, and public land use goals. The Ketchikan Gateway Borough Comprehensive Plan 2020 establishes public policy for land use in the borough and includes goals, objectives, and policies for future land use, conservation and coastal management, traffic circulation, housing, potable water, solid waste, sanitary sewer, drainage, recreation, intergovernmental coordination, economic development, and capital improvements (KGB 2009).

4.9.2 Affected Resources

The city of Ketchikan is divided into specific zoning areas. These include residential, commercial, industrial, or public. The NOAA-owned project site is zoned for industrial waterfront-related uses, which is used to provide for a wide-range of industrial and commercial uses. Some residential and other nonindustrial uses are excluded from this zone for this reason (COK 1959). The Ketchikan Gateway Borough is currently divided into specific zoning areas, which roughly 20 different zones that—for the most part—can be categorized as being residential, commercial, or industrial. Current zoning for the existing port facility under borough zoning is Heavy Industrial. (KGB 2020).

The project site is on land and in tidal waters along Stedman Street within the boundaries of the city of Ketchikan. The immediate areas are currently being used for commercial and industrial purposes such as vessel maintenance, seafood processing, and fuel storage. The project site is also industrial; it is mostly paved and has a warehouse, parking area, shoreside laboratory building, compressor shed, electrical building, and an office on the premises. Off the shoreline, the area is used for the shipping and seafood industry; the project site has a pier, access trestle, and mooring dolphins within the parcel. The areas beyond the project site are forested and near the border with the borough.

4.9.3 Environmental Consequences

Preferred Alternative—Floating Pier

The Preferred Alternative would include demolition, alteration, and construction activities on site, both upland and in-water. During operations, there would be additional vessel traffic to and from the location, along with industrial and office use at the site for 20 to 50 years while in use. All activities during construction and operations would be allowed uses under the current land use designations in the city and borough; actions during construction and operations would be consistent with land use goals and objectives laid out in the comprehensive plans. No land use designations would be changed.

Although use of the area would increase from baseline conditions, the additional vessel traffic and site use during operations would not be a change of current land and water use at the site or surrounding areas. Therefore, the Proposed Action would have a direct, long-term, minor impact on land use in the project area.

Action Alternative 1—Fixed Pile-Supported Pier

The impacts to land use would be the same as under the Proposed Action. Therefore, Action Alternative 1 would have a direct, long-term, minor impact on land use in the project area.

No-Action Alternative

Under the No-Action Alternative, there would be no construction activities, and operations would continue at current use levels. Therefore, the No-Action Alternative would have no effect on land use at the site.

4.9.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with land use.

4.10 Recreational Resources

4.10.1 Regulatory Setting

National, state, and local recreational resources include established parks, camping, boating, and touring facilities potentially affected by the Proposed Action. Local recreational resources may include City, Borough, or tribal owned facilities and properties or locations informally established for recreational or subsistence activities.

The Great American Outdoors Act

The Land and Water Conservation Fund was established by Congress in 1964 to fulfill a bipartisan commitment to safeguard natural areas, water resources and cultural heritage, and to provide recreation opportunities. The fund does not use taxpayer dollars but invests earnings from offshore oil and gas leasing to help strengthen communities, preserve our history and protect national endowment of lands and waters (NPS 2020). The Great American Outdoors Act made the fund permanent.

The Land and Water Conservation Fund requires states and territories to update their Statewide Comprehensive Outdoor Recreation Plan periodically. In each update, the state evaluates the demand and supply of public outdoor recreation resources, documents emerging trends shaping future public recreation facility needs, identifies top public recreation priorities for the state (or by regions), and provides opportunities for ample public participation. North to the Future is Alaska's Statewide Comprehensive Outdoor Recreation Plan. Updated every 5 years, the Statewide Comprehensive Outdoor Recreation Plan guides outdoor recreation providers, advisory boards, user groups, and the public in making decisions in Alaska from 2016 through 2021 (ADNR 2015).

4.10.2 Affected Resources

The Ketchikan area has a wide array of recreational opportunities. Activities in the city and nearby areas include sport fishing, tours and sight-seeing, museums, hiking, and recreational boating. The city is surrounded by the Tongass National Forest, with the boundary of the forest less than 2,000 feet from the project area. The Misty Fjords National Monument in the Tongass National Forest is approximately 45 miles from the project area. The community also draws heavy tourism, bringing nearly a million tourists per year, primarily in the summer; most visitors arrive by cruise ship. Ketchikan is a popular cruise ship port of call, with 528 cruise ships docking in 2019 between May and September (CruisePortInsider 2019).

Sport fishing remains one of the most popular activities in the area with several guiding, outfitter, charter, and fly-out fishing operations in the city. Tours and sightseeing opportunities—many catering to the cruise ship visitors—include kayaking, boat and float plane tours to the Misty Fjords National Monument, nature and wildlife viewing, ziplining, flight seeing, and photography. The community also has several options for camping and hiking (KVB 2019). No established or informal recreational activities are known to occur at or immediately adjacent to the project site.

Recreational facilities in the community of Ketchikan include the Tongass Historical Museum, Totem Heritage Center, Ketchikan Public Library, Ted Ferry Civic Center, Gateway Recreation Center, and five public boat harbors (COK 2020).

4.10.3 Environmental Consequences

Preferred Alternative—Floating Pier

During construction and operations of the Proposed Action, there would be use of heavy equipment, additional vessel and vehicle traffic to the site, and up to 40 additional NOAA employees may relocate to Ketchikan. About 20 employees may relocate permanently.

Heavy industrial activity can create noise and aesthetic disturbance to recreationists seeking solitude or peaceful outdoor experiences. During construction, it would be anticipated that additional noise, traffic, and vessels near the project site would be noticeable to recreationists in the area, primarily those on the water (fishing, boating, kayaking). The noise and equipment from construction—particularly pile-driving—may be heard and seen from some areas of Tongass National Forest or other upland recreation areas, but unlikely to be noticeable. However, the area is already used for heavy industry, and the additional disturbance would have a minor effect on recreational setting.

During operations, most industrial activities would cease. The NOAA Ship *Fairweather* vessel in port would be seen by recreationists on the water, which can have an adverse or beneficial impact to the setting. Research vessels typically go on about three cruises per year, which would add a negligible amount of vessel traffic to current water recreationists.

The project could permanently relocate 20 NOAA employees to Ketchikan. The addition of employees (and possibly other household members) in the area could increase the number of people using recreation resources in the community, such as hiking trails, campgrounds, small boat launches, and recreation facilities. The increase would be slight but detectable, and long term (i.e., lasting 20 to 50 years during operations).

The Preferred Alternative would have a direct impact on recreation resources, which would be minor during construction from setting disturbance and minor during operations with an increase in recreational users.

Action Alternative 1—Fixed Pile-Supported Pier

The impacts from construction would be more intense than under Action Alternative 1 because there would be a substantial amount of pile driving. Installing piles would generate moderate to major noise impacts to recreationists on the water and on the uplands. The impact would be temporary (lasting just through construction) and would occur in an area already used for heavy industry.

Impacts during operations from employee relocation and additional vessel traffic would be the same as the Preferred Alternative.

Action Alternative 1 would have a moderate, temporary impact on the recreational setting during construction and a minor, long-term impact during operations from an increase in recreational users.

No-Action Alternative

Under the No-Action Alternative, the setting and experience of recreationists from the water and upland areas would be the same as current conditions. Therefore, there would be no impact on recreational resources.

4.10.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with recreational resources.

4.11 Utilities and Solid Waste

4.11.1 Regulatory Setting

There are no directly applicable federal or state regulations pertaining to effects of federal actions on local utilities and public services (e.g., solid waste disposal). Regulatory constraints related to the existing capacity and distribution of utility services is typically considered through local zoning or land use law. While the federal government is not required to follow local regulations under the Public Building Amendments of 1988 (PL 100-678), they strive to assess potential effects of projects and conform to local requirements to the extent practicable.

4.11.2 Affected Resources

Currently the primary public utilities available at the existing Port Office Ketchikan site are found along Stedman Street adjacent to the property. There is already existing water, communication, and power service at the facility, provided by Ketchikan Public Utilities. Ketchikan relies primarily on hydropower, with backup electricity sourced from diesel generators. Solid waste disposal and wastewater treatment is currently managed by contracting with commercial pump-out and disposal operators. Above- and below-ground pipes are shown on prior occupant site plans within the site to extend utility services and other operational pipelines that have been used previously for transferring fuel and petroleum products.

4.11.3 Environmental Consequences

Preferred Alternative—Floating Pier

The Proposed Action would require water, sewer, phone, cable, electrical, gas, land and water access security, waste disposal and janitorial services to be provided to the site. Utility services would be extended to on-site structures and berthing stations at the large vessel pier and small craft docks. Although there is utility infrastructure on site, existing active and abandoned electric, telephone, fueling, sewer, water, and communications conduits would be removed to accommodate the accepted revised layout and design.

The project would create an increased demand for utilities at the site. During construction, there would be a greater demand from additional electric and water use to accommodate activity. The demand would decrease during operations when the site is used as offices and docks. The demand increase would be noticeable to local utility providers, but would be within capacity and would not be noticeable to other users of those providers.

Therefore, the Preferred Alternative would have a direct, minor impact to utilities that would be more intense during construction than operations, but would remain within capacity.

Action Alternative 1—Fixed Pile-Supported Pier

Action Alternative 1 would have the same impacts to utilities as the Preferred Alternative. Therefore, the Action Alternative 1 would have a direct, minor impact to utilities that would be more intense during construction than operations, but would remain within capacity.

No-Action Alternative

Under the No-Action Alternative, there would be no demolition, alteration, or construction activities undertaken at the project area. Utility consumption and solid waste service demand would continue at current levels, and no changes to infrastructure would occur. Therefore, there would be no impacts to utilities and solid waste under the No-Action Alternative.

4.11.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with utilities and solid waste.

4.12 TRANSPORTATION

4.12.1 Regulatory Setting

Alaska Department of Transportation and Public Facilities (ADOT&PF) Transportation Data Programs is responsible for collecting and managing state-wide traffic data that fulfills federal requirements for Highway Performance Monitoring System, Travel Monitoring Systems, and the Certified Public Road Mileage; oversees roadway Functional Classification and National Highway System designations; provides crash and traffic data for engineers and planners that improve highway designs, operation, and maintenance, and supports the department's mission to provide safe movement of people, goods, and delivery of State services (ADOT&PF 2021).

4.12.2 Affected Resources

Due to Ketchikan's location on an island characterized by moderately steep shorelines and topography, transportation options are limited. Ketchikan relies heavily on air and sea transportation. Water taxi and city bus services run throughout the Ketchikan Gateway Borough including seasonal shuttle bus services, air taxis, and other private floatplane operators that provide commuter options by charter (KVB 2020).

The Ketchikan International Airport is on Gravina Island, is owned by the State of Alaska and operated by the Ketchikan Gateway Borough (KGB 2020a). It is the fifth busiest airport in Alaska with a total of 247,481 air carrier passengers in 2018 (KGB 2020b.)

One of the primary onshore transportation routes located in the project site is via Stedman Street, mile point 2.582 to 3.202, which eventually becomes the Tongass Highway. This can cause periods of heavy congestion near ferry terminals, cruise ship docks, and the Ketchikan United States Coast Guard Base. The ADOT&PF Annual Average Daily Traffic (AADT) data identifies the average volume of traffic for an average of 24 hours. Table 4.12-1 provides the AADT counts for Stedman Street mile point 2.58 to 3.202 from 2015 to 2018 (ADOT&PF 2020).

Table 4.12-1: Average Annual Daily Traffic Counts

Year	Mile Point	Average Annual Daily Traffic Counts (AADT)
2015	2.582-3.202	5,837
2016	2.582-3.202	6,002
2017	2.582-3.202	5,640
2018	2.582-3.202	6,596

Source: ADOT&PF 2020

4.12.3 Environmental Consequences

Preferred Alternative—Floating Pier

Under the Preferred Alternative, the primary activities potentially affecting transportation near the project site would be during construction, operations, and maintenance.

The construction period of the Ketchikan homeport facility would have direct, negligible, short-term localized adverse road traffic impacts along truck routes and at the entrance to the facility. Traffic congestion on local roadways would likely increase temporarily as construction equipment and supplies are brought to and from the project site during construction. Localized impacts could be experienced associated with trucks entering and exiting the construction site via Stedman Street and the Tongass Highway. The relocation of as many as 20 NOAA personnel would cause a slight increase to traffic to and from the project site during operations and maintenance. The increase of traffic would be negligible and have little to no detectable effect on the AADT. Equipment for vessel maintenance would be brought periodically throughout the year by 18-wheel tractor-trailer rigs with an average of one delivery per month (more frequently from April to September). These deliveries would cause a slight increase on the AADT with non-detectable impacts.

Impacts to air travel would be direct, negligible, and temporary during construction, operations, and maintenance periods. The relocation of NOAA personnel would cause a small increase in air traffic during construction and operations but would have little to no detectable impacts.

Action Alternative 1—Fixed Pile-Supported Pier

Impacts under Action Alternative 1 would be similar to the Preferred Alternative. Construction would cause negligible, temporary adverse impacts to traffic and would likely cause increased congestion on local roadways near the project site at Stedman Street and the Tongass Highway. The relocation of NOAA personnel would cause a slight increase in air travel with negligible, temporary impacts.

No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur. There would be no demolition, alteration, or construction activities at the OMAO MOC-P facility in Ketchikan. The existing dock would remain the same and current levels of air and road traffic throughout Ketchikan would remain unchanged. The No-Action Alternative would have no effect and cause no detectable change to transportation.

4.12.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with transportation.

Prior to construction of the project, NOAA would contact ADOT&PF to determine the need for lane closure and traffic control plans. All applicable permits would be obtained if needed, and agencies would be consulted to ensure the plans comply with traffic regulations.

4.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.13.1 Regulatory Setting

Executive Order 12898

EO 12898, known as the Federal Environmental Justice Policy, requires all federal agencies to identify and develop strategies to address disproportionately high and adverse human health and environmental impacts of its programs, policies, and activities on minority and low-income populations (collectively known as environmental justice populations) in the United States and its territories to the greatest extent practicable and permitted by law. Federal agencies are required to make all documents, notices, and hearings related to human health and the environment accessible to the public. The EO is intended to promote nondiscrimination in federal programs, as well as provide minorities and low-income populations with access to information and public participation.

Two documents provide some measure of guidance to agencies required to implement this executive order: *Environmental Justice: Guidance under the National Environmental Policy Act* (Council of Environmental Quality [CEQ] 1997) and *Promising Practices for EJ Methodologies in NEPA Reviews* (EPA 2016). Both serve as guides for incorporating environmental justice goals into preparation of environmental impact statements under NEPA. These documents provide specific guidelines for determining whether there would be any environmental justice issues associated with a proposed federal action.

