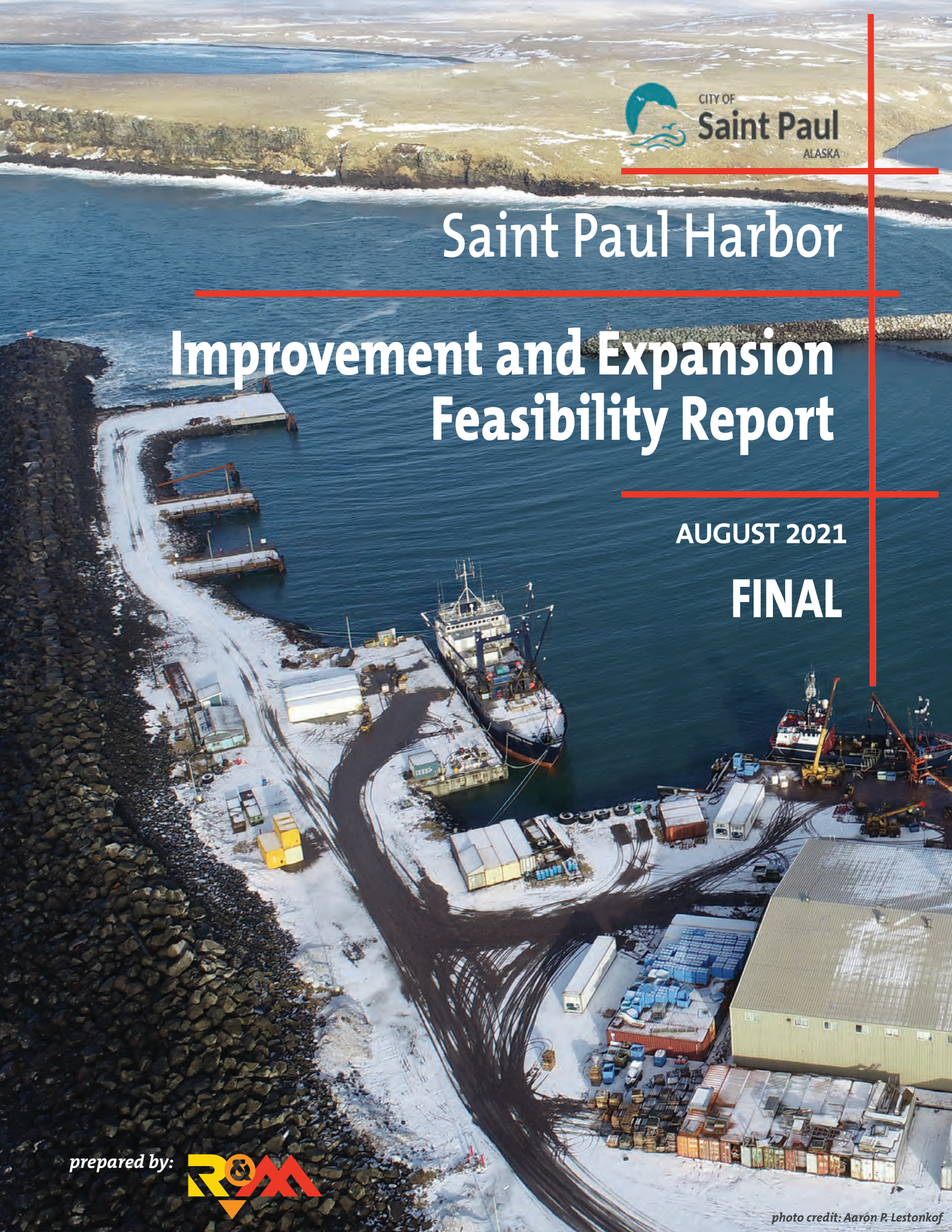
CITY OF
Saint Paul
ALASKA

Saint Paul Harbor

Improvement and Expansion Feasibility Report

AUGUST 2021

FINAL



prepared by: R&M

photo credit: Aaron P. Lestonkof

List of Preparers:

R&M Consultants, Inc.

Northern Economics

HNS Coastal Engineering Planning and Design

Haight & Associates

KPB Architects

City of Saint Paul:

Phillip A. Zavadil, City Manager

Stakeholders:

City of Saint Paul

Aleut Community of Saint Paul

Central Bering Sea Fishermen's Association

Tanadgusix Corporation (TDX)

Trident Seafoods

R&M Consultants, Inc.:

John Daley, PE – Project Manager

Van Le, AICP – Planning and Community Outreach

Jean Cumlat, EIT – Engineering Support

EXECUTIVE SUMMARY

In December 2020 the City of Saint Paul authorized R&M Consultants, Inc. (R&M) to proceed with the Saint Paul Harbor Improvement and Expansion Feasibility Study project. The purpose of the project was to outline alternatives, options, phases and costs to replace, upgrade and expand the community's harbor to meet current and future needs.

R&M solicited input from city staff, industry stakeholders and the community at virtual stakeholder meetings January through May 2021. The stakeholders identified key issues including:

- Adverse wave climate in the entrance channel and harbor, including routine overtopping of the breakwater and damage to moored vessels;
- Inadequate moorage space for the fleet;
- Moorage space for larger vessels;
- Inadequate capacity of the moorage fenders and cleats; and
- The need for a harbor of refuge for the Bering Sea fleet.

The US Army Corps of Engineers (USACE) has spent significant time and resources studying, planning, designing and constructing the breakwaters, entrance channel, and turning basin. The original design of the harbor was predicated on providing moorage for a fleet of 36 crab and bottom fish vessels with lengths up to 120 feet and an unladen draft of 12 feet. This provided access for refrigerated cargo vessel lengths in excess of 300 feet and an entrance channel maintained to -30 feet MLLW. The current inner harbor facilities can only accommodate a fraction of this original design fleet.

A site visit was conducted in June 2021 to inventory the existing moorage facilities. There is inadequate moorage space for the larger commercial fishing vessels. The existing moorage for larger vessels is in poor condition, particularly regarding the fenders and mooring capacity.

Three broad phases of improvements have been identified including:

Phase 1 — Upgrade and expand existing inner harbor facilities for improved larger vessel moorage. Over $90 million in improvements have been identified.

- This would include incremental renovation, replacement, and expansion of the existing large vessel docks. It would include the addition of docks, side tie breasting dolphins, catwalks, and access trestles.
- Renovations to the City South Dock, including new fenders.
- A new Harbormaster's office.

Phase 2 — Expand the breakwater and revise the entrance channel. This is estimated to cost between $170 and $200 million.

- This would include a Federal / U.S. Army Corps of Engineers-led rubble mound breakwater expansion.
- The addition of a new entrance channel with jetties to improve the wave climate and reduce shoaling and subsequent maintenance dredging.

Phase 3 — Relocate the exit to the Salt Lagoon, expand the upland, and expand the inner harbor.

- This would allow the beneficial use of dredge material to create uplands with additional moorage.

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LIST OF ACRONYMS AND ABBREVIATIONS

AML	Alaska Marine Lines
CBSFA	Central Bering Sea Fisherman's Association
MCACES	Micro-Computer Aided Cost Estimating System
MLLW	Mean Lower Low Water
MPH	Miles Per Hour
NED	National Economic Development
NEPA	National Environmental Protection Act
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations and Management
P&S	Plans and Specifications
PED	Preconstruction Engineering and Design

R&M	R&M Consultants, Inc.
TDX	Tanadgusix Corporation
US	United States
USACE	United States Army Corps of Engineers
WRDA	Water Resources Development Act

1.0 INTRODUCTION

Saint Paul Island is in the Pribilof Islands region of the Bering Sea. It is the largest of the five Pribilof Islands with a total surface area of just over 40 square miles. The community is located on a peninsula on the southern tip of the island, adjacent to the harbor.

Saint Paul Island is home to a large Aleut community. For over 200 years the community's economy was centered on harvesting fur seals. This was first under Russian dominance and later under the control of the U.S. Federal Government. Starting in the late 1970s the economy has shifted from fur seals to commercial fishing, which is by far the dominant economic driver today. The Bering Sea is currently one of the most productive fisheries in the world.

Trident Seafoods built a process facility on the island in 1989. This processing plant employs between 30 and 300 workers, depending on the season. Most employees are seasonal and do not live full time on the island. The plant primarily processes opilio and king crab. The Central Bering Sea Fisherman's Association (CBSFA) also provides Trident with halibut.

The first breakwater was constructed in Saint Paul in 1983. It failed the following year during a storm event. A new 750 feet long breakwater was constructed in 1987. This was stable but did not provide adequate inner harbor wave climate for safe moorage. In 1989, the current breakwater was constructed by the USACE. It includes an 1,800-foot-long main breakwater and 970-foot-long detached breakwater. It provides 8 to 10 acres of harbor space with water depths of 18 to 25 feet. The entrance channel is 300 feet wide. In 1996 the USACE deepened the entrance channel, which provided a spending beach on the lee side of the detached breakwater, provided underwater reefs adjacent to the main breakwater, and other improvements. A small boat harbor basin was constructed afterward, which included an inner-harbor breakwater. In 2009 seasonal floating docks were installed in the small boat harbor.

1.1 COMMUNITY INPUT

Community engagement and feedback has been integral to developing and refining the proposed harbor improvements. Several stakeholders have been involved from the start of the project:

- The **City of Saint Paul** was incorporated as a second-class city in 1971. It is operated under a council-manager form of government with an elected Mayor, elected City Council, and hired City Manager.
- The **Aleut Community of Saint Paul** is a federally recognized tribal group. The Tribal Government is a venue through which the Aleut peoples of the island represent and support their unique cultural and historical rights and responsibilities.
- The **Central Bering Sea Fishermen's Association** is a nonprofit 501(c)(4) corporation and management organization that oversees the community's involvement in the Western Alaska Community Development Quota Program. This program is run by NOAA Fisheries and is intended to allocate a percentage of Bering Sea and Aleutian Islands fishery quotas to eligible communities.
- **Tanadgusix Corporation** or (TDX) is a shareholder-owned Aleut native village corporation formed in 1973 shortly after the Alaska Native Claims Settlement Act of 1971. TDX owns about

95% of Saint Paul Island real estate, including the power generating plant, communications facilities, and other local business enterprises.

- **Trident Seafoods** is one of the largest seafood companies in North America. The Saint Paul Island shore-based plant is the largest crab processing facility in the world.

The project team has also coordinated with operators, coastal engineers, and the USACE to ensure technical input has been captured and reflected in the preliminary concept plans. Based on stakeholder input and feedback, the project team and City of Saint Paul staff updated the study concepts, clarified cost estimates, and outlined pros and cons of the various alternatives.

A summary of the planning team and industry stakeholder meetings since the Project Start began in January 2021 include:

- Harbor Planning Team/Industry Stakeholder Coordination Meeting #1 – February 2, 2021
    - As a result of this 1st Harbor Planning Team meeting, R&M created concepts that included more moorage and docking areas that will allow for larger vessels.
- Harbor Planning Team/Industry Stakeholder Coordination Meeting #2 – March 2, 2021
    - Based on input received, concepts and the site plan were updated to include breakwaters to address safety issues from storm surges and weather conditions.
- Harbor Planning Team/Industry Stakeholder Coordination Meeting #3 – April 23, 2021
    - Due to public input received, concepts were updated and added to the study.

A summary of the project team meetings since the Project Start began in January 2021 include:

- December 17, 2020 – Project Kickoff Meeting
- February 4, 2021 – Project Team coordination meeting with Saint Paul
- March 2, 2021 – Preliminary Concepts Meeting with Saint Paul
- March 2, 2021 - Follow up meeting post stakeholder/Harbor Planning Team meeting
- March 17, 2021 – Saint Paul Check in Meeting with Harvey Smith on Breakwaters
- April 8, 2021 – Project Team Meeting with Saint Paul
- May 2021 – Project Team Coordination Meeting with Saint Paul
- June 3, 2021 to June 6, 2021 - Site Visit and Harbor Conditions Assessment
- July 14, 2021 – Present Draft Feasibility Study virtually to Saint Paul City Council

FIGURE 1 – EXISTING HARBOR

2.0 PROJECT GOALS AND OBJECTIVES

The purpose of the project is to outline alternatives, options, phases and costs to renovate, replace, upgrade and expand the community's harbor to meet current and future needs.

The recently completed 2017 *Comprehensive Economic Development Strategy* plan included the following goals:

- Goal 1: Support, Protect, and Create New Fisheries Opportunities.
- Goal 2: Research, Develop St. Paul Island Facilities and Workforce into a Leading Climate Change and Coastal Resilience Research Center
- Goal 3: Tourism; Grow St. Paul Island into a Culturally and Ecologically Unique Tourism Destination.
- Goal 4: Strong Community Foundation; Strengthen Infrastructure and Services to Create a Healthy Foundation for Residents and Businesses to Thrive.

This project supports the previous economic planning effort and is focused on the harbor infrastructure.

Enhanced infrastructure in the harbor can provide:

- Better support for existing businesses / fleet
- Reduced operating (harvest) costs of U.S. commercial fishing
- Reduced damages to fishing vessels caused by storm waves within the existing harbor

- Reduced damages to fishing vessels associated with current loading/offloading
- Adequate moorage for the existing fleet
- Moorage for larger vessels
- Adequate wave climate
- A harbor of refuge for the central Bering Sea fleet

This project is intended to provide a broad planning document that includes a description of existing facility conditions, a description of the fleet, outlining improvements and phases for development, and outlining budgetary costs.

3.0 ENVIRONMENTAL CONDITIONS

3.1 CLIMATE

Saint Paul Island has a northern maritime climate. August is the warmest month with average daily high temperatures of 51.5 degrees Fahrenheit. February is the coldest month with average daily high temperatures of 28.5 degrees Fahrenheit. The highest temperature on record is August 26, 1987 at 66.0 degrees Fahrenheit. The coldest day on record is March 14, 1971 at –19 degrees Fahrenheit.

Precipitation on Saint Paul Island is minimal with an average annual rainfall of about 24 inches. There is some ground snow accumulation in the winter months with annual snowfall averaging 61.7 inches. The island area has periods of persistent and high winds throughout the year. Average year-round winds are 15 MPH. Frequent storms occur from October to April, often accompanied by gale-force winds to produce blizzard conditions.

3.1 TIDES

NOAA provided the follow tidal statistics for Saint Paul.

TABLE 1 – NOAA TIDAL STATISTICS FOR SAINT PAUL

Datum	Elevation (feet)	Notes
Max Tide	5.08	Observed 12/08/2006
HAT	4.01	Highest predicted tide
MHHW	3.24	
MTL	1.96	
MSL	1.88	
DTL	1.62	
MLW	0.92	
MLLW	0.00	
LAT	-1.58	Lowest predicted tide
Min Tide	-2.28	Observed 12/13/1985

3.3 WAVES

There have been studies of the wave climate for the design and construction of the breakwaters. The General Reevaluation Report Environmental Assessment and Finding of No Significant Impact Saint Paul Small Boat Harbor Saint Paul, Alaska February 2006 outlines the following regarding the wave climate:

> *The existing harbor in Village Cove is in direct alignment with deep-water waves approaching between the west-northwest and southwest sectors. Deep-water waves approaching from the*

south and southeast sectors are partially sheltered by Saint George Island and Otter Island and would diffract around Reef Point before impinging on the project site. Southerly and southeasterly deep-water waves therefore undergo considerable energy reduction before affecting the project site. Village Cove is in the lee of Saint Paul Island for waves approaching from northwest clockwise through southeast. Waves in the Bering Sea are extremely large, and around the shallower waters of Saint Paul Island, their heights are depth limited during numerous events each year. Maximum wave height to be expected near the entrance to the present harbor is 27 feet.

Wave heights in the present harbor are greatly modified by the breakwaters and spending beaches. Waves are expected to be attenuated to less than three feet by existing protection. Wave energy enters through both the east and west entrances with the dominant energy entering through the west entrance (the navigation channel).

The original 1982 USACE breakwater project was based on a design wave height of 16.5 feet and 9.7 seconds period for a fifty-year storm.

Waves occasionally overtop the existing breakwater. The wave climate in the entrance channel can be extreme, and the harbor is periodically closed due to weather events. The wave climate regularly forces closure of the City North Dock. The inner harbor wave climate has also resulted in broken mooring lines at the City South Dock and at Trident Dock. There is video-graphic documentation of some of these events.

3.4 SEA ICE

The General Reevaluation Report Environmental Assessment and Finding of No Significant Impact Saint Paul Small Boat Harbor Saint Paul, Alaska February 2006 outlines the following regarding sea ice:

The icepack in the northern Bering Sea occasionally moves south and surrounds the island during periods of prolonged north and northeast winds between January and May. Mariners are warned by NOAA charts against the possibility of entrapment in Village Cove. Ice conditions could possibly preclude the use of the proposed day fishery mooring facilities during the months of January through May and could require vessel removal for short periods in some years.

4.0 EXISTING FLEET

Harbor development is centered on supporting the fleet of vessels that will use the facility. Identification of this fleet is critical to matching the improvements to the demand. There are several broad categories of vessels that comprise the fleet that may call upon the harbor.

Primary (current users):

- Local fishing fleet (primarily halibut)
- Bering Sea crabbers
- Fuel barge
- Cargo barges

Secondary (harbor of refuge / opportunity if infrastructure exists):

- Bering Sea catcher-processors
- U.S. government vessels including USCG, NOAA, and U.S. Navy
- Cruise vessels

Each of these will be described in more detail below:

4.1 LOCAL FISHING FLEET

Saint Paul Island is home to 17 fishing vessels (up from 12) privately owned by local residents. Five larger, locally owned vessels entered the fishery in 2017 due to construction progress on the vessel repair and marine supply facility. All privately owned vessels in the fleet are less than 50 feet long.

PHOTO 1 – LOCAL FISHING FLEET

Local Fleet

Local Fleet

4.2 BERING SEA CRABBERS

According to the NOOA fisheries:

> *The Bering Sea/Aleutian Islands king and Tanner crab fisheries are managed by the State of Alaska, NOAA Fisheries and the North Pacific Fishery Management Council. The State of Alaska opens and closes the fisheries and sets total allowable catches or guideline harvest levels for the fisheries. NOAA Fisheries and the North Pacific Fishery Management Council retain the authority to establish the Crab Rationalization Program and Essential Fish Habitat, prevent overfishing, and rebuild overfished fisheries.*

Saint Paul is the only port that processes crab in the northern region of the Bering Sea. Approximately 70 registered vessels have identified that may participate in the Bering Sea crab fishery. These vessels range from about 80 to 166 feet long. Many of these vessels are home ported in Seattle or Kodiak.

The Central Bering Sea Fishermen's Association (CBFSA) and its subsidiary own and operate seven large fishing vessels that engage in the crab, groundfish, salmon, and halibut fisheries.

See Appendix C for a list of registered crab vessels.

PHOTO 2 – BERING SEA CRABBERS

Aleutian Lady

Adventure

The table below outlines two typical crab vessels:

TABLE 2 – BERING SEA CRABBERS

Vessel	Aleutian Lady	Adventure
LOA	165’	90’
Breadth	38’	25’
Depth	11.5’	18’
Net Tons	135	145
Gross Tonnage	189	226

4.3 FUEL BARGE

North Pacific Fuel, a subsidiary of Petro Star, provides bulk fuel to Saint Paul. They have over a one-million-gallon storage capacity on the island and work to provide for the fuel needs of both the community and the Bering Sea crab vessel fleet. North Pacific Fuel generally makes two bulk fuel deliveries to the island each year with a 180-foot-long barge. The typical fuel capacity of the barge, as configured for Saint Paul Island, is 525,000 gallons.

TABLE 3 – FUEL BARGE SCT 180

Owner	Delta Western
LOA	180’
Breadth	54’
Depth	12’ – 65’
Gross Tonnage	938
Deadweight Tons	1,938

4.4 CARGO BARGES

Two primary barges that call at Saint Paul Island include a 285-foot-long Alaska Marine Line (AML) barge that handles refrigerated containers for seafood shipments and the 243.9-foot-long Coastal Nomad and Coastal Trader freighters, owned by Coastal Transportation. In addition, Bowhead Transport provides service to the island via the 150-foot-long M/V Uŋalaq landing craft / cargo vessel.

TABLE 4 – CARGO BARGES

Owner	AML	Coastal Transportation Nomad	Bowhead Transport M/V Uŋalaq	Dunlap Towing Tug MALOLO
LOA	285’	243.9’	150’	100
Breadth	78’	40’	50’	31
Depth	18’	26.5’	5’	13
TEU Capacity	540	-		
Deadweight Tons	7,071	-		
Gross Tonnage		1,920	400	300

PHOTO 3 – CARGO VESSELS

Cargo Barge (Lynden Alaska Marine Lines)

Coastal Nomad (Coastal Transportation)

M/V Uŋalaq (Bowhead Transportation)

Tug Malolo (Dunlap Towing)

4.5 SECONDARY VESSELS

In addition to vessels that currently and routinely call on the Port of Saint Paul there are other vessels that have the potential to enter the harbor under certain circumstances. These include catcher-processor fishing vessels, government and scientific support vessels, and tour boat / cruise vessels. The below listed vessels are shown to define the upper end of this part of the potential fleet. These vessels may or may not actually call on the harbor.

PHOTO 4 – SECONDARY VESSELS

Northern Eagle

Fairweather

MS Roald Amundsen

TABLE 5 – SECONDARY VESSELS

Owner	American Seafoods	NOAA	Hurtigruten
Vessel	Northern Eagle	Fairweather	MS Roald Amundsen
LOA	341’	231’	459’
Breadth	52’	42’	77’
Depth	26’	15.5’	18’
Deadweight Tons	2,690	695	1,800
Gross Tonnage	5,308	1,591	20,889

5.0 EXISTING INNER HARBOR FACILITIES

5.1 SMALL BOAT HARBOR

In 2009 -2010 floating docks were installed in the small boat harbor, which is maintained at a depth of 12 feet MLLW. These provide moorage for the local fleet and are removed seasonally. They are generally designed for vessels 35-feet-long and under. The floating docks are horizontal steel truss framed with polyethylene floatation tubs and a steel grate deck. The main floats are modules that are 14 feet wide and 40 feet long. They are connected to each other with hinges and pins at the ends. There are also seven finger floats that are each 8 feet wide and 36 feet long. These are connected into the center of the main floats at 40-foot spacing. There is no potable water, electrical, fire suppression, or other utilities. There are approximately 15 slips for vessels 35 feet and less in length. In addition, there is about 1000 feet of side-tie moorage available.

The small boat harbor and floating docks appear to be in very good condition.

PHOTO 5 – SMALL BOAT HARBOR

Small Boat Harbor

Small Boat Harbor

5.2 WEST LANDING

The west landing consists of a concrete bulkhead with a small approach trestle and six dolphins. There are four dolphins on the west and two on the east. Three of the dolphins have tire fenders. The others have no fenders. Each dolphin consists of three steel pipe piles, one vertical and two batters. The approach trestle is 12 feet wide, steel framed, supported by adjacent dolphins, and timber decked.

This facility was previously used to moor the Arctic Star, a floating processor for Icicle Seafoods. The processor was removed in the early 2000s.

The west landing is in poor condition. There is significant rust on the steel dolphins and the concrete abutment is somewhat dilapidated. The water depths are too shallow for crab vessel moorage. The facility is not currently used.

PHOTO 6 – WEST LANDING

West Landing Bulkhead

West Landing Trestle

West Landing Dolphins

5.3 TDX/TRIDENT DOCK

The TDX/Trident Dock was constructed in 1989. It is a steel pile supported, precast concrete deck dock, approximately 294 feet long and 38 feet wide. There are fenders on the face of the dock consisting of steel piling with a timber face panel. The energy is absorbed via side loaded tires that are placed between the upper edge of the face panel and the deck of the dock. There are three pedestal cranes along the face of the dock. These are used to unload seafood product from commercial fishing vessels. There is also a fuel header at this dock that is used to service the Trident fleet as well as all vessels owned by TDX Services.

The dock is in fair condition. There is significant rust on the steel piling.

The seafood is loaded into brailers (a type of net container) and then lifted from the hold of the vessel onto the dock. From there the brailers are transported to the hoppers on the side of the building for processing. Processed seafood is loaded into refrigerated containers and then transported via commercial barge to the lower 48 states.

PHOTO 7 – TDX/TRIDENT DOCK

TDX/Trident Dock Face

TDX/Trident Dock Deck

5.4 CITY SOUTH DOCK

The City South dock is a concrete caisson/barge unit that was built by Concrete Technology in Tacoma Washington, towed/floated into position, then set on the bottom and filled with gravel. The as-built drawings are dated 1989. It has a 200-foot-long face and is 40 feet wide. The top has a 6-foot tall by 2-foot-thick parapet at the outer edge / dock face. Behind this is gravel-fill deck surface. The timber bullrails are in very poor condition and are missing on part of the dock. The fender system consists of tires that have been hung on chains down the face of the dock. There are ladders on the face that have been smashed nearly flat by vessel impact. There is a fuel header that the city maintains at this dock. There are several concrete-block deadmen chain anchors that have been added to the dock for enhanced mooring line capacity.

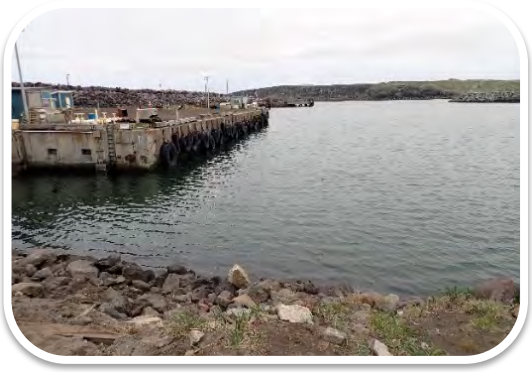
There are a pair of winches and fairleads, one at each end to aid in mooring the AML barge at the dock.

PHOTO 8 – SOUTH DOCK BARGE WINCH

South Dock Barge Winch

The fenders, ladders, and bullrails are in poor condition. The hull of the dock appears to be in fair condition.

PHOTO 9 – CITY SOUTH DOCK



City South Dock

City South Dock

5.5 FORMER FLOATING PROCESSOR MOORAGE (CITY PIER 1 AND 2)

At one point, UniSea had a floating fish processing plant at the site. It has been removed. There are two approach trestles and several deadmen anchors left. Each approach trestle is about 30 feet wide and 70 feet long. Each is steel pipe pile supported with steel framing and a heavy timber deck. Each trestle is in poor condition with heavy rust on all steel members. These are currently used for temporary moorage; however, they were not designed for this function. They are known locally as City Pier 1 and 2.

PHOTO 10 – FORMER UNISEA MOORING

Former UniSea Mooring

Former UniSea Mooring

5.6 CITY NORTH DOCK

The City North Dock is a steel H pile supported, steel framed, concrete deck dock. It is 100 feet long and about 53 feet wide. There are three dolphin structures on the north and one on the south. The dolphins are built from steel pipe piles and have tire energy absorbers. There is damage to the concrete at each corner of the dock. The north end has significant concrete damage with exposed rebar. The fender consists of rubber cylinders hung along the concrete face by chains. The dock is in poor condition.