Council on Environmental Quality

The CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500–1508) provide guidance related to social and economic impact assessments by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (40 CFR 1508.14).

According to the CEQ's environmental justice guidelines, minority and low-income populations should be identified where either: a) the minority or low-income population of the affected area exceeds 50 percent; or b) the minority or low-income population percentage of the affected area is meaningfully greater than the minority or low-income population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997a).

4.13.2 Affected Resources

The main community in the project area is the city of Ketchikan, Alaska's southernmost city. As a regional population hub, Ketchikan provides logistics support, transportation, government services, organizational headquarters, and freight distribution to much of Southeast Alaska.

The population of Ketchikan is 8,224, with a median population age of 38, which is slightly older than the Alaska resident median age of 34. Caucasians make up the majority of the population, with the Alaska Native southeast tribes as the second largest ethnic group in Ketchikan. As shown in Table 4.13-1, minority populations make up approximately 40.7 percent of Ketchikan's population compared to 33.2 percent for the Ketchikan Gateway Borough and 35.2 percent statewide. Ketchikan has a lower median family income and higher unemployment rate as compared to the Ketchikan Gateway Borough as a whole and the state of Alaska. Based on the definitions under the CEQ and EPA's environmental justice guidance (CEQ 1997a; EPA 2016), Ketchikan is not considered a minority or low-income community because the minority and low-income populations are not greater than 50 percent of the total population or meaningfully greater than the state.

Table 4.13-1: Demographic and Socioeconomic Characteristics, 2018

Location	Population	Minority Population	Median Age	Unemployment Rate*	Median Family Income	Poverty Rate
City of Ketchikan	8,224	40.7%	38	8.1%	$72,179	12.6%
Ketchikan Gateway Borough	13,804	33.2%	40	6.6%	$85,295	10.5%
State of Alaska	738,516	35.2%	34	7.4%	$90,284	10.8%

Notes:
*Civilian labor force

Source: USCB 2016, 2018

4.13.3 Environmental Consequences

<u>Preferred Alternative—Floating Pier</u>

The Proposed Action would recapitalize facilities at the OMAO MOC-P facility in Ketchikan. Some short-term economic benefits to Ketchikan may be experienced, as the Proposed Action would require a small number of workers to construct the proposed facilities. Such temporary workers would either come from the local labor pool, resulting in a short-term beneficial impact on local employment levels, and/or would temporarily relocate from elsewhere in Alaska or the contiguous 48 states, thereby temporarily improving the local economy by using local accommodations, dining, and other commercial establishments. Although some short-term beneficial impacts on the local economy may result from increased spending in Ketchikan during construction, these earnings would be small relative to the total amount of economic activity, employment, and income in the project area, and are short-term in nature. Overall, construction of the Proposed Action would have a direct, short-term, negligible impact on socioeconomics in the project area.

While berthing the NOAA Ship *Fairweather* may occur at any time year-round between missions, it is expected to be berthed permanently at the Ketchikan Alaska Campus from November through March each year. Temporary and permanent relocation of a small number of the up to 40 NOAA personnel and wage crew may occur. For the purposes of this analysis, it is assumed that as many as 20 NOAA personnel or wage crew could relocate to Ketchikan permanently, resulting in the exchange of goods and services in the local economy. Although some long-term beneficial impacts on the local economy may result from increased spending in Ketchikan during operation, these earnings would be small relative to the total amount of economic activity, employment, and income in the project area. Therefore, operation of the Proposed Action would have a direct, long-term, minor impact on socioeconomics in the project area.

There are no minority or low-income populations present that would be adversely affected by the Proposed Action. Therefore, there would be no disproportionate or high adverse effects from the Preferred Alternative with respect to environmental justice.

Action Alternative 1—Fixed Pile-Supported Pier

The impacts to socioeconomics would be the same as under the Proposed Action. Therefore, construction of Action Alternative 1 would have a direct, short-term, negligible impact on socioeconomics and operations. There would be no disproportionate or high adverse effects with respect to environmental justice.

No-Action Alternative

Under the No-Action Alternative, there would be no recapitalization of facilities at the OMAO MOC-P facility in Ketchikan. The NOAA Ship *Fairweather* would continue to be operated from alternative locations in Ketchikan or from the NOAA MOC-P located in Newport, Oregon. Therefore, there would be no effect on socioeconomics or environmental justice.

4.13.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with socioeconomics and environmental justice.

4.14 VISUAL RESOURCES

4.14.1 Regulatory Setting

National Environmental Policy Act of 1969

While NEPA does not establish particular guidance for determining the significance of visual/aesthetic resources impacts, 43 U.S.C. Section 4331(b)(2) requires that actions be taken to ensure that aesthetically pleasing surroundings are available.

4.14.2 Affected Resources

The visual environment of Ketchikan and Tongass Narrows is defined by the natural and built features of the area. Natural features dominating the view include open water, the steep topography of Gravina and Revillagigedo Islands, and the heavily forested hillsides. The built environment includes the urban and shoreline development of Ketchikan, Ketchikan International Airport on Gravina Island, and visual elements associated with the developed areas of Ketchikan, such as ships and boats, aircraft, automobiles, and buses.

Tongass Narrows Area

The visual environment of the project area is dominated by the natural features of Tongass Narrows and the steep mountain slopes characterizing the surrounding landmasses. The Tongass Narrows is the narrow passage between the west side of Revillagigedo Island and the east side Gravina Island. The eastern side of the narrows includes the cities of Saxman and Ketchikan. The lush forests, rivers, lakes, and marine habitat enhance the scenery and create recreation and sightseeing opportunities for tourists and residents of the area. Views from Ketchikan are primarily over-water views toward nearby forested, mountainous islands. Waterfront areas are popular for wildlife viewing, picnicking, hiking, and sightseeing. Scenery viewing is among the most popular activities for visitors in the Ketchikan region. During the summer tourist season, increases in shipping and floatplane activity in Tongass Narrows create a perception of human dominance in the view shed.

City of Ketchikan

The city of Ketchikan's visual environment is dominated by a commercial and industrial waterfront, a downtown area with small multistory buildings, and hillside homes. Most land structures are small- to medium-scale buildings. Cruise ships in the downtown harbor area add a large visual element to the environment in the summertime.

Project Site

The project site is situated in a heavily industrial environment along the east shore of the Tongass Narrows. There are large fuel storage tanks, warehouses, office buildings, and piers present along this section of shore and adjacent lands accessed by Stedman Street. The hillsides and steep slopes of the Ketchikan area limit development further inland, and most facilities in this area require access to the water's edge. Looking down on the project site from hillsides and slopes, the view is dominated by industrial facilities on all sides, including views from Bayview Cemetery. The dock facility has become visually unappealing due to the lack of maintenance provided to a condemned dilapidated structure from past owners.

Pennock Island is approximately 0.34 miles west of the project site across the Tongass Narrows. Potential views of vessels berthed at the Ketchikan Port Facility from the Whisky Cove fishing area on Pennock Island to the south across Tongass Narrows from the USCG Station would be minimal.

4.14.3 Environmental Consequences

Preferred Alternative—Floating Pier

Under the Preferred Alternative, impacts to aesthetics would be negligible in the long term. Improvements and upgrades to the main warehouse and office building may subjectively have a beneficial impact on the project site. New outdoor lighting installed would increase the amount of light at the project site, making it more noticeable at night to viewers on the water in the Tongass Narrows and those driving on Stedman Street. However, the area is already heavily developed, and the addition of night lighting would be only a minor increase to the existing setting. The NOAA Ship *Fairweather* would be a constant visual presence among this industrial marine setting during winter months and periodically at other times of the year. This would cause direct, negligible, permanent impacts to aesthetics. During construction activities, heavy equipment and additional lighting would have a more intense impact on aesthetics from the water and the uplands. The impacts would be temporary, minor, and adverse. No substantial change to views from Whisky Cove would result.

Action Alternative 1—Fixed Pile-Supported Pier

Under Action Alternative 1, impacts would be similar to the Preferred Alternative. Aesthetic impacts would be negligible in the long term. Improvements to the main warehouse and office buildings may have a beneficial impact to visual aesthetics to a degree that may be undetectable.

No-Action Alternative

Under the No-Action Alternative, the Proposed Action would not occur; there would be no demolition, alteration, or construction activities undertaken at the NOAA dock facility in Ketchikan. The current dock would continue to degrade and remain visually unappealing. Therefore, no effects to aesthetics would be expected at the Ketchikan NOAA dock facility.

4.14.4 Mitigation Measures

No mitigation measures are proposed for impacts associated with visual resources. Aesthetic treatments to structures, such as downturned lighting or natural-colored building materials may be implemented to improve project aesthetics at NOAA's discretion.

4.15 CULTURAL RESOURCES (INCLUDES HISTORIC PROPERTIES)

For the purposes of this EA, cultural resources are buildings, sites, structures, objects, districts, artifacts, and landscapes that are considered to have historical or cultural value. Therefore, cultural resources include resources that may not have been evaluated yet for inclusion in the National Register of Historic

Places (NRHP). Under NEPA, impacts to all types of cultural resources are considered regardless of their NRHP status. Cultural resources can include, but are not limited to:

- Historic Properties, defined as “any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior.” The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria (36 CFR 800.16), and as used in Section 106 of the National Historic Preservation Act (NHPA).
- Native American cultural items such as human remains, funerary items, sacred objects, and objects of cultural patrimony.
- Archaeological resources, which include pre-contact (i.e., dating to the period in North America predating the arrival of Euro-Americans) and historic-era (dating from the post-contact era) archaeological sites, as well as historic-era standing buildings, structures, and objects.
- Cultural uses of the natural environment, such as ceremonial or other religious use of places, plants, animals, and minerals. These types of resources can include Native American sacred sites that may or may not be considered traditional cultural properties, cultural landscapes, ethnographic landscapes, and historic landscapes.

4.15.1 Regulatory Setting

The Proposed Action must comply with federal laws because of the federal funding and permitting required for project development. State and local laws and regulations protecting cultural resources may also apply.

Federal

National Historic Preservation Act

Separate from NEPA, NOAA must comply with Section 106 of the NHPA (16 U.S.C. Section 470) and its implementing regulations (36 CFR Part 800). NOAA will comply with Section 106 of the NHPA, including government-to-government tribal consultation, to be completed prior to project implementation.

These regulations require federal agencies to consider the effects of their actions on historic properties. The regulations require federal agencies to identify historic properties in an Area of Potential Effects (APE), determine if an undertaking will constitute an adverse effect to identified historic properties, and seek to resolve any adverse effects.

Cultural resources that have not been evaluated for inclusion in the NRHP are evaluated using criteria listed in 36 CFR Part 60. Cultural resources can be determined eligible for inclusion in the NRHP if they possess:

- The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
    - Are associated with events that have made a significant contribution to the broad patterns of our history; or
    - Are associated with the lives or persons significant in our past; or
    - Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
    - Have yielded, or may be likely to yield, information important in prehistory and history.

Cultural resources are typically evaluated for inclusion in the NRHP if they are at least 50 years old, but in less common circumstances if the resources have achieved significance within the past 50 years. If NRHP-eligible resources are identified, then federal agencies are required to avoid, minimize, or mitigate adverse effects to the resource, and to provide the Advisory Council on Historic Preservation, Alaska State Historic Preservation Office (SHPO), Indian Tribes, consulting parties, and the public an opportunity to comment on potential effects to historic properties.

Other Federal Laws

Numerous other laws, regulations, and EOs protect cultural resources. The American Indian Religious Freedom Act of 1978 (42 U.S.C. Section 1996) requires that federal agencies consider the effects of their actions on cultural resources that are of religious significance to Native Americans and Alaska Natives. Native American and Alaska Native graves, burial grounds, and associated funerary objects on federally managed lands are protected by the Native American Graves Protection and Repatriation Act (25 U.S.C. Sections 3001-3013).

EO 13007: Indian Sacred Sites of 1996 directs federal agencies to allow Native Americans to worship at sacred sites on federal property and to avoid adversely affecting such sites to the extent practicable. The Antiquities Act of 1906 (16 U.S.C. Section 431) establishes penalties for damage and destruction of antiquities and allows for designation of historic landmarks on federal lands. The Archaeological Resources Protection Act of 1979 (16 U.S.C. Section 470) establishes a permit process on public and Native American lands and provides penalties for violations and damages to archaeological sites.

State

Alaska Historic Preservation Act

The Alaska Historic Preservation Act (Alaska Statute [AS] 41.35) states that the policy of the State is to preserve and protect the historic, prehistoric, and archaeological resources of Alaska and asserts the State's title to all historic, prehistoric, and archaeological resources situated on land owned or controlled by the State, including tideland and submerged land.

AS 11.46.482(a)(3)—Protection of Cemeteries and Burials

Alaska State laws are also applicable to the discovery of human remains in Alaska. The State Medical Examiner has jurisdiction over all human remains in the state, regardless of age. Specifically, AS 11.46.482(a)(3), which applies to all lands in Alaska, makes the "intentional and unauthorized destruction or removal of any human remains or the intentional disturbance of a grave" a class C felony.

AS 41.35.200—Protection of Archaeological Resources

AS 41.35.200 prohibits the disturbance of "historic, prehistoric and archaeological resources" of the State without a permit.

4.15.2 Affected Environment

The purpose of this section is to describe cultural resources in the APE, which is a geographic area that may be directly or indirectly affected by the Preferred Alternative or No-Action Alternative and therefore comprises the affected environment for cultural resources. Effects could be the direct result of ground disturbances, visible or audible disturbances, or changes in public access, visual intrusions, traffic patterns, or land use as a result of the Preferred Alternative.

Information presented herein is based on a review of data on file at the restricted access Alaska Heritage Resources Survey Database (AHRS) managed by the Alaska Department of Natural Resources Office of History and Archaeology (which also houses the Alaska SHPO). This restricted-access, searchable data repository includes buildings, objects, structures, archaeological, and historic sites; and some paleontological sites, districts, shipwrecks, travel ways, traditional cultural properties, landscapes, and other places of cultural importance. Cultural resources listed in the AHRS should contribute to our understanding of Alaska's prehistoric and historic cultural heritage and should be important in some manner to be considered a cultural resource. For each individual cultural resource, the AHRS has a record with the site name, description of the physical remains, data on the site's location (using the NAD83 datum) as well as a variety of additional descriptive information relevant to management and research needs. The AHRS is continually being updated with both new and revised information. A variety of historic maps and aerial photographs were also reviewed, as well as data publicly available on the internet.