PHOTO 11 – CITY NORTH DOCK

City North Dock

City North Dock

5.7 TRIBAL DOCK

The Tribal Dock is a steel pipe pile supported, steel framed, timber deck dock. It is 60 feet long and was constructed in 2015. It provides access and support to the vessel repair facility adjacent to the small boat basin. It is in very good condition.

PHOTO 12 – TRIBAL DOCK

Tribal Dock

TABLE 6 – CURRENT MOORAGE FACILITIES

Facility	Moorage Length	Condition	Comments
Small Boat Harbor	15 each 35’ slips 1000’ side tie	Good	Suitable for vessels generally less than 35 feet long.
West Landing	300’ (approximate)	Poor	Abandoned side tie moorage for floating processor. Too shallow for use.
TDX/Trident Dock	294’	Fair	The main dock for crab vessels. Poor wave climate in storm conditions.
City South Dock	200’	Fair to Poor	The main dock for cargo and fuel barges. Poor wave climate in storm conditions.
Former UniSea Moorage	2 each at 30’	Poor	Abandoned side tie moorage for floating processor. Used for occasional temporary moorage.
City North Dock	100’	Poor	Available in favorable weather conditions only. Often unavailable due to extremely poor wave climate near the end of the breakwater.
Tribal Dock	60’	Good	Provides support and access to the vessel repair facility.

5.7 HARBORMASTER OFFICE

The harbormaster office is located adjacent to the breakwater near the City South Dock. It is a one-story, timber-framed structure approximately 42 feet long and 19.5 feet wide. It is in poor condition. It is subject to water damage from waves and spray overtopping the breakwater. The roof has been repaired several times. Concrete blocks have been placed as a perimeter defense against waves along the back of the building.

PHOTO 13 – HARBORMASTER OFFICE

Harbormaster Office Front

Harbormaster Office Back

5.8 LOCAL HEAVY EQUIPMENT

There is significant local heavy equipment on the island. This is important when considering the cost of mobilization to the site for marine construction projects.

Cranes – There are two Manitowoc 4000 cranes and several boom sections on the island. One of the cranes appears to be in like-new condition. There is a Grove hydraulic telescoping boom crane in like-new condition on the island. There are also large backhoes, loaders, and dump trucks on the island.

PHOTO 14 – HEAVY EQUIPMENT

Heavy Equipment

Heavy Equipment

Heavy Equipment

Heavy Equipment

5.9 GENERAL OBSERVATIONS ON HARBOR INFRASTRUCTURE

Moorage Capacity – There is approximately 600 feet of moorage for large vessels in the harbor between the Trident Dock (294'), City South Dock (200'), and City North Dock (100'). During rough weather this is reduced to 500' because the City North dock will be unavailable. In rough weather (which is often) there is only room for one barge and two or possibly three crab vessels. This is inadequate for the existing fleet and provides no capacity for emergencies or new vessels. The USACE originally identified 36 crab vessels in the fleet as part of the design basis for the breakwaters. There are now some 70 crab vessels that may call upon the harbor.

Due to the limited capacity described above, there is currently no long-term berthing available to the Bering Sea crab fleet. All moorage is short term transient, and the vessels only stay there long enough for their cargo operations. The crab fleet vessels all use other harbors for off-season moorage. Providing some long-term moorage could reduce transportation and fuel costs for some vessels.

Wave Climate – The wave climate is less than ideal under a variety of conditions:

- The entrance channel requires a 90-degree turn, which results in the vessels turning sideways into steep shoaling waves and being "in the trough." Navigation into the harbor is very challenging and dangerous.
- The breakwater is routinely overtopped by waves and the harbormaster office has been damaged by these events.
- The North Dock is routinely closed due to adverse wave climate.
- The long-period waves cause large horizontal motion of moored vessels inside the harbor and have resulted in broken mooring lines.

Corrosion – There is significant corrosion on the steel elements near the waterfront. In many cases this appears to be extreme with heavy laminations of rust and significant section loss of the base metal. There is little evidence of remaining galvanizing nor any evidence of sacrificial anodes. New development should include hot-dip galvanized steel with sacrificial anodes below the waterline.

Fenders – The majority of the fender systems use rubber tires as the energy absorbing element. This is somewhat commonplace in remote Alaska commercial fishing support facilities. Rubber tires are not engineered to be used in a modern marine fender system. There are no published values for the amount of kinetic energy they can absorb nor the reaction they will produce under berthing loads. There are no published design standards for these. New development should include modern, energy-absorbing fenders with published design values. These should be sized for the design vessel under adverse mooring conditions.

PHOTO 15 - FENDERS

Dolphin with tire fenders

Modern engineered fender system

Mooring Cleats and Bollards - The harbor users and stakeholders unanimously agreed that, due to the adverse wave environment, existing bollards and cleats are insufficient for the mooring loads. Deadmen anchors with chain seem to work better due to larger capacity. Future development should include oversized bollards and/or deadmen anchors with chain designed for mooring in extreme conditions.

6.0 FEDERALLY INSTALLED AND MAINTAINED HARBOR FACIITIES

The contribution and benefit of federal involvement in the development of the breakwaters and existing harbor cannot be overestimated.

6.1 HISTORY OF FEDERAL INVOLVEMENT IN BREAKWATERS

Below is a summary (paraphrased) of three phases of development outlined in the 2006 UASCE General Reevaluation Report - Saint Paul Small Boat Harbor Saint Paul, Alaska:

> ***Phase 1: Harbor Development*** *A feasibility study and environmental impact statement to investigate navigational problems and opportunities in relation to Saint Paul Island and the eastern Bering Sea were completed in 1982. This report presented a harbor designed to accommodate vessels up to 120 feet and had a design fleet of 36 crabbing and bottomfish vessels. The project was based upon a design wave of 16.5 feet and 9.7 seconds for a fifty-year storm. Project features included a 1,800-foot breakwater, and an entrance channel and maneuvering area.*
>
> *In 1983, a Chief of Engineers Report on the project was transmitted to the Secretary of the Army for review. This report and the plan it recommended were authorized in WRDA 1986. Also authorized in WRDA 1986, was the law (Section 204(e)) that permitted non-federal sponsors to undertake navigation improvements in harbors of the United States, subject to certain limitations. In December 1986, the city of Saint Paul requested permission to construct the authorized harbor under the authority of Section 204(e).*
>
> *In 1988, the Corps completed the GDM for the harbor project, in which the project design included a main breakwater 1,050 feet long, 37 feet high; an inner breakwater 1,000 feet long, 18 feet high;*

a turning basin of 2 acres at a depth of 18 feet; a 700-foot dock; and a six-acre mooring basin. By 1990, construction of the general navigation features was completed. The Phase 1 harbor features are shown on Figure 2.

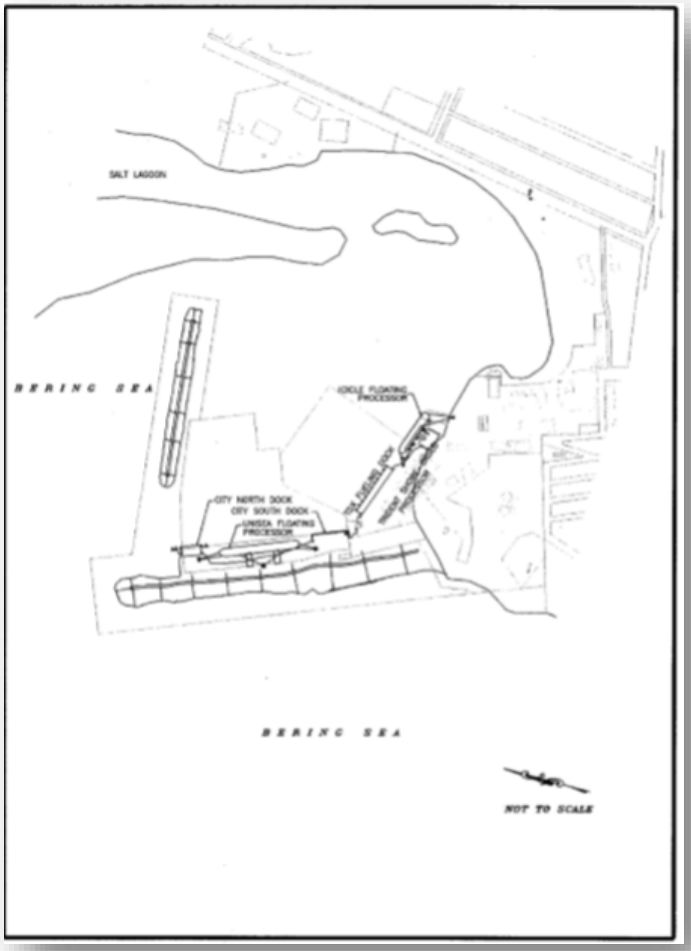


FIGURE 2 - PHASE 1 HARBOR

Phase 2: Harbor Improvements *- Following completion of harbor construction in 1990, unanticipated demand for harbor services was experienced in Saint Paul Harbor. Harbor modifications were required to accommodate the increased boat and ship traffic, including refrigerated cargo vessels larger than 300 feet in length. In addition, the constructed breakwater continued to experience problems with overtopping by storm waves causing damage to vessels and facilities.*

A feasibility study of needed harbor improvements was completed in 1996. The recommended plan increased the depth of the entrance channel to -30 feet MLLW, a maneuvering basin at -29 feet MLLW, a spending beach on the lee side of the detached breakwater, and three offshore reefs parallel to the main breakwater, each 1,300 feet long at a depth of -12 feet MLLW. As an environmental restoration measure to restore water circulation and biological productivity to Salt Lagoon, the natural entrance channel to the lagoon was realigned. The project, recommended in

the 1996 feasibility report, was authorized by Section 101 (b)(3) of the WRDA 1996 (1 10 Stat. 3667).

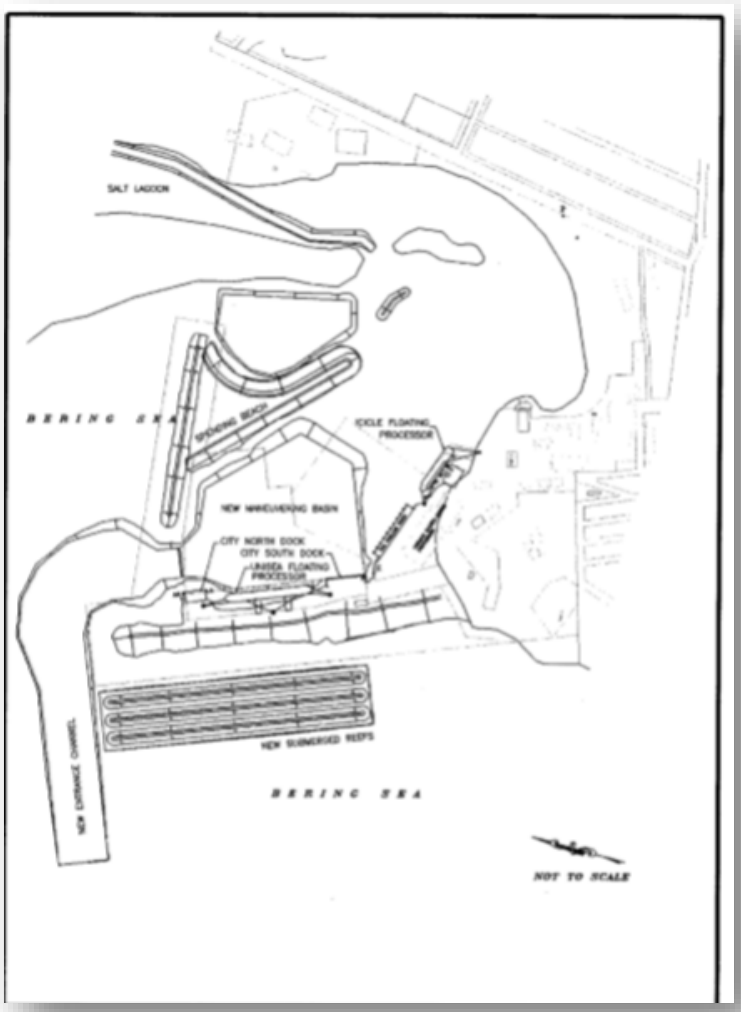


FIGURE 3 - PHASE 2 HARBOR

Phase 3: Small Boat Harbor Development *– A 1996 report presented the findings of a study of the feasibility of adding a small boat harbor to the project. The study found the project to be engineering sound, economically justified as a last added increment to the existing project, politically acceptable, and implementable.*

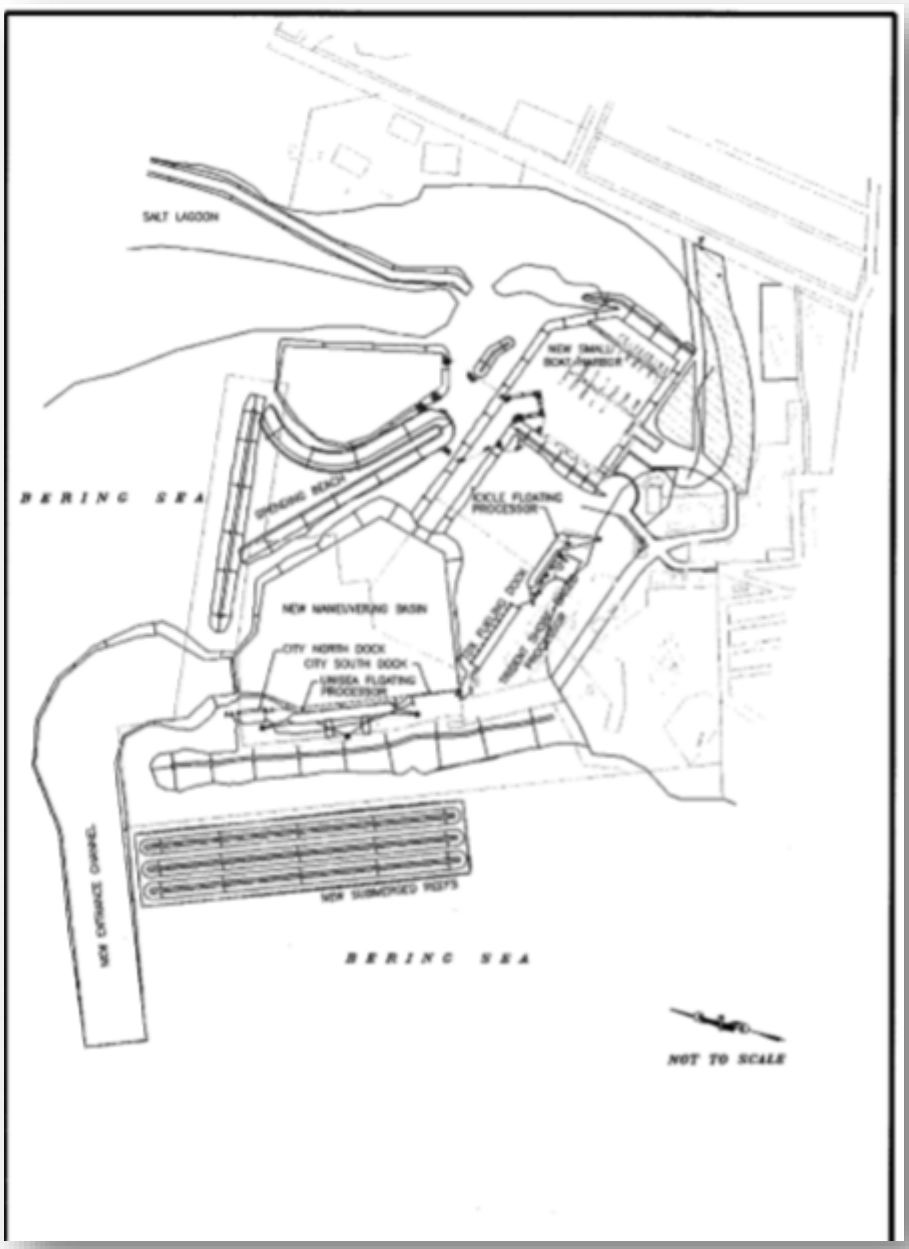


FIGURE 4 - PHASE 3 HARBOR

6.2 CORPS PROCESS

Eligible projects include general navigation features such as breakwaters, entrance channels, and turning basins. Inner harbor facilities, such as docks and uplands are not included. Projects must show a positive benefit to national economic development (NED).

Federal projects developed under the USACE typically undergo a series of phases that may include:

- **Reconnaissance or preliminary studies.** This may include benefit-cost analysis, and an initial determination if a National Economic Benefit exists.
- **Feasibility studies**, including more detailed concept development, some field work and more detailed economic analysis.
- **Environmental work**, including National Environmental Protection Act (NEPA) compliance and permitting.
- **Preconstruction Engineering and Design** (PED).
- **Construction**.

Each of the above steps can take years to complete. Each step may involve cost sharing with the local sponsor (City).

The procedures the USACE follows during the PED process are outlined in several documents, including "ER 1110-2-1150 Engineering and Design for Civil Works Projects". ER 1110-2-1150 states: "The PED Phase is the phase during which the design is finalized, the plans and specifications (P&S) are prepared, and the construction contract is prepared for advertising."

This phase may include the following activities:

- Execution of a cost sharing agreement with the local/non-federal sponsor.
- Preparation of design documentation reports that provide the technical basis for the plans and specifications.
- A technical review conference, typically held early in the PED process and may include a site visit.
- Preparation of permit applications.
- Value engineering. This will include a multi-discipline team to examine life-cycle costs, risks, and provide an MCACES cost estimate.
- Identification and mitigation of any hazardous, toxic, and radioactive waste.
- Relocations. During the PED process, decisions must be made on who will accomplish relocation designs and how relocations will be coordinated with the other elements of the project.
- Model studies. Any modeling studies or ship simulation studies required, but not previously performed during feasibility, shall be conducted during the PED phase.
- Plans and specifications, prepared to USACE formatting requirements.
- Independent government cost estimates. This estimate serves as the document for evaluating contractor bids as a fair and reasonable cost to the government.
- Engineering considerations and instructions for field personnel.
- Independent technical review.

The above is a partial list of some of the main steps that the USACE may undertake in the development of the design. Much of this process is driven by required procedures internal to the federal government. Certain steps may be available for non-federal sponsor participation under the cost sharing agreement.

7.0 DEVELOPMENT OPTIONS, ALTERNATIVES AND PHASES:

Three broad phases were identified for planning and development:

- Phase 1: Upgrade and expand existing inner harbor facilities for larger vessel moorage.
- Phase 2: Expand the breakwater and revise the entrance channel.

- Phase 3: Relocate the exit to the Salt Lagoon, expand the uplands, and expand the inner harbor.

Each of these will be discussed in further detail below.

7.1 PHASE 1: UPGRADE AND EXPAND EXISTING INNER HARBOR FACILITIES

Phase 1 includes incremental renovation, replacement, and expansion of the existing large vessel moorage docks. The inner harbor facilities are non-federally owned and operated. They include a mix of properties that are city, privately, or tribally owned. Over $90 million in improvements have been identified for the inner harbor facilities.

Incremental project elements include:

7.1.1 *Renovations to the City South Dock.*

This facility has substandard fenders and inadequate moorage cleats. The timber bullrails are in poor condition or are missing. There is damage to the concrete at the face of the dock. A renovation project should include:

- New modern fender system
- New mooring bollards at each corner
- New bullrails
- Repairs to the concrete at the face of the dock

PHOTO 16 – MODERN FENDERS

Dock face with modern fenders

7.1.2 A New Harbormaster's Office

The existing harbormaster's office is located adjacent to the breakwater and subjected to wave damage due to overtopping in large storms. It is also in poor shape. A concept design for a new, two-story harbormaster's office was provided by KPB Architects as part of this project. The concept design has garage-type, industrial space on the ground floor and office space on the second floor. The new harbormaster's office should be relocated from the current site. Ideally, it would be situated in a location not subjected to wave overtopping and away from industrial cargo operations. Options for the location include:

- Behind the fuel header on the City South Dock.
- In a new fill section between the City South Dock and the Trident Dock.
- In the uplands near the small boat harbor. (This option has a number of benefits but requires coordination with TDX over land use).

FIGURE 5 - CONCEPT OF NEW HARBORMASTER OFFICE

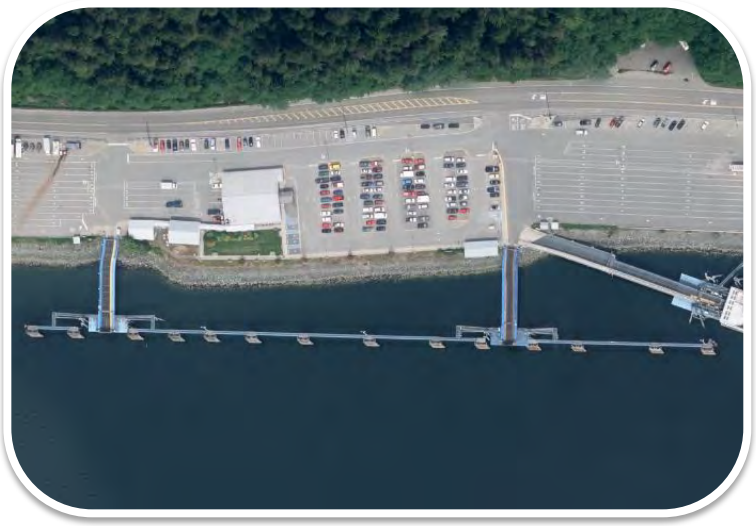
7.1.3 The addition of side-tie breasting dolphin moorage with catwalk access

One of the most efficient and cost-effective ways to provide additional moorage is through breasting dolphins. This system has limited shore access for cargo transfer. Dolphins are groups of piling with a modern, energy-absorbing fender system. Dolphins may be joined together with catwalks for access for mooring line handling. There are several options for breasting dolphins, each with differing capacities and levels of service:

- Three-pile dolphin with modern, energy-absorbing fenders. These are a cost-effective way to provide a modern fender system. It includes a central vertical pile with two-batter piling. The energy unit and face plate is affixed to the central vertical pile.

- Four- or Five-pile dolphin with modern, energy-absorbing fenders. These have a higher capacity and may be appropriate for larger mooring and berthing loads.

PHOTO 17 - AUKE BAY FERRY TERMINAL



Auke Bay ferry terminal with dolphins and catwalks

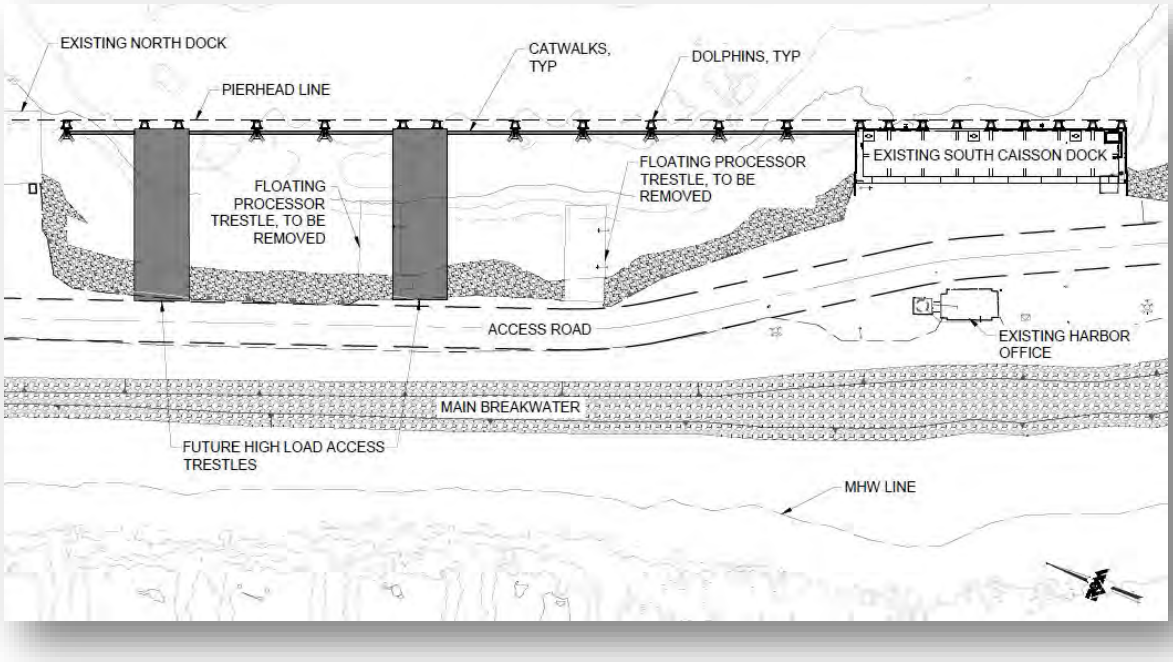


FIGURE 6 – PHASE 1: A DOLPHIN MOORAGE

7.1.4 ***The addition of access trestles or piers.***

These are similar in concept to the existing abandoned UniSea trestles. Most of the vessels may be berthed against dolphins, and the approach trestle can provide high load capacity access to the center of the vessel for cargo and personnel transfer. This system can provide reasonable levels of service and access at an efficient cost.

7.1.5 The addition of several new steel pipe pile-supported concrete deck platform docks.

The highest level of service is to provide a pile-supported platform dock (like the existing Trident Dock.) This can provide both moorage and ship side access for cargo and personnel transfer operations. It is also the costliest option.

For this project, the use of precast concrete for the deck and pile caps is recommended. Concrete can be highly durable and corrosion resistant in the marine environment. Modular precast can be set up for efficient field assembly, saving time and labor costs. Hot-dip galvanized steel piling with sacrificial anodes can support the dock. Modern, energy-absorbing fenders can be installed on the face of the dock.

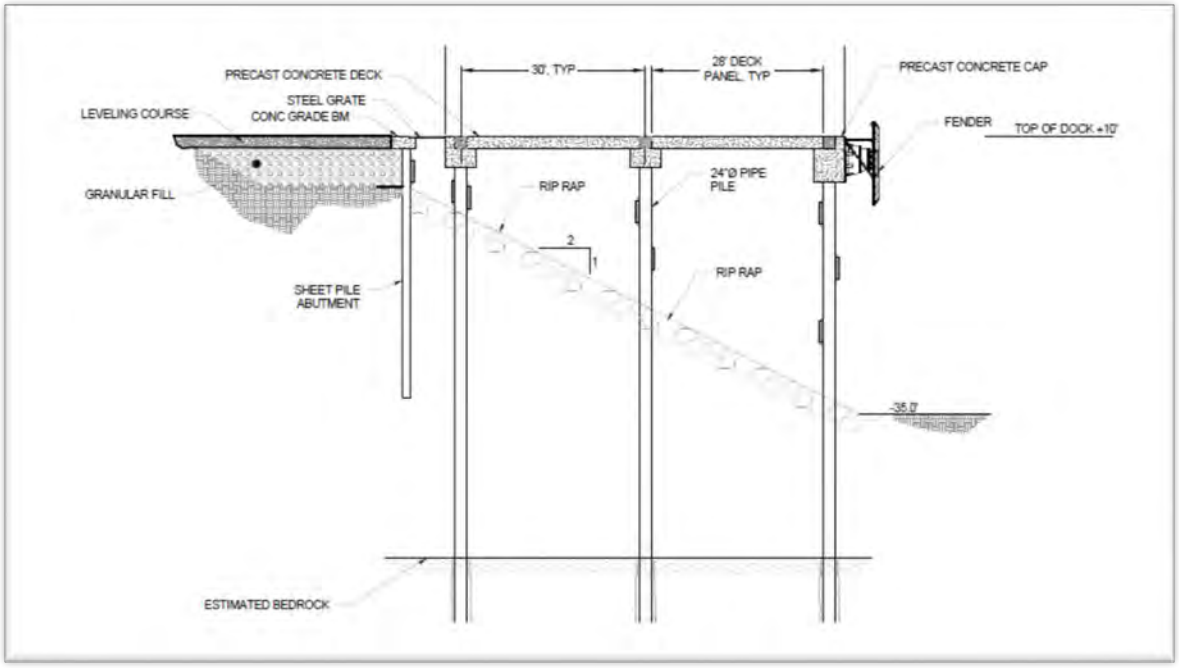


FIGURE 7 - TYPICAL DOCK SECTION

There are options for the size and type of elements with differing capacities and levels of service. For example, a section of the dock could be designed for general industrial cargo operations with a capacity in the 400 to 600 pounds-per-square-foot range. Another section of the dock could be designed for larger load capacities, such as those from a Manitowoc crane. This area might have a capacity of over 1,000 pounds per square foot and be supported by larger diameter piling and thicker deck panels.