Area of Potential Effects

The APE describes the areal extent of where potential direct and indirect impacts to cultural resources could occur. The APE includes the areas proposed for demolition and redevelopment of replacement facilities at the project site. The NOAA property was formerly a fuel transfer dock and warehouse area Previously owned by the Tesoro Refining and Marketing Company (Tesoro), the fuel dispensing and receiving equipment is no longer in operation and has been substantially removed. The former facility was connected to a bulk fuel storage terminal across Stedman Street by transfer pipes beneath the roadway. Fueling activities at this location began in the 1940s and possibly earlier, though numerous replacement structures and renovations have occurred to structures, dock moorings, and dispensing equipment since that time. Until 1997, the terminal was owned and operated by Unocal and then sold to the Tosco Refining Company. In 1998, the Tosco Refining Company sold the property to Tesoro.

The APE where potential physical impacts would occur includes the existing Ketchikan Port Facility property owned by NOAA and managed by OMAO, which contains the facilities and infrastructure described in Section 3. The APE also accounts for potential for changes to the larger visual setting as well as noise and construction-related vibration. From the literature reviewed, it does not appear that there are historically important view sheds looking toward the property or from the property. The project site consists of a historically industrial area with a dock that has been altered and neighboring industrial buildings that limit views into and out of the property. The Proposed Action does not appear to substantively affect the historic setting. The final APE, which takes into account the potential for direct and indirect effects, will be determined through NOAA's consultation with the Alaska SHPO, Indian Tribes, local jurisdictions, and other interested parties during the Section 106 process.

Cultural Setting

Ancestral Alaska Native peoples have lived in the Ketchikan region for thousands of years. Several cultural chronologies have been developed to understand the prehistory and cultural development of Alaska Native peoples in southeast Alaska. One widely accepted chronology divides the post-glacial prehistory into three traditions that correspond to the divisions of the Holocene. Davis's (1990:197) cultural sequence for southeastern Alaska includes a Paleo Marine tradition (9000-4500 B.C.), a Transitional stage (4500-3000 B.C.), a Developmental Northwest Coast stage (3000 B.C. to European contact), and a Historic period.

The Paleo Marine tradition is used to define the earliest cultural stage yet identified in coastal Southeast Alaska during the Early Holocene. Paleo Marine tradition archaeological sites have reliable dates that range from about 10,500 to 7,700 years ago (Gillispie 2018). It is characterized by a well-developed microblade industry with wedge-shaped microblade cores, few or no bifacial tools, and an economy based on coastal marine subsistence (Davis 1990:197). Archaeological excavations at the Chuck Lake site on Heceta Island demonstrate use of shellfish, marine fishes, and sea mammal hunting. The site produced microblade technology and dates to approximately 8,800 years ago (Gillispie 2018). The Paleo Marine tradition is followed by a Transitional stage that dates from about 7,500 to 5,000 years ago and corresponds with the Middle Holocene. During this period, local shorelines stabilized, and diverse forest environments began to develop. Also, during this time, a ground stone tool technology dominated over the microblade and unifacial stone tool industry by 5,000 years ago (HDR 2000; Gillispie 2018). Neoglacial climate change during the Late Holocene resulted in a cooler, wetter climate in Southeast Alaska, and coastlines were fully stabilized by about 2,500 years ago. During this period, referred to as the Developmental Northwest Coast stage, societies developed a social and economic complexity that resulted in a greater dependence on intertidal resources, larger populations, permanent winter villages, fortifications, and elaborate plank houses, and art. Archaeological evidence for larger permanent settlements include presence of shell midden deposits, wooden post molds and hearths, fish weirs, ground stone and bone technology, and human burials (Gillispie 2018).

Previous archaeological studies in the Ketchikan area have been limited to small compliance-related projects, including Charles Mobley's (1995) work on USCG facilities at Base Ketchikan and Point Higgins. Archaeologists from the State Office of History and Archaeology also tested a pre-contact site at Refuge Cove (HDR 2000).

The project area and its vicinity are in the traditional territory of the Tongass Tlingit Tribe (Taantakwaan), of southern Southeast Alaska (De Laguna 1990; Monteith 1998). The Tlingit culture included an economy based on fish, particularly anadromous fish; permanent villages; a sophisticated wood working industry; a highly developed and distinctive art form; and a social organization structured around lineages and clans (HDR 2000).

In each Tlingit tribal area, at least one principal village was established. The village was occupied in the winter but was usually deserted in summer when families dispersed to fishing and hunting camps (De Laguna 1990). Village sites were preferably situated on sheltered bays with views of the approaches. A sandy beach was important for landing canoes and for access to salmon streams, fresh water, timber, and good hunting, fishing, and gathering grounds. Aboriginal houses were planked rectangular structures, with excavated centers and low-pitched gabled roofs. They could accommodate six or more families and slaves, often totaling 40 to 50 persons. Single houses or whole villages were occasionally surrounded by palisades (de Laguna 1990).

The Tlingit were distributed in a number of localized, clan-based, territorial groups across Southeast Alaska, with some 10 or more such groups being known. At the time of historic contact, the Ketchikan area was situated within the territory of the Tongass (Taantakwaan) Tlingit, which included the southern portion of Revillagigedo Island; Annette, Gravina, and Duke Islands; and the area around the mouth of Portland Canal (De Laguna 1990).

Prior to moving to Ketchikan, the last village of the Tongass Tlingit was south of Nakat Inlet on Tongass Island (Goldschmidt and Haas 1946). There was a Tongass summer fishing camp at Ketchikan Creek by 1881 (Welsh 1999), and the 1883 Coast Pilot noted three Indian Houses in the area (Sealaska Corporation 1975).

Ketchikan

Ketchikan, situated on the southwest edge of Revillagigedo Island, is known as the “gateway” to Alaska. Native Alaskans were long drawn to Ketchikan Creek’s bountiful salmon runs and abundant fresh water, as were the early settlers that followed. The city’s location on the Inside Passage made it an important shipping port, while the area’s cannery and mining booms brought population and development (Reeve and Kuklok 2011). The Tlingit people built the first structures in what is now downtown Ketchikan, occupying seasonal shacks every summer when they came to Ketchikan Creek to harvest pink salmon. Early Euro American settlement quickly followed, and by the late 1880s a salmon cannery and dock had been built along what is now Ketchikan’s central waterfront. By the early 1890s, more permanent buildings (including a general store) had been constructed and settlement concentrated at the narrow shoreline above the tide flats west of the creek mouth. From there, Ketchikan developed mostly along the waterfront (Reeve and Kuklok 2011). During the gold rush of the 1890s, Ketchikan served as a supply center.

During the mid-1890s, the Newtown area grew north of the promontory of Ketchikan’s present tunnel. Downtown occupied the area between the promontory to the north and Ketchikan Creek to the south. At that time, the area south of Ketchikan Creek and known as “Indian Town” or “Old Town” was populated by Tlingit Indians, mostly from Tongass Island (Reeve and Kuklok 2011). In 1900, Ketchikan was incorporated and the arrival of settlers and gold miners had increased the population to 454. The city charter described the town as the center of the Ketchikan Mining District and the only available anchorage on the Tongass Narrows (HDR 2000).

A thriving local mining industry and construction of a large cannery and a cold storage plant south of the creek spurred substantial growth in Ketchikan between 1900 and 1910. Development extended out over the tide flats and the Tongass Narrows, with wharves, buildings, and streets built on pilings. The Ketchikan Spruce Mills, built in 1903, supplied milled lumber for construction of downtown buildings and street decking. Between 1910 and 1920, a concrete bank, mercantile building, and restaurant/rooming house were erected (Reeve and Kuklok 2011).

The salmon canning industry, which drove Ketchikan’s 1920s boom, led to the population exceeding 5,000 and briefly making Ketchikan the territory’s most populous city. During that period, the commercial center remained downtown, while the city expanded several miles north and south along the Tongass

Narrows. The canning industry peaked in the mid-1930s and construction continued outside the downtown core, with suburbs and commercial areas expanding, particularly along Tongass Avenue north of Downtown. A pulp mill at Ward cove and expansion of the region's timber industry drove another Ketchikan building boom in the 1950s that included demolition of older wood-frame buildings and construction of new "fireproof" ones. By the 1990s, the cruise industry's seasonal retail establishments began replacing many of the downtown establishments that had previously catered to workers in the timber and fishing industries. Much of the year-round retail activity moved to commercial areas north of downtown (Reeve and Kuklok 2011).

The Union Oil Dock

NOAA's Ketchikan Ship Base Office Property was developed as a bulk terminal for Union Oil Company of California during Ketchikan's 1920s boom era (Hartley 1983). Built in 1926 south of downtown and near the southern end of the city limits, the terminal is depicted in the 1927 Sanborn Map Company atlas with a wharf, oil warehouse, office and adjoining oil storage. The parcel's inland portion held four steel gasoline and kerosene tanks, as well as a one-story residence and accessory building on the southern side of Stedman Street, which was then an elevated plank road (Sanborn Map Company 1927).

Along the Tongass Narrows waterfront, immediately south of the Union Oil dock, was the General Petroleum Corporation property with its wharf and massive steel tanks. Farther south was the USCG base, originally established in 1920 to support the United States Lighthouse Service (and converted to Coast Guard use in 1940). To the immediate north of the Union Oil dock was the New England Fish Company plant (1923) with its salmon cannery, warehouse, cold storage, fish packing facility, general store, ice houses, storage buildings, and residences. Farther north, at the Fidalgo Island Packing Company plant (circa 1900), were employee bunkhouses 10 buildings identified as "Native Dwellings in Canning Season." East across Stedman Street from the Union Oil property were single-family homes and a tennis court along the mountainside. Farther north on Stedman Street were additional residences, including a two-story "Bunk & Boarding House (Oriental)" at 935 Stedman Street. One of the largest concerns in town was the Ketchikan Lumber and Shingle Company (Sanborn Map Company 1927).

Union Oil's association with Alaska dates back to 1911 when the tanker S.S. Lansing first delivered Union Oil products to Alaska. The company built its first Alaska bulk terminal in Ketchikan in 1926. During the 1950s, Union Oil opened an Alaska exploration office, participated in the first discovery of commercial quantities of Alaskan crude oil, and discovered Alaska's first commercial gas field in Kenai. Union Oil participated in three other major oil discoveries while drilling in the Cook Inlet in 1965 (Hartley 1983). Beginning in the late 1960s, Union Oil's barge *SEA 76* was delivering fuel from Ketchikan to distributors in Juneau, Sitka, Petersburg, Wrangell, and other southeastern Alaska locations. The sea tankers *Coast Range* and *Sierra Madre* replenished the Union Oil terminal tanks in Ketchikan every 5 weeks. The terminal superintendent received fuel orders by telephone or VHF radio from remote settlements, then scheduled stops for the SEA 76, sometimes to stops over 300 miles north (Hartley 1983).

Ketchikan's Union Oil dock made news in 1953 when the world's largest floating dock stopped there on its way from Houston, Texas to Whittier, Alaska for installation. The 429-foot floating dock was brought to the Union Oil dock by an Alaska Freight Lines tug on a 7,200 nautical-mile journey (Fairbanks Daily News-Miner 1953). The Union Oil dock was also known for reliable service as reported by the *Pacific Fisherman* in 1955: "For marine fuels and lubricants you can always depend on, tie up to the Union 76 dock" (Pacific Fisherman 1955).

Based on a 2004 review of plans by PND, Incorporated, the Union Oil dock appears to have substantially and repeatedly modified since its original construction. The oldest available plan sheets are dated September 1958. Prepared by the engineering firm of Petrey and Knowles from Alhambra, California, the plan sheets depict the fender system on the main wharf. A plan sheet dated April 1966 and prepared by Union Oil Company of California depicts repairs to the face of the main wharf and appears to have been part of a larger construction plan set. Notes on the sheet refer to new bearing piles under the existing dock in addition to the dock face repairs. Field observations from 2004 by PND and the chronology of available plans indicate that the main wharf was heavily impacted by a ship prior to 1966. Older piles were bent below cross bracing and the dock was likely stabilized with new construction. There are also plan sets from 1975 and 1981 (PND 2004).

Historic Properties

No previously documented historic properties are in the APE; however, it does not appear that formal archaeological or historic resource surveys have been previously conducted for the project area. The NOAA Ketchikan Ship Base Office Property has not been documented but has the potential to meet NRHP evaluation criteria for its association with the expansion of Alaska's oil industry and the community development of Ketchikan. Prior to project implementation, NOAA will fulfill the requirements of Section 106 of the NHPA.

NOAA MOC-P Ketchikan Ship Base Office Property

The NOAA Ketchikan Ship Base Office Property at 1010 Stedman Street, which encompasses the entirety of the APE, has not been documented for the AHRS. Although the NOAA property has not been evaluated for the NRHP, it may be significant under NRHP Criterion A for its historic role in the expansion of Alaska's oil industry and for its contributions to Ketchikan's community development. Preliminary research indicates that the NOAA property is a former Union Oil bulk terminal established in 1926. Until 1997, the terminal was owned and operated by Union Oil and its successors, then sold to the Tosco Refining Company. In 1998, the Tosco Refining Company sold the property to Tesoro. NOAA purchased the property from Tesoro in 2004. While potentially significant, the property appears to have minimal historical integrity as it has been substantially modified since its construction in 1925. An evaluation of the Ketchikan Port Facility property will be completed, in consultation with the Alaska SHPO, in accordance with Section 106 of the NHPA.

Historic Properties Outside of the APE

Table 5.15-1 includes a list of NRHP-eligible or -listed resources documented in the AHRS and within 0.5 mile of the APE. Many of the resources contribute to the Stedman-Thomas NRHP Historic District. The other major resource grouping is on the USCG base. None of these resources are in the APE but are included to provide historical context for the types of resources near the APE.

Table 4.15-1: Historic Properties within 0.5 mile of APE

AHRS Card No.	Property	Date Constructed	NRHP Status	Date of Determination or NRHP Listing
KET-00341	Stedman-Thomas NRHP Historic District	1996	Listed in NRHP	February 21, 1996
KET-00089	Thomas Street Viaduct	1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00127	Williams House at 507 Stedman Street	1900	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00186	Building at 110-106 Thomas Street	1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00196	Building at 511 Stedman Street	1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00335	House at 212 Tatsuda Way	c.1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00336	Warehouse at 521 Tatsuda Way	1939	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00337	House at 122B Inman Street	c.1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00338	House at 114A Inman Street	c.1930	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00339	House at 108 Inman Street	1920s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996

Table 4.15-1: Historic Properties within 0.5 mile of APE

AHRS Card No.	Property	Date Constructed	NRHP Status	Date of Determination or NRHP Listing
KET-00340	House at 100 Inman Street	1930s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00414	House at 114 Inman Street	c.1904	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00416	House at 127 Inman Street	c.1930s	Contributes to Stedman-Thomas NRHP Historic District	February 21, 1996
KET-00139	St. Elizabeth's Episcopal Church at 525 Deermont Street	1927	Determined eligible by SHPO and agency	September 17, 1993
KET-00279	Headquarters Building, 16th Lighthouse District, 1300 Stedman Street	1919-1920	Listed in NRHP	June 28, 1983
KET-00546	North Pyrotechnic Bunker, USCG Base, 1300 Stedman Street	c.1940	Determined eligible by SHPO and agency	February 25, 1998
KET-00548	.30 Caliber Machine Gun Emplacement, USCG Base, 1300 Stedman Street	c.1940	Determined eligible by SHPO and agency	February 25, 1998
KET-00974	USCG Cutter Acushnet, USCG Base, 1300 Stedman Street (homeport)	1946	Determined eligible by SHPO and agency	May 4, 2006
KET-00542	Buoy Shed, USCG Base, 1300 Stedman Street	1932	Determined eligible by SHPO and agency	February 25, 1998
KET-01391	Building at 929 Stedman Street	1920	Determined eligible by SHPO and agency	April 14, 2017
KET-01349	Fidalgo Cannery building at 720 Stedman Street	c.1904	Determined eligible by SHPO and agency	

The property listed in Table 4.15-2, which abuts the project area's northern boundary, is documented in the AHRS as not NRHP eligible.

Table 4.15-2: Historic Properties Not NRHP Eligible

AHRS Card No.	Property	Date Constructed	NRHP Status	Date of Determination or NRHP Listing
KET-01135	Segment A of the South Tongass Highway, mile point 2.6 to 4.8	c.1923	Determined not eligible by SHPO and agency	February 25, 2019

The following property listed in Table 4.15-3, which is across Stedman Street (aka South Tongass Highway) from the project area's northern boundary, is not documented in the AHRS but may be NRHP eligible.

Table 4.15-3: Historic Properties Possibly NRHP Eligible

AHRS Card No.	Property	Date Constructed	NRHP Status	Date of Determination or NRHP Listing
None	Bayview Cemetery, 1121 Stedman Street	1903	Unevaluated	N/A

Bayview Cemetery, established in 1903, is at 1121 Stedman Street, about 200 feet southeast of the project area. The cemetery has not been documented in the AHRS. Although cemeteries are not usually considered for listing in the NRHP, they can be eligible if they meet special requirements in addition to the usual NRHP requirements of significance and integrity. Under the special requirement of Criteria Consideration D, a cemetery is eligible for the NRHP if it derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events. Additional research is required to determine whether Bayview Cemetery meets the NRHP requirements for eligibility, including Criteria Consideration D.

4.15.3 Environmental Consequences

This section analyzes the potential for direct and indirect effects to cultural resources in the APE, in accordance with NEPA. The Proposed Action is also subject to Section 106 of the NHPAs. Direct effects to cultural resources typically result from ground disturbance during construction activities or from demolition of or alterations to historic resources. Such direct impacts are typically permanent as sites, artifacts, features, and other cultural objects can be destroyed.

Typically, indirect effects to cultural resources occur through increased use or visual effects on resources that are valued for their context, setting, association, or similar aspects of integrity. Historic districts, for example, may have settings that contribute to their historical significance, and alterations to the view shed may indirectly impact these resources.

Preferred Alternative—Floating Pier

During construction, direct and indirect effects to potential terrestrial or underwater archaeological resources may occur under the Preferred Alternative. Although no previously identified archaeological resources have been identified from the literature, an archaeological survey has not been conducted for the Preferred Alternative. Proposed ground disturbing activities in upland areas, such as grading of the NOAA property, removal or replacement of below-ground utilities, and the removal and installation of a replacement tank, could impact unidentified archaeological resources. In-water construction activities, such as the installation of concrete piles, could also impact potential underwater archaeological resources. The potential for new archaeological resources is low in this area due to the existing development and presence of impervious surfaces under the Preferred Alternative, as well as the limited number of previously recorded archaeological resources in the vicinity. Although there is a low potential for archaeological resources, BMPs, such as conducting an archaeological survey or having an archaeological monitor present to conduct spot checks during ground-disturbing construction activities in previously undisturbed native soils and following standard protocols for inadvertent discoveries, are recommended. If an archaeological site is encountered, it would be treated as a potentially eligible resource and further notifications and consultations would occur to determine the most appropriate management. However, archaeological resources are neither known nor considered highly likely to be present; and therefore, the Preferred Alternative would have a negligible to no effect on archaeological resources at the site.

Direct and indirect effects to the potentially NRHP-eligible Ketchikan Port Facility would relate to demolition of the existing pier, trestle, and associated buildings and structures and construction of the new facilities. The NOAA Ketchikan Port Facility has not been evaluated for NRHP eligibility for the purposes of this EA but the resource may hold potentially significant associations with the expansion of Alaska’s oil industry and the community development of Ketchikan, but the historical integrity is minimal due to the substantial changes that it has experienced since its construction in the 1920s. Consistent with Section 106 of the NHPA, NOAA will confirm the NRHP eligibility of the resource when it consults with the

Alaska SHPO. If adverse effects of the Proposed Action on the potentially eligible NRHP resources associated with the Ketchikan Port Facility are identified during the Section 106 process, these adverse effects would be resolved through a Memorandum of Agreement with the Alaska SHPO, tribes, and other consulting parties.

Operational effects to cultural resources and historic properties are not anticipated to be significant. Future operations could result in minor ground disturbances associated with utility repairs and upgrades or maintenance activities, for example; however, these would be expected to be small in scale and typically occur in previously disturbed areas. Therefore, there would be a low likelihood of encountering archaeological resources, should any be present. Future operations associated with the new trestle and marine facilities would be consistent with operations at the existing facility and would therefore not substantially affect the NOAA Ketchikan Port Facility if it were to be determined eligible for the NRHP.

Action Alternative 1—Fixed Pile-Supported Pier

Impacts to cultural resources and historic properties would be the same as under the Preferred Alternative. Therefore, Action Alternative 1 would likely have negligible to no effects on cultural resources and historic properties in the project area. Any potential impacts to historic properties would be mitigated or resolved through a Memorandum of Agreement with the Alaska SHPO, tribes, and other consulting parties.

No-Action Alternative

Under the No-Action Alternative, there would be no recapitalization of facilities at the Ketchikan Port Facility in Ketchikan. The NOAA Ship *Fairweather* would continue to be operated from alternative locations in Ketchikan or from the OMAO MOC-P facility in Newport, Oregon. No impacts from proposed project activities would occur under this alternative. Consequently, there would be no effects to cultural resources and historic properties resulting from implementation of the No-Action Alternative.

Future activities, such as land transfers and demolition, will not occur under the No-Action Alternative. If these currently unplanned activities happen in the future and are found to potentially affect historic properties, they would be subject to the review requirements under Section 106 of the NHPA.

4.15.4 Mitigation Measures

Preferred Alternative—Floating Pier

No mitigation measures are proposed for impacts associated with cultural or historic resources under the Preferred Alternative. Consultation with the SHPO under the Section 106 NHPA would occur separately from the NEPA process. If there are any potentially adverse effects to historic properties identified during that consultation, mitigation options such as use of an archaeological observer may be developed through the Section 106 process and potentially guided by a project Memorandum of Agreement. Following the conclusion of the Section 106 process and agreed upon measures identified for avoiding or minimizing any impacts to cultural resources, such effects would be reduced to less than significant.

Action Alternative 1—Fixed Pile-Supported Pier

No mitigation measures are proposed for impacts associated with cultural or historic resources under Action Alternative 1. Consultation with the SHPO under the Section 106 NHPA would occur separately from the NEPA process. If there are any potentially adverse effects to historic properties identified during that consultation, mitigation options may be developed through the Section 106 process and potentially guided by a project Memorandum of Agreement. Following the conclusion of the Section 106 process and measures identified for avoiding or minimizing any impacts to cultural resources, such effects would be reduced to less than significant.

No-Action Alternative

No mitigation measures are proposed for impacts associated with cultural or historic resources.

4.16 CUMULATIVE EFFECTS

Cumulative effects are additive or interactive effects that would result from the incremental impact of the Proposed Action, when added to other past, present, and reasonably foreseeable future actions (regardless of the agency or person undertaking such actions). Reasonably Foreseeable Future Actions (RFFAs) are those actions that are reasonably certain to occur in the project area based on funded projects with existing plans. In accordance with 40 CFR 1508.7 and as detailed in CEQ guidance entitled Considering Cumulative Effects Under NEPA (1997b), agencies should analyze the potential cumulative effects that may occur when considering a proposed action "added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions."

The project is in a well-established industrial waterfront area. Specific past, present, and reasonably foreseeable projects in the spatial and temporal boundaries of the Proposed Action considered in the effects analyses are described in Table 4.16-1.

Table 4.16-1: Past, Present, and Reasonably Foreseeable Future Actions

Past, Present, or Reasonably Foreseeable Future Action	Description	Location Relative to Ketchikan Homeport Site
Port Office Ketchikan Dock—Past Renovations	In 2005, NOAA installed a floating camel system on the face of the existing pier, rearranged the property line fence and gate along Stedman Street, and upgraded the electrical service on-site including the electric utility service to the pier. In 2006, NOAA upgraded the water/wastewater utility service to the pier, replaced the Site Operations Building with a manufactured building, and upgraded the Steam Boiler Building. In 2007-2008, NOAA installed a new Force Main Sewer connection between the on-site lift station and the city connection point at Stedman Street. In 2008, a storm destroyed the small boat dock and NOAA retrieved and disposed of the wreckage. Additionally, in 2008, NOAA condemned the creosote wood trestle, including access to the Lab Building situated on the trestle. In 2015, NOAA installed a new Gravity Feed Sewer line connection between the Site Operations Building and on-site lift station, demolished the concrete fueling pad, and made miscellaneous asphalt repairs.	on site
City of Ketchikan, Bar Harbor Grated Trestle for Floating Dock—Past Action	The Ketchikan Bar Harbor Drive Down Float Facility project included the construction of a drive down float, including a 20-foot by 48-foot approach dock with vehicle transition; a 17-foot by 140-foot transfer bridge, a 48-foot by 120-foot drive down float with bridge support float, including six 24-inch by 0.500-inch thick galvanized steel Float Anchor Piles, eight 16-inch by 0.500-inch thick galvanized steel Dock Support Batter Piles, six 16-inch by 0.500-inch thick galvanized steel Vertical Dock Support Piles, and float mooring pile frames as required (PND 2012). Marine excavation of 5,100 cy with disposal in an approved uplands site allowed for all-tide access (PND 2012). The project also refurbished, relocated and reinstalled the existing Net Float, including reinstallation of six 16-inch by 0.500-inch thick galvanized steel Float Anchor Piles (PND 2012). A domestic water system, life ring cabinets and fire extinguishers were added to improve safety (PND 2012). A fire standpipe system was also installed.	Approximately 2.2 miles northwest
Ketchikan Shipyard Expansion Program—Past Action	The Ketchikan Shipyard is a public-private partnership that aims to create and maintain long-term economic development by providing vessel maintenance, repair, and construction services. The Ketchikan Shipyard was originally constructed in the 1980s and has since undergone various upgrade and maintenance projects including construction of employee facilities, expansion of fabrication and storage facilities, construction of a second dry dock, and installation of standby power generators and a process water treatment system. The dry dock was fabricated in China and arrived in Ketchikan in July 2007. The buildout hit a major milestone in 2012 with the completion of the shipyard's assembly hall, a 70,000 square foot indoor workspace for building new ships. The shipyard's steel shop was completed in the fall of 2013. The Ketchikan Shipyard received $1.18 million in FY 2015 State appropriations to be used to relocate an electrical substation.	Approximately 3.1 miles northwest
Thomas Basin Project—Past Action	The City of Ketchikan recently replaced some failed retaining walls in Thomas Basin. The Thomas Basin project included replacing two 50-foot access gangways with 80-foot ADA compliant gangways.	Approximately 3,100 feet northwest

Table 4.16-1: Past, Present, and Reasonably Foreseeable Future Actions

Past, Present, or Reasonably Foreseeable Future Action	Description	Location Relative to Ketchikan Homeport Site
Ward Cove Marine Facility Project—Present Action	The Ward Cove Marine Facility Project involves the construction of a new ship berthing complex and ferry terminal as part of the AMHS, Ward Cove Marine Facility Project. The Ward Cove berthing facility is largely complete as a functional replacement for the existing AMHS South Berth facility in Ketchikan and to consolidate all Ketchikan based AMHS management and engineering functions to the Ward Cove property. The recently installed marine facility consists of a pile supported trestle, steel transfer bridge, concrete mooring float, and floating dock.	Approximately 3 miles north of Ketchikan
Gravina Access Project 67698—Future Action	The FHWA and the ADOT&PF have completed their environmental review of the Gravina Access Project to improve surface transportation between Revillagigedo Island and Gravina Island in the Ketchikan Gateway Borough in Southeast Alaska. In 2017, a Record of Decision and Final Supplemental Environmental Impact Statement was issued identifying Alternative G4v as the selected alternative for the project (ADOT&PF 2017). The selected alternative includes a passenger waiting facility, a new heavy freight mooring facility, reconstructed ferry berths, and other amenities to improve access for ferry travellers and freight movement to and from Gravina Island. The construction timeline for this project is not publicly available. See press release: http://dot.alaska.gov/comm/pressbox/arch_2015/PR15-2556.shtml	3.4 miles to the chosen Alternative G4V of the Gravina Access Project
Ketchikan Harbor Maintenance and Improvements—Present/Future Action	The City of Ketchikan operates five public boat harbors in the Ketchikan area (Bar Harbor, Thomas Basin, Knudson Cove, Hole-In-The-Wall, and Casey Moran/City Float; see https://evogov.s3.amazonaws.com/media/16/media/121024.pdf). Although there is no official publicly available schedule or documentation, it is possible that routine maintenance/improvements involving in-water work could occur at any of these harbors in the near future.	Approximately 0.5 miles northwest to the closest City of Ketchikan harbor
Ketchikan Public Utilities—Utility Easement for Submerged Hybrid Power Cable—Future Action	Ketchikan Public Utilities has applied for a utility easement for submerged hybrid power cable across State-owned tide and submerged land in Tongass Narrows, between Gravina Island and Revillagigedo Island, Ketchikan, Alaska (Public Notice ADL 109136, 2020). The cable will replace an existing submerged power cable in the same general area. The proposed work will consist of approximately 2,500 linear feet of 3.4-inch diameter submarine cable, and 160 linear feet of 12-inch HDPE sleeve, 90 cy of backfill material, and 10 cy of concrete anchors installed at the ends of the HDPE sleeve. The general installation process involves use of a cable laying vessel (barge or dive boats) and divers. The construction timeline for this project is not specified in the Public Notice.	Approximately 3.3 miles northwest

Notes:
ADA = Americans with Disabilities Act
ADOT&PF = Alaska Department of Transportation and Public Facilities
AMHS = Alaska Marine Highway System
cy = cubic yards
FHWA = Federal Highway Administration
HDPE = high-density polyurethane

4.16.1 Preferred Alternative

The anticipated effects of the Preferred Alternative are not expected to be substantially exacerbated by the past, present, and RFFAs in Table 4.16-1 due to the proximity from the Ketchikan homeport facility. However, because underwater noise can travel long distances, an analysis with respect to in-water noise impacts on fish and marine mammals is presented below. Overall, cumulative effects of the Proposed Action when considered with other past, present, and RFFAs are not expected to result in a significant impact to any of the resource areas and environmental topics analyzed in this EA.