7.1.6 The addition of shore power to several berths

One concept is to provide dolphin moorage with limited, three-phase shore power. This could be used for longer-term berthing of crab vessels. Most, if not all, of the crab boats are fitted for three-phase power.

Their onshore power receptacles are probably 100 or 200 ampere pin & sleeve type. The shore power pedestals can be fabricated for their typical plugs, but the circuit breakers may be rated to allow much less power as long-term moorage does not require the use of all on-board equipment.

Shore power would require the following major tasks / components:

- Provide two pad-mount transformers at the dock's utility site, with one providing 480Y/277 volt and the other providing 208Y/120 volt three-phase power.
- Provide switchboards with utility metering and feeder circuit breakers adjacent to the utility transformers. The switchboard enclosures should be fabricated with stainless steel material. Provide utility meters with each feeder. The switchboards should be mounted to a concrete pad with the openings on the leeward side of the wind.
- Provide two, 208Y/120-volt, three-phase, 60-ampere (maximum) feeders to individual pedestals for vessel shore power. The pedestals should be fabricated with painted stainless-steel enclosures with a pin & sleeve receptacle for three-phase power, a 50-ampere, 208-volt single-phase receptacle, and a 30-ampere, 120-volt receptacle. Each receptacle should be protected with a circuit breaker with ground fault protective relaying.
- If floating processors or vessels with 480-volt power requirements are envisioned, provide single 480Y/277-volt feeders. Terminate the feeders to pedestals with a single circuit breaker with ground fault protective relaying. With the pedestal, include terminal blocks to allow future cable connections to vessels.

Benefits to the above improvements include:

- Additional moorage for the large vessel fleet
- Limited, long-term moorage with shore power
- Modern, energy-absorbing fenders
- A modern, safe, and more functional harbormaster office

7.1.7 Phase 1 Rough order of magnitude cost estimates

Rough order of magnitude cost estimates is outlined in the appendix and summarized in the table below. The following points should be noted:

- Mobilization and demobilization can be significant and can vary widely for a remote site such as Saint Paul Island. Also, these costs may be more depending on the number of separate projects advanced. It is generally more efficient to advance a large project as opposed to a series of small projects.
- 3 pile dolphins with modern fenders are estimated to cost about $650,000 each not including engineering or mobilization.
- Pile supported platform docks and trestles are estimated to cost about $750 per square foot not including engineering or mobilization. High load capacity docks are estimated to cost about $1,000 per square foot.
- Buildings are estimated to cost between $700 and $1,000 per square foot not including engineering mobilization or utility extensions.

- Design engineering is estimated at 10% of construction cost. This does not include permitting or field investigations.
- Construction administration is estimated at 6% of construction cost.
- A 25% contingency is recommended at this level of estimating.

Note that these estimates are very preliminary and should be used for initial planning purposes only.

TABLE 7 – PHASE 1 ROUGH ORDER OF MAGNITUDE COST ESTIMATES

Facility Item	Unit Cost	Number	Cost
Mobilization and Demobilization	$4,000,000	1	$5,970,000
Demolition of Miscellaneous Structure	$500,000	1	$500,000
Refurbish South Dock	$1,000,000	1	$1,000,000
Dolphins	$650,000	23	$14,892,500
Platform Dock and Access Trestle	$3,575,000	3	$10,725,000
Harbormaster Office	$1,500,000	1	$1,523,652
Trident to South Dock Connection	$750	9,000	$6,750,000
Platform Dock at Vessel Repair Facility	$750	27,000	$20,250,000
Electrical and Lighting	$2,500,000	1	$2,500,000
		Sub Total Construction	$64,110,952
		Engineering and Admin	$10,800,000
		Sub Total Project	$74,910,952
		25% Contingency	$18,727,738
		Total	**$93,638,690**

7.2 PHASE 2: EXPAND THE BREAKWATER AND REVISE THE ENTRANCE CHANNEL

Phase 2 is centered on improving the wave climate in the harbor and providing additional moorage. This would include a USACE-led, rubble mound breakwater expansion project. Two options have been advanced for consideration.

Option A concept incudes a new entrance channel approximately 500 feet wide with parallel breakwater jetties that define the channel from the harbor into deep water and a rubble mound extension to the north. The entrance channel breakwater jetties provide both enhanced wave protection and control of the longshore sediment transfer along the existing breakwater (that currently results in ongoing maintenance dredging). Maintaining deep water into the inner harbor will reduce shoaling of the waves. Some incident wave energy will be reduced by the side slopes of the jetties. The breakwater to the north provides both enhanced wave protection to the inner harbor and a new moorage basin with space for large vessels 500 feet or more in length. This is a harbor of refuge for the central Bering Sea.

A preliminary wave diffraction analysis was done as part of this project. This shows a large benefit to the inner harbor wave climate.

FIGURE 8 – OPTION A BREAKWATERS

Additional study should be done on the entrance channel navigation.

Benefits include:

- A safer entrance channel with improved navigation to the inner harbor
- Much better inner harbor wave climate
- The addition of 16.7 acres for moorage
- Reduction in maintenance dredging
- A harbor of refuge for large vessels

The Phase 2 Option A breakwaters are estimated to cost between $170 and $200 million, not including planning and engineering.

Option B concept is centered on breakwaters further offshore to provide a harbor of refuge for larger vessels.

FIGURE 9 – OPTION B BREAKWATERS

The Phase 2 Option B breakwaters are estimated to cost approximately $500 million, not including planning and engineering.

Rough order of magnitude estimates for the breakwaters are based on the following unit costs:

- Primary armor rock $300 per cubic yard 37% porosity
- Filter stone $200 per cubic yard 37% porosity
- Toe berm $200 per cubic yard 37% porosity
- Core rock $150 per cubic yard 35% porosity
- Dredging $10 per cubic yard

Note that breakwater rock prices can vary widely. Larger sized primary armor rock can be very expensive and premanufactured concrete armor units may be more cost efficient. Note that these estimates are very preliminary and should be used for initial planning purposes only.

7.3 PHASE 3: RELOCATE THE EXIT TO THE SALT LAGOON, EXPAND THE UPLANDS, AND EXPAND THE INNER HARBOR

Phase 3 is centered on relocating the exit to the salt lagoon and creating new uplands and additional moorage. The exit to the salt lagoon would be moved to the north. The dredged material would be used to fill in the lowlands where the current channel now lies. 17.2 acres of new uplands and an additional 16.4 acres of inner harbor moorage would be provided.

Phase 2 and 3 benefits include:

- The creation of usable uplands with the addition moorage
- The creation of side tie moorage
- The creation of small boat moorage in the salt lagoon
- The addition of a small boat launch ramp

7.4 GENERAL DESIGN FEATURES AND CONSIDERATIONS

The following discussion outlines certain design features for consideration.

Minimal use of bulkhead docks due to wave climate. Due to the adverse wave climate, bulkhead type docks are not preferred. The vertical walls of a bulkhead dock will reflect wave energy. Conversely an armor rock slope associated with a platform dock or dolphin moorage will absorb energy and help to attenuate the waves.

Provide engineered fender systems. Tire fender systems are not specifically engineered for mooring and berthing use. An engineered rubber element is more efficient and predictable. A modern fender system with energy unit and face panel will provide superior mooring and berthing for the fleet.

Establish a pierhead line. Establishing a pierhead line parallel to the face of the City South Dock and another one parallel to the face of the Trident Dock will be beneficial. This can provide a continuous and contiguous berthing face, which could accommodate a wide range of vessels.

Keep uplands clean for cargo movement. It is beneficial to keep buildings and structures to a minimum around the dock face and away from the immediate adjacent uplands. It may be desirable to move the harbormaster's office to a location away from the South Dock.

Provide hot-dip galvanized steel with sacrificial anodes. It would be beneficial to use hot-dip galvanized steel with sacrificial aluminum alloy anodes in new construction. The combination of these can provide a longer service life.

8.0 FINANCIAL FEASIBILITY ASSESSMENT

This section presents an overview of the harbor's financial situation and presents annualized cost estimates from a life cycle cost analysis of a new platform dock and dolphins.

8.1 FINANCIAL OVERVIEW

Historically, the City of Saint Paul has covered the cost of the harbor through its general fund. The city created its Harbor Fund in conjunction with a NOAA Coastal Energy Impact Program loan it took out in the 1980s for the harbor and bulk fuel improvements. The loan currently has a balance of approximately $9 million. There has been a moratorium on repayment of the loan because of the crab crash in 1999–2000,

and the city is in the process of having the loan forgiven by Congress. Once the loan is forgiven, the city plans to move the harbor's financial activity to the general fund and cover the cost of staffing the harbormaster position in its public safety fund. Unless there is an increase in the level of use of the harbor, the city plans to continue supporting the harbor with general funds.

The harbor's financial position has fluctuated over time, usually in response to specific events affecting use and expenses. Harbor revenues were significantly higher in 2016, for example, due to a harbor dredging project that generated dockage and wharfage revenue from the construction barge and delivery of rock. Payment of debt in 2017 resulted in a large repair and maintenance expense. The five years of the harbor fund's revenues and expenses for 2015–2019 are shown in Table 7. The audited financial statements for 2020 have not been published, but revenues totaled $105,883 and total expenses were $220,644, resulting in a net deficit of $114,761 (City of St. Paul 2021).

TABLE 8 – HARBOR ENTERPRISE FUND STATEMENT OF REVENUES, EXPENSES, AND CHANGES IN NET POSITION

	Calendar Year				
	2015	**2016**	**2017**	**2018**	**2019**
Thousands of Dollars					
Operating Revenues					
Harbor charges	103.3	375.3	55.4	44.2	90.2
Operating Expenses					
Salaries and wages	57.3	62.8	54.8	85.2	53.9
Employee benefits	20.6	18.2	14.6	43	25.3
Material and supplies	2.2	2.2	3.0	4.0	10.1
Fuel and utilities	27.9	21.6	26.3	10.4	13.7
Depreciation	98.2	98.2	98.2	64.7	64.7
Insurance	8.6	9.3	10.5	9.1	11.6
Repair and maintenance	0.0	4.3	1,777.7	0.0	2.3
Legal and consulting	0.0	13	0.1	0.0	0.6
Administrative cost allocation	18.7	19	13.2	17.3	24.2
Other general and administrative costs	0.0	0.0	0.0	0.0	5.0
Other services and charges	0.2	0.0	0.0	0.0	0.0
Total Operating Expenses	233.6	248.6	1,998.5	233.7	211.5
Operating Income (Loss)	-130.4	126.8	-1,943.1	-189.6	-121.4
Nonoperating Revenues (Expenses)					
Investment income (loss)	0.0	0.0	0.0	0.0	0.0
Loss on disposal of capital assets	-430.3	0.0	0.0	0.0	0.0
Loss on write off of construction in progress	0.0	0.0	0.0	0.0	0.0
State PERS relief	2.7	0.0	0.0	0.7	1.7
Harbor grant	0.0	0.0	0.0	0.0	0.0
Harbor project	0.0	0.0	0.0	0.0	0.0
Net Nonoperating Revenues (Expenses)	-427.6	0	0.0	0.7	1.7
Gain (loss) before transfers	-557.9	126.8	-1,943.1	-188.8	-119.7
Transfers in (out)	-22.3	0.0	0.0	0.0	0.0
Change in Net Position	-580.2	126.8	-1,943.1	-188.8	-119.7
Net Position (Deficit), beginning	*-328.4*	-908.6	-781.8	*-2,725.0*	-2,913.9
Net Position (Deficit), ending	-908.6	-781.8	-2,724.9	-2,913.9	-3,033.5

Notes: Net Position was restated in 2018 to recognize the City's proportional share of Net Other Postemployment Benefits from its participation in the State of Alaska's Public Employee Retirement System, based on GASB Statement No. 75.

Source: City of St. Paul (2020a).

Harbor rates are set annually in a master rate schedule published by the City Manager. The current rates for the harbor are shown in Figure 10.