Fish

Implementation of the Proposed Action, including pile installation (impact or vibratory driven) would have insignificant effects on fish. Past, present, and future development projects have had, have, and would have the potential to result in impacts to fish, including noise disturbance. Although there are ongoing and future actions and plans, including the Gravina Access Project over 3 miles away, underwater noise attenuation over this long distance would limit cumulative impacts to minor behavioral effects such as fleeing or temporary cessation of feeding or spawning behaviors. The impacts of the Proposed Action would result in short-term increases in underwater noise and turbidity therefore potentially contribute to past and ongoing cumulative impacts to these species. However, because impacts would be short-term and localized, and BMPs and impact minimization measures would be in place, cumulative impacts would not significantly affect fish populations in the proposed project area.

Marine Mammals

Implementation of pile driving activities (either impact or vibratory driven) would have insignificant effects on marine mammals, and would not adversely affect the ESA-listed humpback whale. The Proposed Action may result in behavioral disturbance to marine mammals from underwater sounds associated with pile driving; however, these effects would be limited to localized, temporary disturbances to marine mammals in the project area, including temporary cessation of feeding or movement out of the area during active pile driving.

Past, present, and future development projects have had, have, and would have the potential to result in impacts to marine mammals, and could also have additional impacts to the species, their habitat, and prey. Because marine mammals are highly mobile, the noise impacts of the Proposed Action could combine with underwater and airborne noise impacts to marine mammals from other actions and activities in the region, including the Gravina Access Project over 3 miles away. However, because of underwater sound attenuation over this long distance, the expected impacts of the Proposed Action on marine mammals in general would be temporary and short in duration, cumulative impacts to marine mammals associated with pile driving noise are considered unlikely. Continued adherence to the requirements of the ESA and MMPA would limit disturbance to marine mammals. Furthermore, existing regulatory mechanisms and minimization measures would protect marine mammals (e.g., sound attenuation devices, visual surveillance, the use of shutdown zones) (see Section 4.2, Noise and Section 4.8, Biological Resources) and further decrease the likelihood of potential cumulative impacts to these species.

4.16.2 Action Alternative 1

The anticipated effects of Action Alternative 1 with consideration of the past, present, and RFFAs in Table 4.16-1 would be the same as described for the Preferred Alternative.

4.16.3 No-Action Alternative

Cumulative effects would not occur under the No-Action Alternative.

5.0 PUBLIC SCOPING AND AGENCY CONSULTATION

Public scoping in advance of preparing an EA under NEPA is not required based on NOAA's NEPA implementing guidelines and is not customarily performed. While public scoping has not occurred, NOAA has conferred with key public officials and affected regulatory agencies to inform them of the Proposed Action and its intention to prepare a Draft EA for public and agency review and comment.

As is customary, NOAA intends to seek public and agency input regarding this Draft EA during a 30-day review period. A notice of availability for public access to and review of the Draft EA will be published via the Internet or posted at a public library, along with how to submit comments to NOAA. This notice will also be published in the classified section of the Ketchikan Daily News prior to initiation of the 30-day comment period.

In addition, electronic copies of the Draft EA will be provided to potentially affected regulatory agencies and other stakeholders. These entities may include, but are not limited to, the following:

Federal Agencies:

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- U.S. Army Corps of Engineers, Regulatory Branch
- U.S. Fish and Wildlife Service, Alaska District, Endangered Species Program
- U.S. Coast Guard Base Ketchikan

State Agencies:

- Alaska Department of Fish and Game
- Alaska Department of Environmental Conservation (Division of Water)
- Alaska Department of Environmental Conservation (Division of Air Quality)
- Alaska Department of Natural Resources, Office of History and Archaeology

Local/Regional Agencies/Stakeholders:

- City of Ketchikan, City Manager
- City of Ketchikan Fire Department
- City of Ketchikan Public Works Department
- Ketchikan Gateway Borough, Planning and Community Development
- Ketchikan Port and Harbors, Harbormaster
- Ketchikan Public Utilities

Native Organizations

- Organized Village of Saxman
- Ketchikan Indian Community
- Cape Fox Corporation
- Sealaska Corporation
- Central Council of the Tlingit and Haida Indian Tribes of Alaska
- Metlakatla Indian Community

Comments received from agencies and the public during the public comment period will be provided in Appendix C: Agency and Public Comment.

6.0 SUMMARY OF POTENTIAL IMPACTS, BMPS, AND MITIGATION MEASURES

No potentially significant impacts have been identified for the Proposed Action when implemented using either the Preferred Action or Action Alternative 1. Table 6-1 provides a summary of potential impacts by environmental resources for each action alternative analyzed, as well as a summary of BMPs and mitigation measures to be considered, as necessary, to support a finding of no significant impact.

No anticipated environmental impacts were identified in relation to the No-Action Alternative.

Table 6-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
Air Quality	Construction	Minor	Moderate	• Watering exposed surfaces • Covering haul trucks transporting loose material • Removing visible mud or dirt track-out onto adjacent public roads • Limit vehicle speeds on unpaved roads • Complete paving and grading work in a timely manner, and lay building pads as soon as possible after grading • Minimize idling times • Maintain construction equipment as per manufacturer's specifications	None
	Operations	Minor	Minor	• Minimize idling times • Maintain equipment as per manufacturer's specifications	None
Noise	Construction	Moderate	Moderate	• Route truck traffic away from sensitive receptors • Turn off equipment when not in use • Prohibit unnecessary idling of internal combustion engines • Locate stationary noise-generating equipment away from sensitive receptors • Equip all internal combustion engine-driven equipment with intake and exhaust mufflers	None
	Operations	Moderate	Moderate	• Prohibit unnecessary idling of internal combustion engines	None
Geologic Resources	Construction & Operations	Negligible	Negligible	• Conduct site-specific geotechnical evaluations to address any geologic hazards such as seismic hazards and hazards of coastal erosion	None
Water Resources	Construction	Minor	Minor	• Obtain approvals under federal CWA • Implement SWPPPs and ESCPs • Implement standard BMPs for sediment control and water quality during in-water construction • Use the smallest-diameter piles practicable while still minimizing the overall number of piles	None

Table 6-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
				• Waste from pile work would be transported to a permitted upland location for disposal • Prepare a Pile Removal and Installation Plan to implement procedures for in-water pile installation and removal in accordance with NOAA's 2009 Guidelines (NOAA 2009)	
	Operations	Negligible to Moderate	Negligible to Moderate	• Obtain approvals under federal CWA • Obtain APDES Multisector General Permit	None
Hazardous Materials	Construction	Negligible to Minor	Negligible to Minor	• Leachability testing of all lead-based painted materials; handling and disposal of such materials in accordance with applicable regulations including Title 18 AAC, federal hazardous waste and OSHA regulations • Pile Removal and Installation Plan in accordance with NOAA's 2009 Guidelines for the use of treated wood products in aquatic environments (NOAA 2009) • Pipeline Removal Plan in accordance with Title 18 AAC • Soil and Groundwater Management Plan which provides guidance if any contaminated soil or groundwater is found, in accordance with Title 18 AAC 75 and federal hazardous waste regulations pertaining to OSHA requirements • Site-specific Health and Safety Plan in accordance with 29 CFR 1910.120 and AKOSH requirements	None
	Operations	Negligible	Negligible	None	None
Wetlands	Construction & Operations	Minor	Minor	• Implement standard BMPs for in-water construction	None
Floodplains	Construction & Operations	Minor	Minor	None	None
Biological Resources	Construction	Minor	Minor	<u>Marine fish, EFH, marine mammals, and TES:</u> • Coordinate with NMFS regarding whether to implement bubble curtains or other sound attenuation devices (e.g., cushion block, and isolation casings) to reduce the acoustical footprint.	None

Table 6-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
				• Should impact pile driver be required based on a final pier design, a soft start for impact drivers would be implemented • In coordination with the NMFS, hydroacoustic monitoring may be conducted to determine the extent at which certain nose thresholds presented in Appendix B would be met, and to be able to mitigate underwater noise as needed <u>Birds protected under MBTA:</u> • Coordinate with USFWS if an active MBTA or BGEPA-protected bird nest is observed on site during construction • Apply standard BMPs associated with spill prevention and hazardous materials management (see Section 4.5, Hazardous Materials)	
	Operations	Negligible	Negligible	None	None
Land Use	Construction & Operations	Negligible	Negligible	None	None
Recreational Resources	Construction	Minor	Moderate	None	None
	Operations	Minor	Minor	None	None
Utilities and Solid Waste	Construction & Operations	Minor	Minor	None	None
Transportation	Construction & Operations	Negligible	Negligible	Prior to construction of the project, NOAA would contact the ADOT&PF to determine the need for traffic control, including permits and agency consultation, as needed	None
Socioeconomics and Environmental Justice	Construction & Operations	Minor	Minor	None	None
Visual Resources	Construction	Minor	Minor	Aesthetic treatments to structures (e.g., lighting, natural colors) may be implemented to improve project aesthetics	None
	Operations	Negligible	Negligible	None	None

Table 6-1: Summary of Potential Direct Impacts, BMPs, and Mitigation Measures

Resource	Phase	Preferred Alternative	Action Alternative 1	BMPs and Anticipated Regulatory Compliance	Recommended Mitigation
Cultural Resources	Construction & Operations	Negligible	Negligible	None	None, pending consultation with SHPO under the Section 106 NHPA.

Notes:
Due to the previously developed nature of the NOAA property and the industrialized waterfront where it is set, Coastal Zone Management Act, Farmlands and Vegetation resources were dismissed from detailed analysis. See Table 3-1 with the rationale for dismissal.

ADOT&PF = Alaska Department of Transportation and Public Facilities
AKOSH = Alaska Occupational Safety and Health
BGEPA = Bald and Golden Eagle Protection Act
BMP = Best Management Practice
CWA = Clean Water Act
EFH = Essential Fish Habitat
ESCP = Erosion and Sediment Control Plan
MBTA = Migratory Bird Treaty Act
SHPO = State Historic Preservation Office
SWPPP = Stormwater Pollution Prevention Plan
TES = Threatened and Endangered Species

7.0 CONCLUSION

The findings of this EA indicate that no significant effects would result from implementation of the Proposed Action using either the Preferred Alternative or Action Alternative 1, assuming standard BMPs and mitigation measures discussed in Section 4 and summarized in Table 6-1, Summary of Potential Impacts, BMPs, and Mitigation Measures, are implemented.

8.0 LIST OF PREPARERS

Preparer	Role
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Arika Mercer	Visual Resources and Transportation Subject Matter Expert, References
Jeremy Mull	Water Resources Subject Matter Expert
Geoffrey Thornton	Geology and Floodplains Subject Matter Expert

9.0 REFERENCES

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Appendix A: NOAA Ship *Fairweather* Specifications

NOAA Ship *Fairweather*

NOAA Ship *Fairweather* in the Gulf of Alaska with namesake Mt. Fairweather.

Hull Number	*S220*
Call Sign	WTEB
Home Port	
	Ketchikan, AK
Marine Operations Center	
	Pacific (MOC-P)
Port Office	
	Ketchikan, AK
Regular Area of Operations	
	Pacific
General Classification	
	Hydrographic Survey Vessel
Mailing Address	
	NOAA Ship ***Fairweather*** Marine Operations Center, Pacific 2002 SE Marine Science Dr. NOAA Ship ***Fairweather*** 1010 Stedman Street Ketchikan, AK 99901

Contact Information

IN PORT	AT SEA
Cellular	VoIP
907-254-2842 (Ship)	301-713-7779
907-254-2836(CO)	Iridium
907-254-2837 (XO)	808-659-0054
907-254-2839 (OOD)	001-8816-7631-0054
907-617-4106 (EOW)	
Land Line (Home Port)	
541-867-8785 (VC)	Inmarsat Mini-M:
541-867-8786 (VC)	
206-260-1400 (Fax)	Fax or E-Fax
	Inmarsat B
Ship's Email	011-804-336-990-710 (Voice)
Noaa.Ship.fairweather@noaa.gov	011-870-336-9910-711 (Data)

Design		**Speed & Endurance**	
Designer:	Maritime Administration	Emergency Speed (KTS):	13.4
Builder:	Aerojet-General Shipyards	Cruising Speed (KTS):	12.5
Launched:	March 15th, 1967	Range (nm):	8640
Delivered:	January 1968	Endurance (days):	30
Commissioned:	April 10, 1968	Endurance Constraint:	Food/ Stores
Length (LOA - ft.):	231	**Compliment - Maximum**	
Breadth (moulded - ft.):	42	Commissioned Officers/Mates	12
Draft, Maximum (ft.):	15.5	Engineers, Licensed	4
Depth to Main Deck (ft.):	8	Engineer, Unlicensed	7
Hull Description:	Welded steel/ ice strengthened	Deck	13
Displacement:	1,800 tons	Survey	9
Berthing		Stewards	4
Single Staterooms:	25	Electronic Technicians	1
Double Staterooms:	16	USPHS Medical Officer	0
Other Staterooms:	0	**Total Crew**	**51**
Total Berths:	**57**	**Scientists**	**6**

Medical Facilities:	**Food Service Seating Capacity**	
One medical treatment room containing one berth for patients. Emergency and first-aid equipment aboard, administered by designated vessel personnel. USPHS medical officer available upon request and availability of officer.	Mess Room:	37

Navigational Equipment (Ship's Use)	**Type (Make/Model/Amount/Location)**
Radars (X and S Band)	Furuno, FAR/FR-2805/ 2/Bridge
GPS and DGPS	Northstar/ 951/952/ 1/Bridge
Gyro Compass	SGB/ Meridian/ 2/Athwart ship passageway
Deepwater and Shallow Navigational echosounders	Furuno/ FE-700/ 1/Bridge
ECDIS	Transis/1/Bridge

Navigational Equipment (Access to onboard Scientists)	Type (Make / Model / Amount / Location)
GPS and DGPS	None
Gyro Compass	None
Deepwater and Shallow Navigational echosounders	None
ECDIS	None
Charting Program with Ship's Position	None

Laboratory Spaces and other Scientific Spaces

Type	Location	ft.^{2}	Description: (Available Services and / or Connections, counter space, etc.)
Wet Lab	Aft most lab	240	Only counter space available to scientist, fresh water sink
Dry Lab	Just Aft of mess Deck	220	Counter space, part of a computer rack.
Electronics/Computer Lab	Just Forward of the mess	140	Data Plot 2: Used for crew computers
Electronics/Computer Lab	Just Aft of the Bridge	342	Data Plot 1: Used for hydrographic mission. Not available for scientist use.

Scientific Data Collection Systems and Supportable Operations

Type	Brief Description (where equipment is involved, please state what type (i.e. ME70, EK60, ES60, Seabird, etc.)
Conductivity, Temp., Depth (CTD) Without Water Samples	Seabird
Dive Team Equipped	If all divers are available
Multibeam Equipped for Hydrographic Surveys	Reson 7125 (on Launches), Reson 8160 (on ship)
Scientific Computer System Equipped	

DATA COLLECTED BY THE SHIP'S SCIENTIFIC COMPUTER SYSTEM (SCS) IN THE STANDARD CONFIGURATION

Description	Units	Data Source
BWR - Bearing and Distance to WPT (Rhumb Line)	XXX	XXX
GLL - Geographic Position (Lat/Lon)	DM.M	GP150
HDT - Heading (True)	DMS	SG Brown Meridian
OSD - Own Ship Data (Ship course & speed)		
OSD - Own Ship Data (Ship course & speed)		
RMC - Recommended Min Nav Info RMC Tags		GP150
VWR - Relative wind speed and angle		

DECK EQUIPMENT:

Winch – (A-Frame)		Winch (J-Frame)	
Quantity:	1	Quantity:	1
Manufacturer:	DWS International Inc.	Manufacturer:	Markey
Model	5050 EHI	Model	COM-15V
Drive:	Electro-hydraulic	Drive:	Electro-hydraulic
Max. Pull (lbs):		Max. Pull (lbs):	1,869
Max. Depth (m)		Max. Depth (m)	
Drum Capacity:		Drum Capacity:	
Type of Cable Installed:		Type of Cable Installed:	0.375
Length of Cable on the drum (m)	960	Length of Cable on the drum (m)	4000
Location:	Boat Deck	Location:	Fantail, Starboard side

Crane, Telescopic Boom		Crane (Fixed Length)	
Quantity:	2	Quantity:	1
Manufacturer:	Skagit	Manufacturer:	Skagit
Model:		Model:	
Boom Length (ft):	25	Boom Length (ft):	40
Lifting Cap. (lbs):	1,500 extended	Lifting Cap. (lbs):	5,000
Location:	Foredeck, Port and Starboard	Location:	Boat deck

A Frame		J Frame	
Quantity:	1	Quantity:	1
Type:	Movable	Type:	Movable
Clearance over the side (ft):	9	Clearance over the side (ft):	4
Horizontal Clearance (ft):		Horizontal Clearance (ft):	
Safe Working Load (lbs)	8,000	Safe Working Load (lbs)	8,000
Location:	Center fantail	Location:	Fantail, Port side

Anchor - Bow	
Quantity	2
Type	Stockless
Weight (lbs)	3000
Port Anchor Chain Length (fathoms)	165
Starboard Anchor Chain Length (fathoms)	165

Boat Davit (Make / Model)		Boat Davit (Make / Model)	
Quantity:	**4**	Quantity:	2
Manufacturer:	**Vest Davit**	Manufacturer:	
Model:		Model:	
Hoisting Capacity		Hoisting Capacity	6080
Location	Boat Deck- Port and Starboard	Location	"E" Deck- Port and Starboard
Boat type used	Launch	Boat type used	FRB and Ambar

BOATS (Normally Equipped)				
	Type	**Horsepower**	**Length Over All (Ft)**	**Max. Persons**
1	Survey Launch	500	28	9 rough, 13 calm
		Reson 7125		
2	Rigid Hull Inflatable Boat (RHIB)	315	23	5 rough, 7 calm
3	Rescue Boat (SOLAS Approved)	300	23	4 rough, 6 calm

Additional Capabilities (not previously stated)	
Type	**Description**
None stated	

Appendix B: Underwater Noise Technical Memorandum

UNDERWATER NOISE TECHNICAL MEMO FOR INSTALLATION/REMOVAL OF PILES AT NOAA OMAO KETCHIKAN PORT FACILITY

Underwater noise would be generated from pile driving during the construction of the proposed action, which could affect fish species and marine mammals nearby. As described in Chapter 1, "Introduction," the proposed action involves the demolition of derelict structures and the construction of a dedicated pier and shore facilities to support the berthing of the NOAA Ship *Fairweather* on a long-term basis, along with the addition of a small boat ramp. Roughly 100 14-inch-diameter timber piles, 50 36-inch-diameter concrete piles, and 50 24-inch-diameter steel pipe piles would be removed under the proposed project. The piles would be removed from the bedrock using the vibratory pile driving method, assuming two minutes operation to loosen the pile by vibratory hummer and lift by a crane.

Twenty-two 24-inch-diameter and four 36-inch-diameter steel pipe piles would be installed under the proposed Preferred Alternative. One-hundred-and-twenty-four 24-inch-diameter and two 36-inch-diameter steel pipe piles would be installed under the proposed Action Alternative 1 (Figure 2-6). The piles would be inserted into the bedrock at a depth of up to 52 feet. The piles would be driven into the bedrock using either a rock socket driving method (preferred), vibratory pile driving method or impact pile driving method. These methods are assessed in this technical memorandum.

Rock sockets pile driving is a technique that is used to embed a pile into solid rock, typically for offshore applications where the depth is shallow or there is sloping solid rock. It involves drilling into the rock layer to create a socket which is slightly larger than the pile, creating a void around the outer edge of the pile which is filled with ultra-high strength grout that provides resistance against lateral loads and uplift forces. Impact pile driving includes a piston system with weights that are usually raised by a power source (e.g., diesel, hydraulic, or steam) then dropped onto the pile, hammering the pile into the ground. The noise produced during impact pile driving is impulsive and with high intensity. Potential impacts to fish species as a result of impact pile driving are described below. However, a vibratory driver works by inducing particle motion to the substrate immediately below and around the pile, causing liquefaction and allowing the pile to sink downward (for this reason, vibratory pile driving is suitable only where soft substrates are present). The noise produced during vibratory driving is lower in intensity and can be considered continuous in comparison to the impulsive noise produced during impact pile driving. Potential impacts to marine mammal and fish species as a result of the pile driving are described below.

FUNDAMENTALS OF UNDERWATER NOISE

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid (e.g., water) or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Sound typically is described by pitch and loudness. Pitch is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Loudness is the intensity of sound waves combined with the reception characteristics of the auditory system. Intensity may be compared with the height of an ocean wave because it is a measure of the amplitude of the sound wave. Acoustics addresses primarily the propagation and control of sound.

In addition to the concepts of pitch and loudness, several noise measurement scales are used to describe a sound. A dB is a unit of measurement describing the amplitude of sound; a dB is equal to 20 times the logarithm to base 10 of the ratio of the pressure of the sound measured to the reference pressure. For underwater sounds, a reference pressure of 1 micro pascal (μPa) commonly is used to describe sounds in terms of decibels. Therefore, 0 dB on the decibel scale would be a measure of a sound pressure of 1 μPa. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a tenfold increase in acoustic energy, while 20 decibels is 100 times more intense, and 30 decibels is 1,000 times more intense.

The number of sound pressure peaks traveling past a given point in a single second is referred to as the frequency, expressed in cycles per second or Hertz (Hz). The amplitude of pressure waves generated by a sound source determines the perceived loudness of that source. Sound pressure amplitude is measured in micro-Pascals (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 µPa to 100,000,000 µPa. Because of this huge range of values, sound is rarely expressed in terms of pressure. Instead, a logarithmic scale is used to describe the sound pressure level (SPL) in terms of decibels (dB). Sound intensity for underwater applications is typically expressed in dB referenced to 1 micro Pascal (µPa).

When a pile-driving hammer strikes a pile, a pulse is created that propagates through the pile and radiates sound into the water, the ground substrate, and the air. Sound pressure pulse as a function of time is referred to as the waveform. In terms of acoustics, these sounds are described by the peak pressure, the RMS, and the sound exposure level (SEL).

The peak pressure is the highest absolute value of the measured waveform and can be a negative or positive pressure peak. For pile-driving pulses, the RMS level is determined by analyzing the waveform and computing the average of the squared pressures over the time that makes up that portion of the waveform containing the vast majority of the sound energy (Richardson et al. 1995). The pulse RMS has been approximated in the field for pile-driving sounds, by measuring the signal with a precision sound level meter, set to the “impulse” RMS setting, and typically is used to assess effects on marine mammals. SEL is an acoustic metric that provides an indication of the amount of acoustical energy contained in a sound event. For pile driving, the typical event can be one pile-driving pulse or many pulses, such as pile driving for one pile or for one day of driving multiple piles. Typically, SEL is measured for a single strike and a cumulative condition.

Another measure of the pressure waveform that can be used to describe the pulse is the sound energy itself. The total sound energy in the pulse is referred to in many ways, such as the “total energy flux” (Finerran, et al. 2002). The “total energy flux” is equivalent to the unweighted SEL for a plane wave propagating in a free field, a common unit of sound energy used in airborne acoustics to describe short-duration events, referred to as dB re 1µPa2-sec. Peak pressures and RMS sound pressure levels are expressed in dB re 1 µPa. The total sound energy in an impulse accumulates over the duration of that pulse. A common unit of total sound energy used in acoustics to describe short-duration events is the sound exposure level (SEL).

The cumulative SEL associated with the driving of a pile can be estimated using the single-strike SEL value and the number of pile strikes, using the following equation:

$$SEL_{CUMULATIVE} = SEL_{SINGLE\ STRIKE} + 10 \log (\#\text{ of pile strikes})$$

For example, if a single-strike SEL for a pile is 165 dB and it takes 1,000 strikes to drive the pile, the cumulative SEL is 195 dBA (165 dB + 30 dB = 195 dB), where 10 * Log10(1000) = 30.

Peak intensity, RMS, and SEL are used by resource agencies to assess the effects of underwater noise on fish.

PROJECT AREA PROTECTED SPECIES

Coastal and downstream waters surrounding BSU Ketchikan consist of migratory pathways and feeding areas critical for maintenance of anadromous fish and support of significant commercial and recreational fishing resources. Endangered and protected species in the area include humpback whale, Steller’s sea lion, northern (Queen Charlotte) goshawk, peregrine falcon, bald eagle, marbled murrelet, and harlequin duck (USCG 2011). Protected species in the proposed action area also include fish species less than 2 grams and greater than or equal to 2 grams.

To more accurately reflect marine mammal hearing capabilities, marine mammals are divided into functional hearing groups based on measured or estimated functional hearing ranges. NOAA modified the functional hearing groups as follows in Table 1 (NOAA 2018):

Table 1: Summary of the Five Functional Hearing Groups of Marine Mammals

Functional Hearing Group	Estimated Auditory Bandwidth	Species or Taxonomic Groups
Low frequency cetaceans (Mysticetes–Baleen whales)	7 Hz to 25 kHz (best hearing is generally below 1000 Hz, higher frequencies result from humpback whales)	All baleen whales
Middle frequency Cetaceans (Odontocetes)	150 Hz to 160 kHz (best hearing is from approximately 10-120 kHz)	Includes species in the following genera: Lagenorhynchus,Orcinus, Physeter, Delphinapterus, Monodon, Ziphius, Berardius, Mesoplodon
High frequency cetaceans (Odontocetes)	200 Hz to 180 kHz (best hearing is from approximately 10-150kHz)	Includes species in the following genera: Phocoena, Phocoenoides
Phocid pinnipeds (true seals)	75 Hz to 100 kHz (best hearing is from approximately 1-30 kHz)	All seals
Otariid pinnipeds (sea lions and fur seals)	100 Hz to 48 kHz (best hearing is from approximately 1-16 kHz)	All fur seals and sea lions

Source: Southall et al. 2007 and NOAA 2018

Humpback whales

Acoustics and hearing: Humpback whales are known to produce three classes of vocalizations: (1) "songs" in the late fall, winter, and spring by solitary males; (2) sounds made within groups on the wintering (calving) grounds; and (3) social sounds made on the feeding grounds (Richardson et al. 1995). The main energy of humpback whale songs lies between 0.2 and 3.0 kHz, with frequency peaks at 4.7 kHz. Feeding calls, unlike song and social sounds, are highly stereotyped series of narrow-band trumpeting calls. They are 20 Hz to 2 kHz, less than 1 sec in duration, and have source levels of 175 to 192 dB re 1 μPa-m. The fundamental frequency of feeding calls is approximately 500 Hz (summarized in DON 2008b, and citations therein). Thus, humpback whales are in the low-frequency functional hearing group, with an estimated auditory bandwidth of 7 Hz to 22 kHz (Southall et al. 2007). Their vocal repertoire ranges from 20 Hz to greater than 10 kHz (DON 2008a) (Table 1).

Steller sea lions

Acoustics and hearing: Steller sea lions have similar hearing thresholds in-air and underwater to other otariids. Hearing in air ranges from 0.250–30 kHz, with a region of best hearing sensitivity from 5–14.1 kHz (Muslow and Reichmuth 2010). The underwater audiogram shows the typical mammalian U-shape. The range of best hearing was from 1 to 16 kHz. Higher hearing thresholds, indicating poorer sensitivity, were observed for signals below 16 kHz and above 25 kHz (Kastelein et al. 2005). Like other otariids, Steller sea lions have an estimated auditory bandwidth of 100 Hz to 40 kHz (Southall et al. 2007, NOAA 2013). Vocalizations range from <4 to 120 kHz (DON 2008a) (Table 1).

Harbor seals

Acoustics and hearing: Harbor seals are assigned to functional hearing group that includes phocid pinnipeds, or true seals, with an estimated auditory bandwidth of 75 Hz to 100 kHz (Southall et al. 2007, NOAA 2013). Vocalizations range from 25 Hz to 4 kHz (DON 2008a) (Table 4-1).