CATEGORY/ITEM	RATE	NOTES
Dockage (Commercial)		
Minimum - Up to 3 hours	$ 119.79	Any time over 3 hours will be billed per period
48'- 100'	$ 219.62	12 - hour period
101'-125'	$ 272.86	12 - hour period
126'-150'	$ 319.44	12 - hour period
151'-175	$ 419.27	12 - hour period
176'-200'	$ 472.51	12 - hour period
201'-225'	$ 496.10	12 - hour period
226' +	$ 605.61	12 - hour period
Dockage (Pleasure Craft)		
All pleasure vessels	$ 83.19	24 - hour period
Touch & Go		
All vessel classes	$ -	If at dock less than 15 minutes
Wharfage		
Per 2,000 lbs, minimum cargo $165.00	$ 5.32	
Per empty containers, flat, skid	$ 13.31	
Crab Pots		
Loading or offloading across City docks	$ 2.66	Per pot
Repairing/working pots on City docks	$ 9.08	Per pot
Storage on the Dock		
Authorized use only	$ 1.14	Per square foot per day
Unauthorized use only	$ 2.73	Per square foot per day
Notes		
Equipment going over the City Docks will be charged wharfage. Exceptions only when used for rock dredging and loading.		
1-Acre Upland Storage		
Authorized use only	$ 0.19	Per square foot per day

Source: City of St. Paul (2020b).

FIGURE 10 – HARBOR RATES FROM CITY OF SAINT PAUL MASTER SCHEDULE

8.2 LIFE CYCLE COST ANALYSIS FINDINGS

The life cycle cost of a facility combines its construction cost with its operations, maintenance, and replacement costs over its useful life. This forward-looking approach uses the time value of money concept to "discount" future life cycle costs over a set period to a single net present value in present year dollars. That cost is then annualized to arrive at the portion of the facility's life cycle cost that needs to be covered by revenues each year.

Typically, the discount rate used for a life cycle cost analysis is based on either an identified cost of capital for the operating entity or guidance from the Office of Management and Budget (OMB). OMB has set a negative value for its real discount rates, including for 30-year projects. This analysis instead assumes that the discount rate will be 0%, meaning that future costs are not discounted.

The study team prepared a cost estimate for a platform dock and dolphins. The total capital cost—including mobilization/demobilization, demolition, construction, and engineering and administration—is estimated at $94.97 million. In addition to the capital cost, major maintenance and repair costs are expected on a regular basis, with approximately 1.5% of the original capital cost every five years and an

additional 3.7% (total of 5.2%) every fifteenth year. The net present value of those major maintenance and repair costs is $14.08 million. On an annualized basis, with regular operating expenses (2009 through 2019 average for the harbor fund, excluding 2017) included, the annual cost of the platform dock and dolphins is $2.88 million (Table 8). If only operating expenses and major maintenance and repairs are included, the annual cost would be $505,000.

TABLE 9 – ANNUALIZED COST OF PLATFORM DOCK AND DOLPHINS

	Net Present Value	Annualized Cost
Capital Costs	$94,970,000	$2,374,250
Major Maintenance and Repairs	$14,082,152	$352,054
Regular Operating Expenses		$153,097
Total Cost: Platform Dock and Dolphins		**$2,879,401**

Table 9 presents the incremental cost of adding platform dock, per 100 feet of 65-foot-deep dock. Capital and O&M costs are expected to add $141,000 of annual costs for each 100-foot length. If only major operations and maintenance are covered, the annual cost will be $18,000.

TABLE 10 – ANNUALIZED INCREMENTAL COST OF 100' X 65' PLATFORM DOCK

	Net Present Value	Annualized Cost
Capital Costs	$4,898,000	$122,450
Major Maintenance and Repairs	$726,275	$18,157
Total Cost: 100' x 65' Platform Dock		**$140,607**

8.3 FINANCIAL PROJECTIONS AND CONSIDERATIONS

Assuming the only major maintenance and repairs are covered by general funds, construction of the platform dock and dolphins will increase the cost to the city by an annualized $352,000. The actual expenses are estimated to be $1.4 million every five years plus an additional $3.5 million ($4.9 million total) every 15 years, assuming the city makes repairs on that schedule. To the extent that the city can receive grants or other support for this work, it could reduce this additional burden.

Increased activity in the harbor would affect this projection. However, at this time, no major changes are anticipated in the level of harbor usage. A summary of industry projections related to harbor use are as follows:

- **Commercial Fishing:** The commercial fishing industry has been one of the major drivers of Saint Paul's economy. There had been two additional floating processors in the community, though they left after the crab fishery crashed in 1999–2000. Saint Paul is the only port that processes crab in the northern region of the Bering Sea, which benefits the community (Zavadil 2021); however, the fishing industry offers limited growth potential because most species of value are already being harvested. Expensive quota purchases, policy limitations, and equipment upgrades are prohibiting factors in participation in fisheries for other species (Agnew::Beck and Northern Economics 2017). The pollock fishery approaches $1 billion some years, but it is all processed at sea. Processing finfish in Saint Paul would require a prohibitively expensive upgrade to

wastewater treatment and, due to regulations and costs, processors are less likely to invest in shore-based facilities for other species in the community (Zavadil 2021).

- **Tourism:** The Pribilof Islands are world-class birding destinations, in addition to Saint Paul offering opportunities to view other marine mammals, local historical and cultural attractions, and other activities. Accommodations are limited in the community, and the Trident facility offers the only meal service available. Air travel to Saint Paul Island is limited and weather dependent. Small cruise ships have come to the community on occasion in the past, though the harbor is not large enough to host large cruises; passengers must use skiffs to come to shore. Despite limitations, Saint Paul may have opportunities to boost its tourism, which would result in some limited increase in use of its harbor facilities. Vessels large enough to provide viewing stability for birders would be needed to increase harbor use for that purpose (Agnew::Beck and Northern Economics 2017, 2020).
- **Mining:** Saint Paul Island has sand, gravel, and scoria resources (Agnew::Beck and Northern Economics 2017). The Aleut Community of Saint Paul Island conducted a feasibility study for use of the scoria resource for local production of concrete that found that some production would be feasible but risky, especially given the low margins associated with manufacturing concrete products (Northern Economics 2018). Though no further action has been taken, if development of scoria concrete manufacturing were to take place, it could affect harbor usage by changing the nature of inbound and potential outbound raw materials.
- **Vessel Service:** The recently completed vessel repair facility could increase usage of the harbor by vessels that would otherwise have had to travel to another community to do maintenance (Aleut Community of Saint Paul Island 2021).

Overall, some potential exists for increased harbor usage, but it is uncertain at this time and may require improvements identified in Phases 2 and 3 in this report to accommodate the larger vessels needed to meet industry demand.

8.4 OTHER CONSIDERATIONS

The City will seek grants and other supportive funding for the new platform dock and dolphins. No major change in harbor usage is expected as part of these initial improvements and the city will likely continue to fund harbor operations through its general fund.

No changes to management of the facilities are anticipated because of these improvements. As noted above, the long-term plan is for the harbor facilities to be managed by City of Saint Paul staff, with the harbormaster position located within the Public Safety Fund.

9.0 RECOMMENDATIONS

The following outlines general recommendations:

Document the existing wave climate. It is recommended that the city establish a library of documentation of the adverse wave climate. This is important in establishing the need for improvements and in garnering funding. There are several online YouTube videos that show vessels entering the harbor in adverse conditions. These are highly compelling. In addition to the entrance channel videos of the North Dock and inner harbor, including moored vessels would be helpful. Having scalable objects in the image helps to provide realistic, science-based measurement of the wave heights and periods. Also, recording the day

and time of the event can provide a means to correlate conditions to the specific weather systems and tides of that day.

Initiate a phased approach to inner harbor development and renovations. Many inner harbor improvements have been identified. The practical reality is that incremental, phased improvements will be advanced based on available funding. Project elements can be combined based on funding into manageable projects. For example, a prioritized list may include the following:

- Upgrade and renovate city South dock.
- Replace the harbormaster office.
- Provide several hundred feet of dolphin moorage.
- Provide shore power.

Initiate a USACE process for phases 2 and 3. The USACE process must be initiated by "the local sponsor," in this case the City. It will typically start with a problem statement and be followed by a study with a cost sharing agreement. As mentioned previously, the problem statement is centered on the adverse wave climate and ability to service the fleet.

APPENDIX A

Design and Development Drawings

Saint Paul Harbor

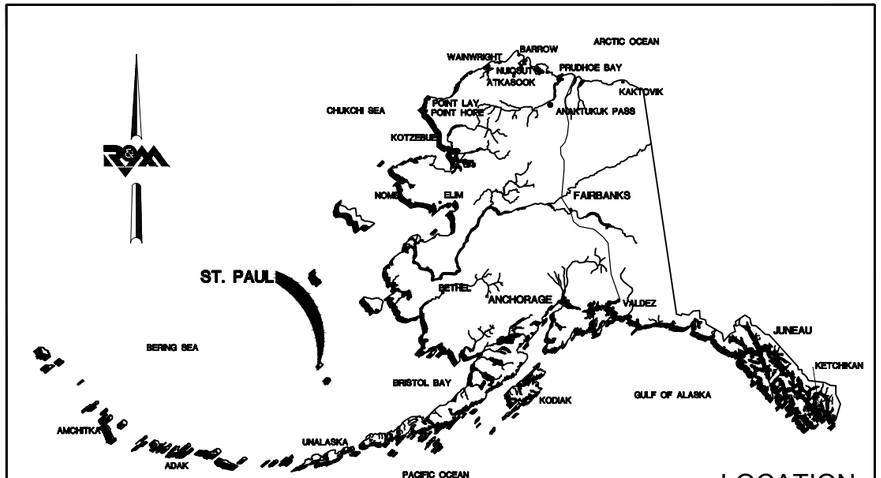
Planning Drawings
Saint Paul, Alaska
JULY 2021

DESIGNED BY:

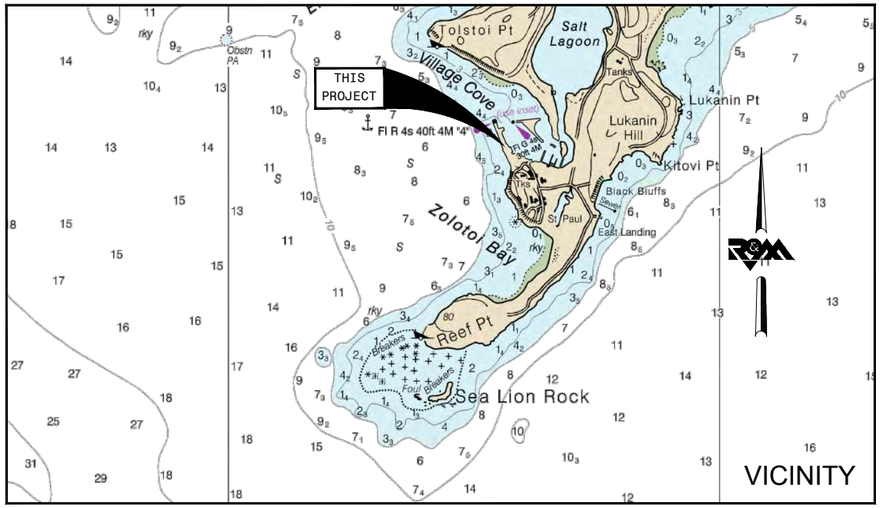
R&M CONSULTANTS, INC.

9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com• email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403

CORPORATE AUTHORIZATION NUMBER AECC111



LOCATION

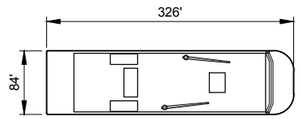


VICINITY

INDEX OF DRAWINGS

SHT	TITLE
G1	COVER
G2	DESIGN VESSELS
G3	EXISTING SITE PLAN
G4	BREAKWATER CONCEPT A
G5	BREAKWATER CONCEPT B
G6	BREAKWATER CONCEPT B
G7	PHASED SITE PLAN
G8	PROPOSED SITE PLAN
S1	PILE DOCK PLAN AND ELEVATION
S2	DOLPHIN DETAILS

INDEX



FUEL BARGE
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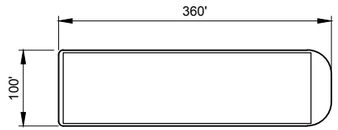
2.) DISPLACEMENT: 15,000 SHORT TON



CARGO BARGE
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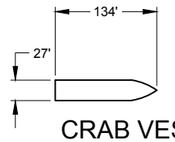
2.) DISPLACEMENT: 23,000 SHORT TON



CRAB VESSEL - ARCTIC SEA
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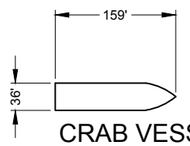


CRAB VESSEL - NORTHERN PATRIOT
1.) MAXIMUM DRAFT: 48'