The following occur in Tongass Narrows, but are unlikely to be affected:

Killer whales

Acoustics and hearing: Killer whales, like most cetaceans, are highly vocal and use sound for social communication and to find and capture prey. The sounds include a variety of clicks, whistles, and pulsed calls (Ford 2009). As summarized in DON (2008b, and citations therein), the peak to peak source levels of echolocation signals range between 195 and 224 dB re 1 μPa-m. The source level of social vocalizations ranges between 137 to 157 dB re 1 μPa-m. Acoustic studies of resident killer whales in British Columbia have found that there are dialects, in their highly stereotyped, repetitive discrete calls, which are group-specific and shared by all group members (Ford 2009). These dialects likely are used to maintain group identity and cohesion and may serve as indicators of relatedness that help in the avoidance of inbreeding between closely related whales (Ford 2009). The killer whale has the lowest frequency of maximum sensitivity and one of the lowest high frequency hearing limits known among toothed whales. The upper limit of hearing is 100 kHz for this species.

In contrast to resident whales, transient killer whales appear to use passive listening as a primary means of locating prey, call less often, and use high-amplitude vocalizations only when socializing, communicating over long distances, or after a successful attack. This probably results from the ability of other marine mammal species (their prey) to “eavesdrop” on killer whale sounds (DON 2008b).

Dall’s porpoise

Acoustics and hearing: Only short duration pulsed sounds have been recorded for Dall’s porpoise; this species apparently does not whistle often (Richardson et al. 1995). Dall’s porpoises produce short-duration (50 to 1,500 μs), high-frequency, narrow band clicks, with peak energies between 120 and 160 kHz. There are no published data on hearing ability of this species (DON 2008b).

Harbor porpoise

Acoustics and hearing: 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). Harbor porpoises are in the high-frequency functional hearing group, whose estimated auditory bandwidth is 200 Hz to 180 kHz (Southall et al. 2007). Their vocalizations range from 110 to 150 kHz (DON 2008a) (Table 1).

Gray whale

Acoustics and hearing: As summarized in Jones and Swartz (2009) and DON (2008b, and references therein), gray whales produce broadband signals ranging from 100 Hz to 4 kHz (and up to 12 kHz). The most common sounds on the breeding and feeding grounds are knocks which are broadband pulses from about 100 Hz to 2 kHz and most energy at 327 to 825 Hz (Richardson et al. 1995). The source level for knocks is approximately 142 dB re 1 μPa-m. During migration, individuals most often produce low-frequency moans. The structure of the gray whale ear is evolved for low-frequency hearing. Gray whale responses to noise include changes in swimming speed and direction to move away from the sound source; abrupt behavioral changes from feeding to avoidance, with a resumption of feeding after exposure; changes in calling rates and call structure; and changes in surface behavior, usually from traveling to milling.

Fish

There are no ESA-listed fish species occurring in the project area. Five species of Pacific salmon, pink (Oncorhynchus gorbuscha), chum (O. keta), sockeye (O. nerka), coho (O. kisutch), and Chinook salmon (O. tshawytscha), occur within the project area. The bays and coves of the area provide a protected habitat for Dungeness crabs (Cancer magister), Red king crab (Paralithodes camtschaticus), and tanner crab (Chionoecetes bairdi). Other invertebrates found in the area include shrimp, abalone, and shellfish species including geoduck clams (Panopea generosa).

Essential Fish Habitat (EFH) for species occurring within the project area includes Alaska stocks of Pacific salmon, and the ground fish Dover Sole (Table 2). Additional information on EFH can be found at https://alaskafisheries.noaa.gov/habitat/efh.

Table 2: EFH in the Project Area

Species	Life stages	Habitat Description
Chinook Salmon	Marine juveniles, marine immature and maturing adults	Marine juveniles: Marine juveniles: all marine waters off the coast of Alaska from the mean higher tide line to the 200-nm limit of the U.S. EEZ, including the Gulf of Alaska. Marine immature and maturing adults: marine waters off the coast of Alaska to depths of 200 m and ranging from the mean higher tide line to the 200-nm limit of the EEZ, including the Gulf of Alaska.
Chum Salmon	Marine juveniles, marine immature and maturing adults	Marine juveniles: all marine waters off the coast of Alaska to approximately 50 m in depth from the mean higher tide line to the 200-nm limit of the EEZ, including the Gulf of Alaska. Marine immature and maturing adults: Same as Chinook salmon
Coho Salmon	Marine juveniles, marine immature and maturing adults	Marine juveniles: same as Chinook salmon. Marine immature and maturing adults: same as Chinook salmon.
Dover Sole	Late juveniles, adults	Late juveniles: lower portion of the water column along the middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the Gulf of Alaska wherever there are substrates consisting of sand and mud. Adults: same as above late juveniles.
Pink Salmon	Marine juveniles, marine immature and maturing adults	Marine juveniles: same as Chinook salmon. Marine immature and maturing adults: same as Chinook salmon
Sockeye Salmon	Marine juveniles, marine immature and maturing adults	Marine juveniles: same as chum salmon Marine immature and maturing adults: same as Chinook salmon

Source: NPFMC 2012, 2015

APPLICABLE NOISE CRITERIA

NOAA issued Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NOAA 2018). NOAA has compiled, interpreted, and synthesized the best available science, including a recent Navy Technical Report (Finneran 2015), to produce updated acoustic threshold levels for the onset permanent threshold shifts (PTS) (Table ES1) and replace those currently in use by NOAA for determining PTS. Updates include a protocol for estimating PTS onset threshold levels for impulsive (e.g., airguns, impact pile drivers) and non-impulsive (e.g., sonar, vibratory pile drivers) sound sources, the formation of marine mammal functional hearing groups (low-, mid-, and high-frequency cetaceans, and otariid and phocid pinnipeds), and the incorporation of marine mammal auditory weighting functions into the calculation of PTS threshold levels. These acoustic threshold levels are presented using dual metrics of cumulative sound exposure level and peak sound pressure level.

Table 3 provides the underwater acoustic threshold levels for onset of Permanent Threshold Shifts (PTS). Dual metrics of SEL_{cum} and peak sound pressure level have been recommended as most appropriate for establishing PTS onset acoustic threshold levels for marine mammals (NOAA 2018).

Table 3: Summary of PTS Onset Dual Metric Acoustic Threshold Levels*

Hearing Group	PTS Onset Threshold Levels (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	219 dBpeak & 183 dB SELcum	199 dB SELcum
Mid-Frequency (MF) Cetaceans	230 dBpeak & 185 dB SELcum	198 dB SELcum
High-Frequency (HF) Cetaceans	202 dBpeak & 155 dB SELcum	173 dB SELcum
Phocid Pinnipeds (Underwater) (PW)	218 dBpeak & 185 dB SELcum	201 dB SELcum
Otariid Pinnipeds (Underwater) (OW)	232 dBpeak & 203 dB SELcum	219 dB SELcum

Notes: > = greater than; dB = decibel; SEL = sound exposure level; SPL = sound pressure level.
* Dual metric acoustic threshold levels: Use whichever level [dBpeak or dB SELcum] exceeded first. All SELcum acoustic threshold levels (re: 1 μPa2-s) incorporate marine mammal auditory weighting functions, while peak pressure thresholds should not be weighted. Note: Acoustic threshold levels for impulsive or non-impulsive sources are based on temporal characteristics at the source and not the receiver.
The SELcum could be exceeded in multitude of ways (i.e., varying exposure levels and durations, duty cycle). It is valuable for action proponents, if possible, to indicate under what conditions these acoustic threshold levels will be exceeded.
Note: In this Table, dB peak, is equivalent to the ANSI abbreviation of Lpk and SELcum is equivalent to the ANSI abbreviation of LE (ANSI 2013).
Source: NOAA 2018. https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

Also, in June 2008, the Fisheries Hydroacoustic Working Group (FHWG) — whose members include the Southwest and Northwest Divisions of the NMFS; the California, Washington, and Oregon Departments of Transportation; the CDFW; and the U.S. Federal Highway Administration — issued interim threshold criteria, based on the best available science, for the onset of injury to fish from pile driving noise (FHWG 2008). This is a dual criterion including an SPL of 206 dB (peak) and a cumulative SEL of 187 dB for fish 2 grams and heavier or a cumulative SEL of 183 dB for fish smaller than 2 grams (Table 4). The FHWG has determined that noise at or above the 206 dB (peak) SPL can cause barotrauma to auditory tissues, the swim bladder, or other sensitive organs. Noise levels above the accumulated SEL may cause temporary hearing-threshold shifts in fish. Behavioral effects are not covered under these criteria but could occur at these levels or lower. Behavioral effects may include fleeing the area and the temporary cessation of feeding or spawning behaviors.

Table 4: Interim Threshold Criteria for the Onset of Injury in Fish

Fish Size	Peak Noise (SPL) (dB)	Accumulated Noise (SEL) (dB)
Less than 2 grams	>206	>183
Greater than or equal to 2 grams	>206	>187

Notes: > = greater than; dB = decibel; SEL = sound exposure level; SPL = sound pressure level.
Source: Fisheries Hydroacoustic Working Group (FHWG) 2008.

ESTIMATION OF PILE DRIVING NOISE

Because the project construction plan and contractor are not known at this time, pile driving was evaluated for three scenarios (vibratory pile driving, impact pile driving, and rock socket drilling with installing the pile using a vibratory hammer and impact pile driving) to install the 36-inch and 24-inch-diameter steel pipe and concrete piles. Vibratory pile driving would be used to remove existing concrete, timber, and steel piles. To estimate underwater noise levels for vibratory pile driving and impact pile driving scenarios, measurements and the attenuation measures from the Caltrans Guidance for Hydroacoustic Analysis (Caltrans 2020 Table I.2-1) were used for 36-inch concrete piles (cast in steel shell), and for 36-inch and 24-

inch steel pipe underwater pile driving conducted under similar circumstances (i.e., similar water depths in areas of similar substrate) was reviewed for source-level data at 10 meters. For rock socket drilling with installing the pile using a vibratory hammer and impact pile driving (worst case scenario), reference noise levels from the Alaska DOT Hydroacoustic Pile Driving Noise Study (JASCO 2015), were used.

Also, since the project construction plan and contractor are not known at this time, the number of strikes for each pile was assumed based on the length of 10 feet[1] driven into bedrock, and conservatively assuming approximately four strikes/seconds for an inch of the pile to be driven. These analyses assumed that fish and marine mammals would be stationary during pile driving (i.e., would not relocate away from the source) and that all pile strikes would produce noise at the maximum peak SPL and SEL. Therefore, these calculations, as shown in Table 5 (Vibratory), Table 6 (Impact), and Table 7 (rock socket drilling with installing the pile using vibratory hammer and impact pile driving), represent the worst-case scenario for accumulated sound effects over a 24-hour period.

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[1] The length of 10 feet that would be driven into bedrock, was provided in the email from Dale McCoy on Tuesday June 21, 2016 at 1:09 p.m.

Table 5: Expected Pile Driving Noise Levels and Distances of Criteria Level Exceedance with Vibratory Drivers

Type of Pile		Pile Size (inches)	Maximum Quantity	Water Depth (m)	Distance from Pile (meter)	Transmission Loss Constant (F Value)	Assumed Sound Pressure Levels			Pile Depth below substrate		Number of Strikes	SEL Accumulated	Vibratory Pile Driving Method											
														Onset of Physical Injury			Fish Behavior	Marine Mammal, dB SEL						Harbor Seal, in Air, dB RMS	
														Peak	Cumulative SEL dB			Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	Behavioral Harassment		
														dB	Fish ≥ 2 g	Fish < 2 g	dB							Injury	Behavior
														Distance (m) to threshold (PTS Isopleth to threshold (meters))											
							Peak	SEL	RMS	Feet	Inches			206	187	183	150	199	198	173	201	219	120	120	90
Preferred Alternative																									
Preferred Alternative Floating Pier	Steel Piles	24	18	4 to 5	10	15	181	153	153	35	420	1680	185	0	8	14	16	3	0	4	2	0	1585	1	27
Preferred Alternative Mooring Dolphins	Steel or Fiber Reinforce Polymer Piles	36	2	5 to 5	10	15	191	159	159	50	600	2400	193	1	24	40	40	6	1	9	4	0	3981	1	27
Preferred Alternative Small Boat Floating Dock	Steel Piles	24	4	6 to 5	10	15	181	153	153	35	420	1680	185	0	8	14	16	3	0	4	2	0	1585	1	27
Action Alternative																									
Action Alternative 1 Fixed Pier	Steel Piles	24	100	7 to 5	10	15	181	153	153	35	420	1680	185	0	8	14	16	3	0	4	2	0	1585	1	27
Action Alternative 1 Access Trestles	Steel Piles	24	10	8 to 5	10	15	181	153	153	35	420	1680	185	0	8	14	16	3	0	4	2	0	1585	1	27
Action Alternative 1 Mooring Dolphins	Steel or Fiber Reinforce Polymer Piles	36	2	9 to 5	10	15	191	159	159	50	600	2400	193	1	24	40	40	6	1	9	4	0	3981	1	27
Action Alternative 1 Small Boat Floating Dock	Steel Piles	24	4	10 to 5	10	15	181	153	153	35	420	1680	185	0	8	14	16	3	0	4	2	0	1585	1	27
Pile Removal																									
Timber piles (trestle)		14	100	11 to 5	10	15	184	145	157	50	600	120	166	0	0	1	29	2	0	3	1	0	2929	1	27
Concrete piles		36	50	12 to 5	10	15	191	159	159	50	600	120	180	1	3	6	40	2	0	4	1	0	3981	1	27
Steel piles main wharf and dolphins		24	50	13 to 5	10	15	181	153	153	50	600	120	174	0	1	2	16	1	0	1	1	0	1585	1	27

Notes: dB = decibel; SELcum = cumulative sound exposure level; SPL = sound pressure level, NA = Not Applicable/not reaching threshold.
Source: NMFS 2009, Caltrans 2020, AECOM 2020.

Table 6: Expected Pile Driving Noise Levels and Distances of Criteria Level Exceedance with Impact Drivers

Type of Pile		Pile Size (inches)	Max. Quantity	Water Depth (m)	Distance from Pile (meter)	Transmission Loss Constant (F Value)	Attenuation	Assumed Sound Pressure Levels			Pile Depth below substrate		Number of Strikes	SEL Accumulated	Impact Pile Driving Method												
															Onset of Physical Injury			Fish Behavior	Marine Mammal, dBZ SEL						Behavioral Harassment	Harbor Seal, in Air, dB RMS	
															Peak	Cumulative SEL dB			Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds			
															dB	Fish ≥ 2 g	Fish < 2 g	dB	SELcum Threshold	183	185	155	185	203		Injury	Behavior
															206	187	183	150	Peak Threshold	219	230	202	218	232			
						15	0	Peak	SEL	RMS	(ft)	Inches			Impact Pile Driving Method (PTS Isopleth to threshold (meters)										160	120	90
Preferred Alternative																											
Preferred Alternative Floating Pier	Steel Piles	24	18	3 to 5	10	15	0	195	164	176	35	420	1680	196	2	41	76	541	SELcum	179	6	214	96	7	117	1	27
																			Peak	NA	NA	3	NA	NA			
Preferred Alternative Mooring Dolphins	Steel or Fiber Reinforce Polymer Piles	36	2	3 to 5	10	15	0	210	183	193	50	600	2400	217	18	970	1585	7356	SELcum	2842	101	3385	1521	111	1585	1	27
																			Peak	3	NA	34	3	NA			
Preferred Alternative Small Boat Floating Dock	Steel Piles	24	4	3 to 5	10	15	0	195	164	176	35	420	1680	196	2	41	76	541	SELcum	192	7	229	103	7	117	1	27
																			Peak	NA	NA	3	NA	NA			
Action Alternative																											
Action Alternative 1 Fixed Pier	Steel Piles	24	100	3 to 5	10	15	0	195	164	176	35	420	1680	196	2	41	76	541	SELcum	192	7	229	103	7	117	1	27
																			Peak	NA	NA	3	NA	NA			
Action Alternative 1 Access Trestles	Steel Piles	24	10	3 to 5	10	15	0	195	164	176	35	420	1680	196	2	41	76	541	SELcum	192	7	229	103	7	117	1	27
																			Peak	NA	NA	3	NA	NA			
Action Alternative 1 Mooring Dolphins	Steel or Fiber Reinforce Polymer Piles	36	2	3 to 5	10	15	0	210	183	193	50	600	2400	217	18	970	1585	7356	SELcum	2842	101	3385	1521	111	1585	1	27
																			Peak	3	NA	34	3	NA			
Action Alternative 1 Small Boat Floating Dock	Steel Piles	24	4	3 to 5	10	15	0	195	164	176	35	420	1680	196	2	41	76	541	SELcum	192	7	229	103	7	117	1	27
																			Peak	NA	NA	3	NA	NA			
Pile Removal															Vibratory Pile Removing (PTS Isopleth to threshold (meters)												
															206	187	183	150	SELcum Threshold	199	198	173	201	219	120	120	90
Timber piles (trestle)		14	100	11 to 5	10	15	0	184	145	157	50	600	120	166	0	0	1	29	SELcum	2	0	3	1	0	2929	1	27
Concrete piles		36	50	12 to 5	10	15	0	191	159	159	50	600	120	180	1	3	6	40	SELcum	2	0	4	1	0	3981	1	27
Steel piles main wharf and dolphins		24	50	13 to 5	10	15	0	181	153	153	50	600	120	174	0	1	2	16	SELcum	1	0	1	1	0	1585	1	27

Notes: dB = decibel; SELcum = cumulative sound exposure level; SPL = sound pressure level, NA = Not Applicable/not reaching threshold.
Source: NMFS 2009, Caltrans 2020, AECOM 2020.

Table 7: Expected Pile Driving Noise Levels and Distances of Criteria Level Exceedance with Rock Socket Drilling with Installing the Pile Using Vibratory Hammer and Impact Pile Driving

Type of Pile	Pile Size (inches)	Max. Quantity	Water Depth (m)	Distance from Pile (meter)	Transmission Loss Constant (F Value)	Attenuation	Sound Pressure Levels			Pile Depth below substrate		Number of Strikes	SEL Accumulated	Distance (m) to threshold												
														Onset of Physical Injury			Fish Behavior	Marine Mammal, dBZ SEL							Harbor Seal, in Air, dB RMS	
														Peak	Cumulative SEL dB			Hearing Group	Low-Frequency Cetaceans	Mid-Frequency Cetaceans	High-Frequency Cetaceans	Phocid Pinnipeds	Otariid Pinnipeds	Behavioral Harassment		
														dB	Fish ≥ 2 g	Fish < 2 g	dB	SELcum Threshold	183	185	155	185	203		Injury	Behavior
														206	187	183	150	Peak Threshold	219	230	202	218	232			
						0	Peak	SEL	RMS	(ft)	Inches			Impact Pile Driving Method (PTS Isopleth to threshold (meters))										160	120	90
Impact Pile Driving – Reference Noise Levels from JASCO 2015																										
Impact Pile Driving	36	100	3 to 5	10	20.3	0	195	169	183	9	102	408	195	3	25	39	408	SELcum	39	3	44	24	4	117	1	27
																		Peak	NA	NA	4	NA	NA			
Vibratory Pile Driving Method – Reference Noise Levels from JASCO 2015														Vibratory Pile Driving Method												
														206	187	183	150	SELcum Threshold	199	198	173	201	219	120	120	90
Vibratory Pile Driving	36	100	3 to 5	10	21.9	0	180	155	165	50	600	360	180	1	5	8	47	SELcum	4	1	5	3	0	1111	1	27
Drilling*	36	100	3 to 5	10	18.9	0	190	165	175	50	600	13140	206	1	63	63	213	SELcum	7	1	9	5	1	8229	1	27
Pile Removal (Vibratory) – Reference Noise Levels from Caltrans 2020														Vibratory Pile Removing (PTS Isopleth to threshold (meters))												
														206	187	183	150	SELcum Threshold	199	198	173	201	219	120	120	90
Timber piles (trestle)	14	100	11 to 5	10	15	0	184	145	157	50	600	120	166	0	0	1	29	SELcum	2	0	3	1	0	2929	1	27
Concrete piles	36	50	12 to 5	10	15	0	191	159	159	50	600	120	180	1	3	6	40	SELcum	2	0	4	1	0	3981	1	27
Steel piles main wharf and dolphins	24	50	13 to 5	10	15	0	181	153	153	50	600	120	174	0	1	2	16	SELcum	1	0	1	1	0	1585	1	27

Notes: dB = decibel; SELcum = cumulative sound exposure level; SPL = sound pressure level, NA = Not Applicable/not reaching threshold.
* Drilling was conservatively assumed as vibratory pile driving in this calculation.
Source: NMFS 2009, JASCO 2015, Caltrans 2020, AECOM 2020.

POTENTIAL EFFECTS OF PILE DRIVING NOISE ON MARINE MAMMALS AND FISH

Sound and acoustic pressure resulting from pile driving could affect special-status species listed above by causing behavioral avoidance of the construction area and/or injury. This would apply to both fish species and marine mammal species listed and described above.

Vibratory Pile Driving Method: With respect to fish, the 206 dB (peak) SPL noise criteria for injury to fish would not be exceeded beyond one meter (3.3 feet) by Project activities. The 187 dB and 183 dB cumulative SEL criteria for fish smaller than 2 grams and for fish greater than or equal to 2 grams would be exceeded, up to 40 meters or 131 feet, as shown in Table 5. Similarly, with respect to marine mammals, the cumulative SELs of 199 dB, 198 dB, 173 dB, 201 dB, and 219 dB criteria for various types of marine mammals listed above, would be exceeded, up to 15 meters or 50 feet, as shown in Table 5. Similarly, behavioral impact distance would reach up to 40 meters or 131 feet for fish species, and up to 3,981 meters or 13,060 feet for marine mammals. Air noise impact distance due to pile driving to harbor seal species, as shown in Table 5, would reach up to 1 meter (3.3 feet) to injury threshold, and up to 27 meters (89 feet) to behavioral impact threshold.

Implementing mitigation measures described below (MM BIO: Underwater Noise Mitigation Measures due to Pile Driving) would reduce the pile driving underwater noise impact distance to close proximity to the pile being driven, to less than 10 meters or 33 feet for fish species, and 3 meters (10 feet) or less for marine mammals. Similarly, behavioral impact distance would reach up to 10 meters or 33 feet for fish species, and up to 858 meters or 2,815 feet for marine mammals. The cessation of pile driving at the end of each workday would allow cumulative noise levels to reset before driving continues the following day.

Impact Pile Driving Method: With respect to fish, the 206 dB (peak) SPL noise criteria for injury to fish would not be exceeded beyond 18 meters (60 feet) by Project activities. The 187 dB and 183 dB cumulative SEL criteria for fish smaller than 2 grams and for fish greater than or equal to 2 grams would be exceeded, up to 1,585 meters or 5,200 feet, as shown in Table 6. Similarly, with respect to marine mammals, the cumulative SELs of 183 dB, 185 dB, 155 dB, 185 dB, and 203 dB criteria for various types of marine mammals listed above, would be exceeded up to 3,385 meters or 11,100 feet, as shown in Table 6. Similarly, behavioral impact distance would reach up to 7,360 meters or 24,000 feet for fish species, and up to 1,585 meters or 5,200 feet for marine mammals. Air noise impact distance due to pile driving to harbor seal species, as shown in Table 6, would reach up to 1 meter (3.3 feet) to injury threshold, and up to 27 meters (89 feet) to behavioral impact threshold.

Implementing mitigation measures described below (MM BIO: Underwater Noise Mitigation Measures due to Pile Driving) would reduce the pile driving underwater noise impact distance to close proximity to the pile being driven, to less than 341 meters or 1,120 feet for fish species, and 730 meters (2,400 feet) or less for marine mammals. The behavioral impact distance would be reduced to 1,585 meters or 5,200 feet for fish, and 341 meters or 1,120 feet for marine mammals. The cessation of pile driving at the end of each workday would allow cumulative noise levels to reset before driving continues the following day.

Rock Socket Drilling with Installing the Pile Using Vibratory Hammer and Impact Pile Driving Method: Rock sockets would be drilled, and the piles would be set in the sockets with a vibratory hammer. Drilling would occur over a range of 45 minutes to 3 hours 40 minutes depending on the pile. The vibratory hammer would be used for up to 6 min per pile. The impact hammer struck the piles from 1 to 5 times (JASCO 2015). Drilling was conservatively assumed as vibratory pile driving in the noise propagation calculations. With respect to fish, the 206 dB (peak) SPL noise criteria for injury to fish would not be exceeded beyond four meters (13 feet) by Project activities. The 187 dB and 183 dB cumulative SEL criteria for fish smaller than 2 grams and for fish greater than or equal to 2 grams would be exceeded, up to 39 meters or 128 feet, as shown in Table 7. Similarly, with respect to marine mammals, the cumulative SELs of 183 dB, 185 dB, 155 dB, 185 dB, and 203 dB criteria for various types of marine mammals listed above, would be exceeded up to 424 meters or 1,391 feet, as shown in Table 7. Similarly, behavioral impact distance would reach up to 541 meters or 1,775 feet for fish species, and up to 1,111 meters or 3,645 for marine mammals during pile driving. Air noise impact distance due to pile driving to harbor seal species, as shown in Table 6, would reach up to 1 meter (3.3 feet) to injury threshold, and up to 27 meters (89 feet) to behavioral impact threshold.

Implementing mitigation measures described below (MM BIO: Underwater Noise Mitigation Measures due to Pile Driving) would reduce the pile driving underwater noise impact distance to close proximity to the pile being driven, to less than 20 meters or 66 feet for fish species, and three meters (10 feet) or less for marine mammals. The behavioral impact distance would be reduced to 63 meters or 207 feet for fish, and 2,434 meters or 8,000 feet for marine mammals. The cessation of pile driving at the end of each workday would allow cumulative noise levels to reset before driving continues the following day.

Pile Removal: With respect to pile removal, as shown in Tables 5 through 7, the 206 dB (peak) SPL noise criteria for injury to fish would not be exceeded beyond 1 meter (3.3 feet). The 187 dB and 183 dB cumulative SEL criteria for fish smaller than 2 grams and for fish greater than or equal to 2 grams would be exceeded, up to six meters or 20 feet. Similarly, with respect to marine mammals, the cumulative SELs of 183 dB, 185 dB, 155 dB, 185 dB, and 203 dB criteria for various types of marine mammals listed above, would be exceeded up to 4 meters or 13 feet. Similarly, behavioral impact distance would reach up to 40 meters or 131 feet for fish species, and up to 3,981 meters or 13,061 feet for marine mammals. Air noise impact distance due to pile driving to harbor seal species, as shown in Table 6, would reach up to 1 meter (3.3 feet) to injury threshold, and up to 27 meters (89 feet) to behavioral impact threshold.

Implementing mitigation measures described below (MM BIO: Underwater Noise Mitigation Measures due to Pile Driving) would reduce the pile removing underwater noise impact distance to close proximity to the pile being driven, to less than 1 meter or 3.3 feet for fish species, and also 1 meter (3.3 feet) or less for marine mammals. The behavioral impact distance would be reduced to nine meters or 30 feet for fish, and 858 meters or 2,415 feet for marine mammals. The cessation of pile driving at the end of each workday would allow cumulative noise levels to reset before driving continues the following day.

MM BIO-##: Underwater Noise Mitigation Measures due to Pile Driving.

Depending on the rate at which the piles are installed and removed, pile driving is expected to occur for at least 30 days (assuming 4 piles per day) during the construction period. In areas where the SEL threshold would be exceeded, fish and marine mammals could experience temporary shifts in hearing thresholds and behavioral effects. These behavioral effects could result in the temporary cessation of feeding or movement out of the area during active pile driving. Following the cessation of pile driving, fish are expected to resume use of the area. Because of the shallow water depths in the vicinity (approximately 20 feet or less), attenuation rates likely would be higher than modeled in this analysis, which would decrease the affected area. To ensure that potential impacts to special-status fish species and marine mammals would be avoided or mitigated to less than significant, the following MM would be implemented to allow fish species and marine mammals to move away from the area before full power pile driving commences:

- A soft start for impact drivers requires contractors to provide an initial set of strikes at reduced energy followed by a 30-second waiting period; this procedure is then repeated two additional times. A soft start would be implemented before pile driving begins each day and any time following the cessation of pile driving for a period of 30 minutes or longer.
- Also, hydroacoustic monitoring will be conducted to determine the extent at which certain thresholds would be met, and to be able to mitigate underwater noise as needed.
- An air bubble curtain, cushion block, and isolation casings will be properly placed around all in-water piles during pile driving activities to effectively attenuate underwater sound levels. Examples of potentially effective systems include a confined air bubble curtain, dewatered casing, multi-stage air bubble curtains system, or encapsulated bubble curtain demonstrated to effectively reduce underwater sound. These systems will be employed in water that is 1 meter (3.3 feet) or deeper.
- The vibratory method of pile driving (where practicable) will be used with an air bubble curtain and isolation casings.

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Appendix C: Agency/Public Comments

[Placeholder: This appendix will contain copies of written comments received from agencies and the public in response to NOAA's solicitation for comment on the Draft EA during the 30-day comment period, and subsequent communications]