1 DESIGN VESSELS

Scale: 1:100

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403

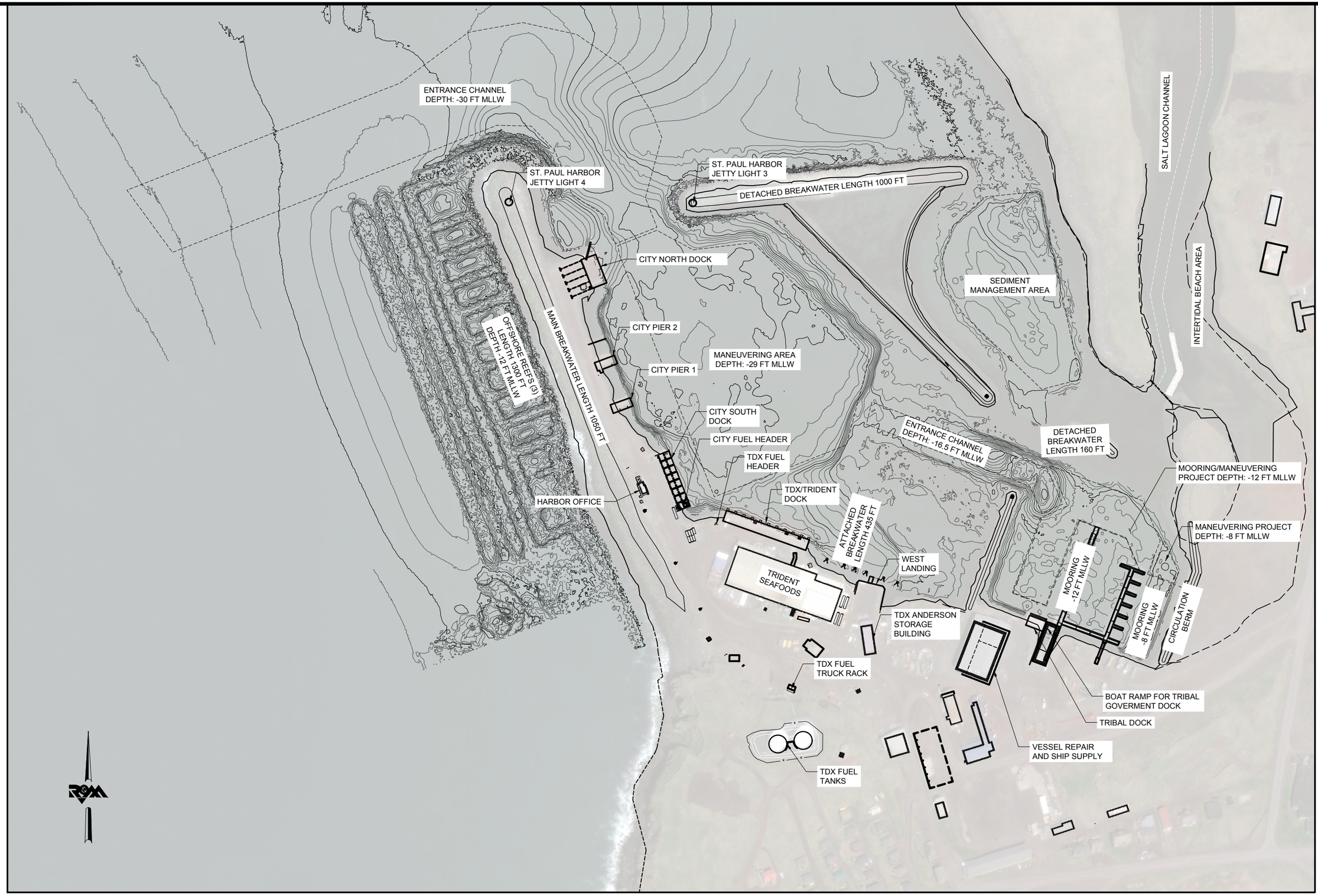
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC
Checked By: JD
Date: JUNE 2021
Phase: CONCEPT PLANS
Project No: 2875.01
SHEET TITLE: DESIGN VESSELS
SHEET NO: **G2**



1 **EXISTING SITE PLAN**
Scale: 1" = 150'

0 150 300
SCALE IN FT

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC
Checked By: JD
Date: JULY 2021
Phase: CONCEPT PLANS
Project No: 2875.01
SHEET TITLE: EXISTING SITE PLAN

SHEET NO: **G3**

1 **BREAKWATER CONCEPT A**
Scale: NTS

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD

Date: JULY 2021

Phase: CONCEPT PLANS

Project No: 2875.01

SHEET TITLE: BREAKWATER CONCEPT A

SHEET NO: **G4**

1 **BREAKWATER CONCEPT B**

Scale: NTS

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD

Date: JULY 2021

Phase: CONCEPT PLANS

Project No: 2875.01

SHEET TITLE: BREAKWATER CONCEPT B

SHEET NO: **G5**

1 **BREAKWATER CONCEPT B**

Scale: NTS

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com• email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD

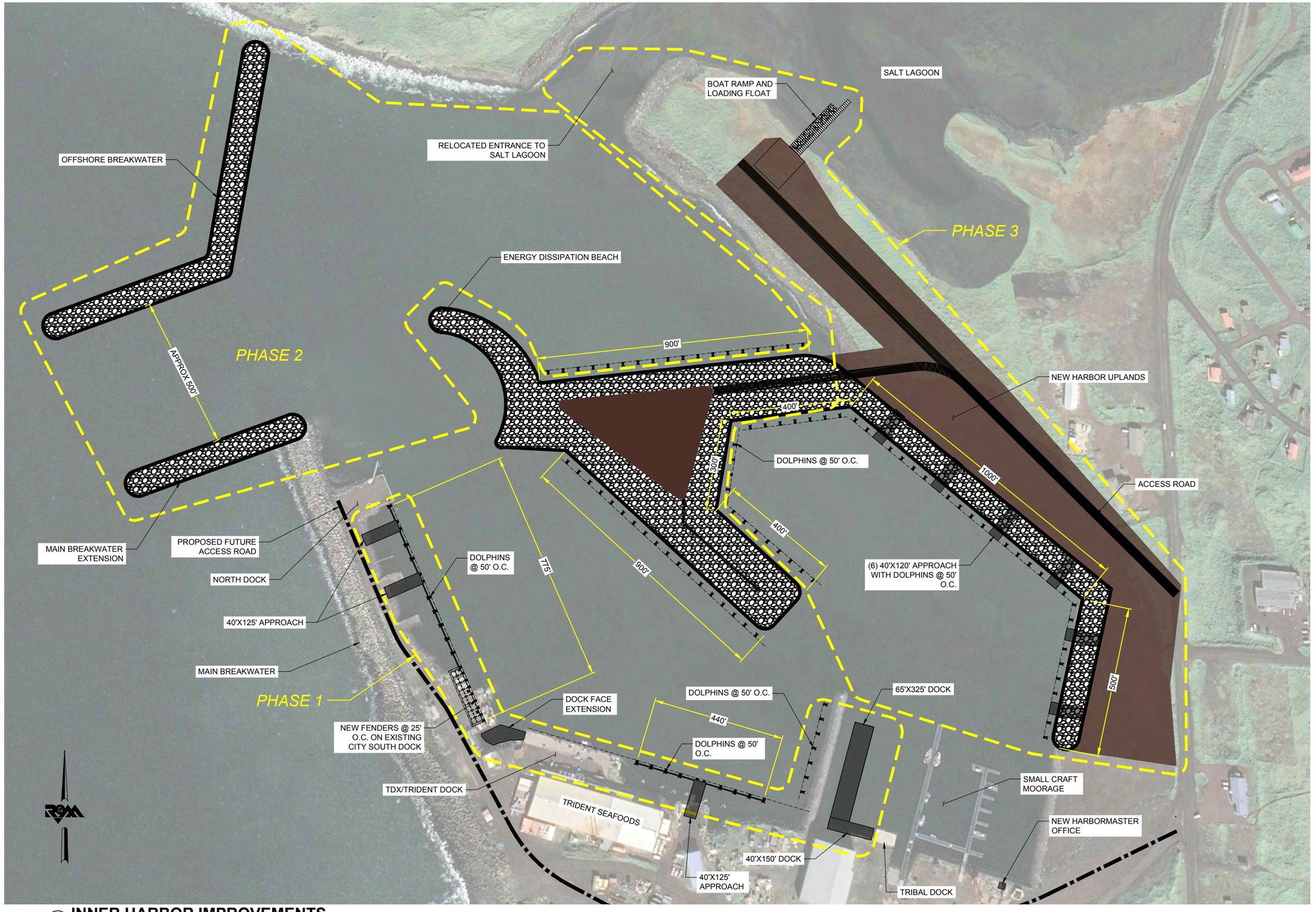
Date: JULY 2021

Phase: CONCEPT PLANS

Project No: 2875.01

SHEET TITLE: BREAKWATER CONCEPT B

SHEET NO: **G6**



1 **INNER HARBOR IMPROVEMENTS**
Scale: NTS

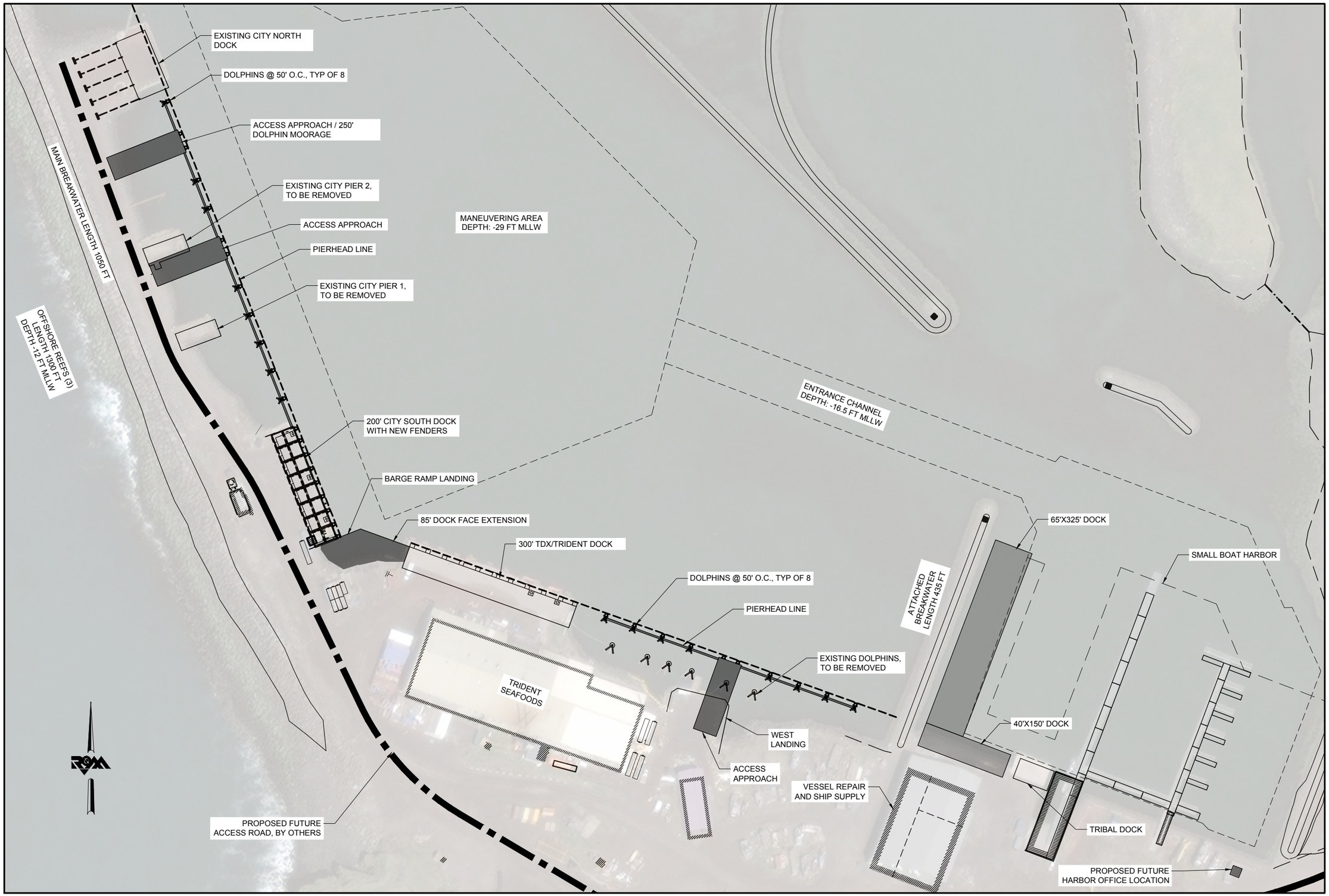
R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403
CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD
Date: JULY 2021
Phase: CONCEPT PLANS
Project No: 2875.01
SHEET TITLE: PHASED SITE PLAN
SHEET NO: **G7**



1 **PROPOSED SITE PLAN**
Scale: 1" = 150'

0 75 150
SCALE IN FT

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403

CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC
Checked By: JD
Date: JULY 2021
Phase: CONCEPT PLANS
Project No: 2875.01
SHEET TITLE: PROPOSED SITE PLAN

SHEET NO: **G8**

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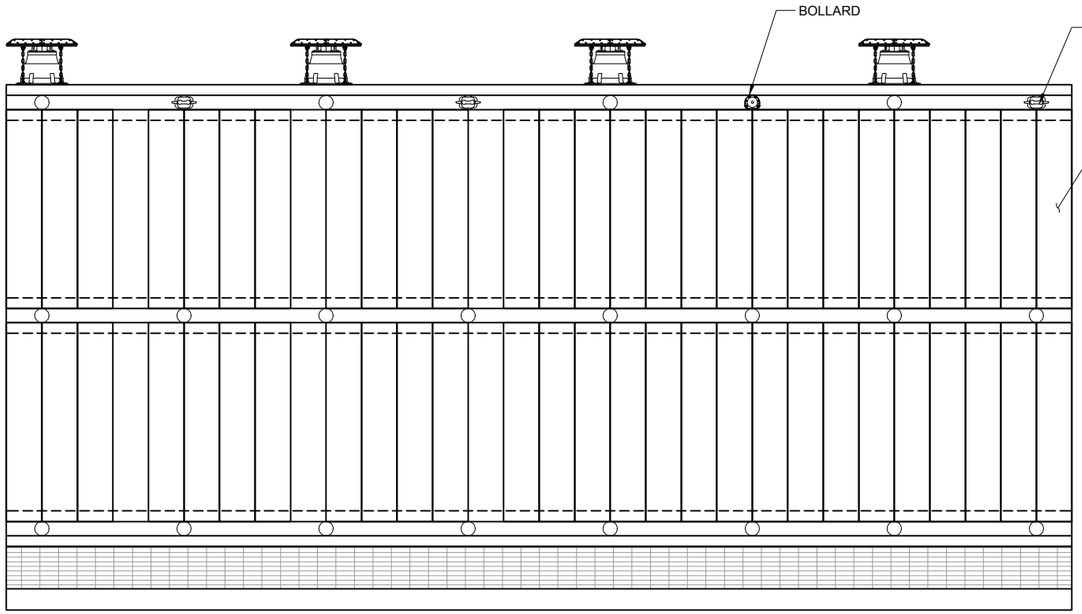


150' DOCK SECTION

1 DOCK PILE LAYOUT

Scale: 3/32" = 1'-0"

2 ELEVATION

Scale: 3/32" = 1'-0"

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403

CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD

Date: JUNE 2021

Phase: CONCEPT PLANS

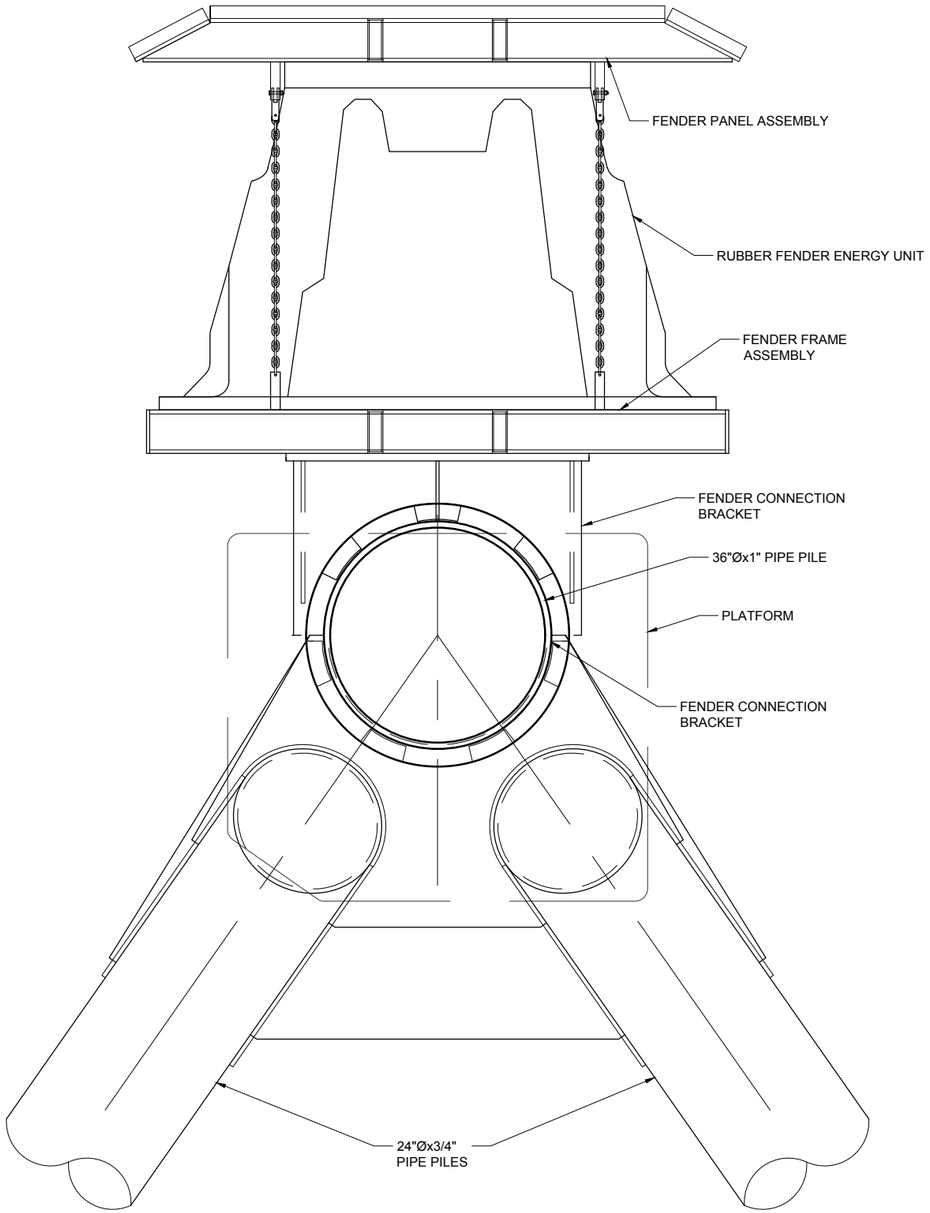
Project No: 2875.01

SHEET TITLE:

PILE DOCK PLAN AND ELEVATION

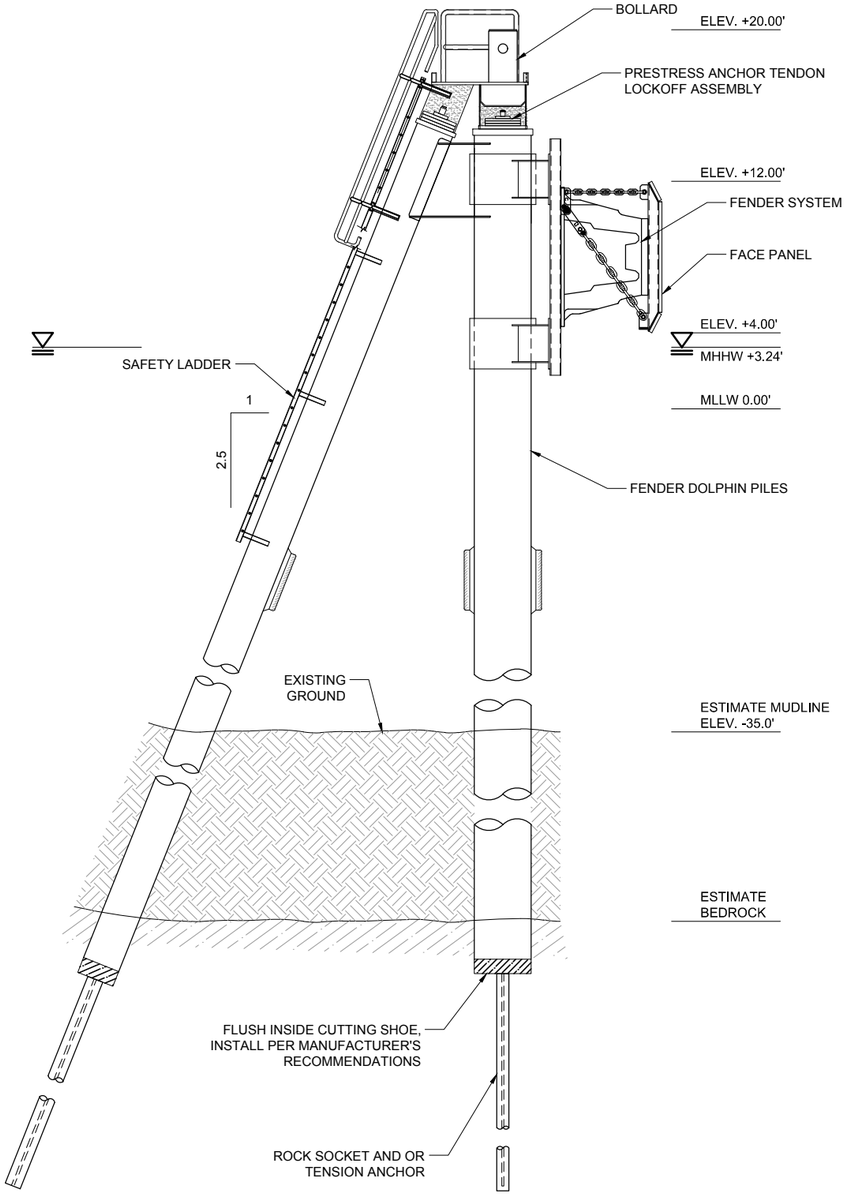
SHEET NO:

S1



1 DOLPHIN PLAN

Scale: 1" = 1'



2 DOLPHIN ELEVATION

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

R&M CONSULTANTS, INC.
9101 Vanguard Drive
Anchorage, Alaska 99507
rmconsult.com•email@rmconsult.com
phone: 907.522.1707 • fax: 907.522.3403

CORPORATE AUTHORIZATION NUMBER AECC111

Saint Paul Harbor Feasibility Study

Saint Paul Island, Alaska

No.	Description	Date

Drawn By: JC | Checked By: JD

Date: JULY 2021

Phase: CONCEPT PLANS

Project No: 2875.01

SHEET TITLE: DOLPHIN DETAILS

SHEET NO: **S2**

APPENDIX B

Harbormaster Office Concept Drawings

SAINT PAUL

SAINT PAUL HARBOR IMPROVEMENTS

SAINT PAUL, AK

CONCEPT

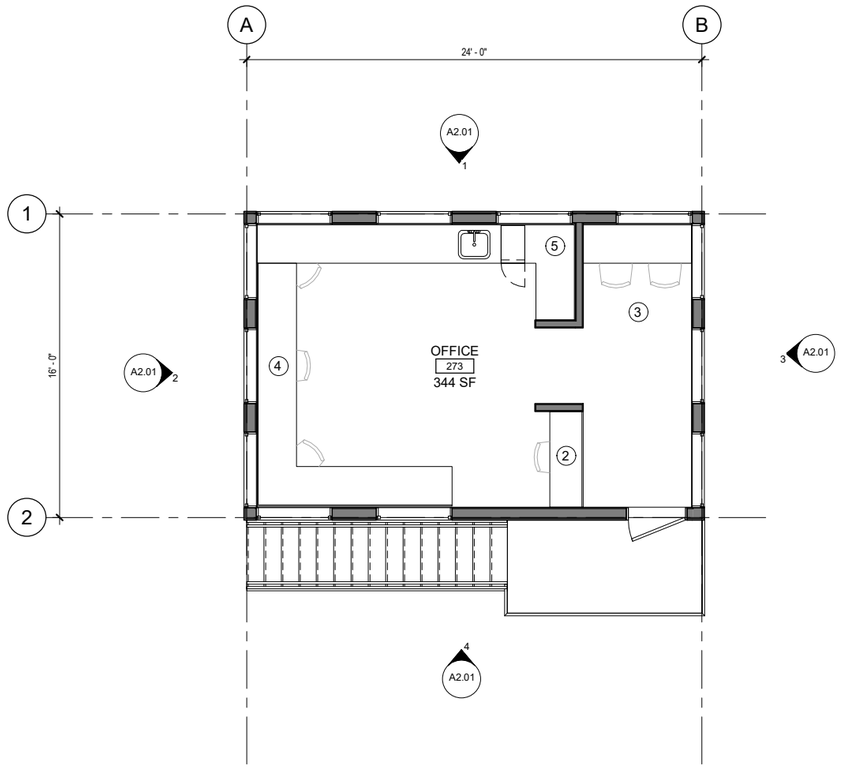
07.29.2021

ARCHITECT
KPB ARCHITECTS
500 L STREET, SUITE 400
ANCHORAGE, ALASKA 99501
Ph: 907.274.7443

KPB ARCHITECTS

REFERENCED PLAN NOTES

1. OVERHEAD GARAGE DOOR
2. CUSTOMER INTERFACE COUNTER
3. GUEST INTERNET SPACE
4. BUILT-IN CASEWORK DESKS AND STORAGE
5. KITCHENETTE



2 FLOOR PLAN -LEVEL 2
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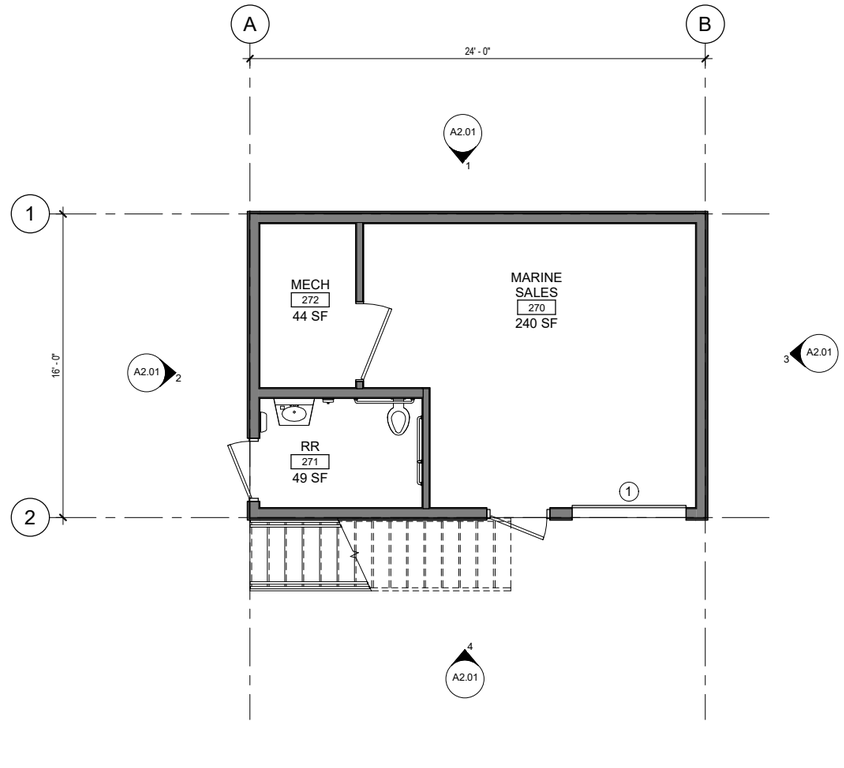


1 FLOOR PLAN - LEVEL 1
1/4" = 1'-0"

Graphic Scale: 1 inch = 4 feet

0 4' 8' 12' 16'

N

CONCEPT-NOT FOR CONSTRUCTION

KPB ARCHITECTS
500 L STREET, SUITE 400
ANCHORAGE, AK 99501
(V)907.274.7443 (F)907.274.7407
WWW.KPBARCHITECTS.COM
AK CORPORATION # 34952 D

SAINT PAUL
SAINT PAUL HARBOR
IMPROVEMENTS
CONCEPT
SAINT PAUL, AK

REVISION SCHEDULE

#	DESCRIPTION	DATE

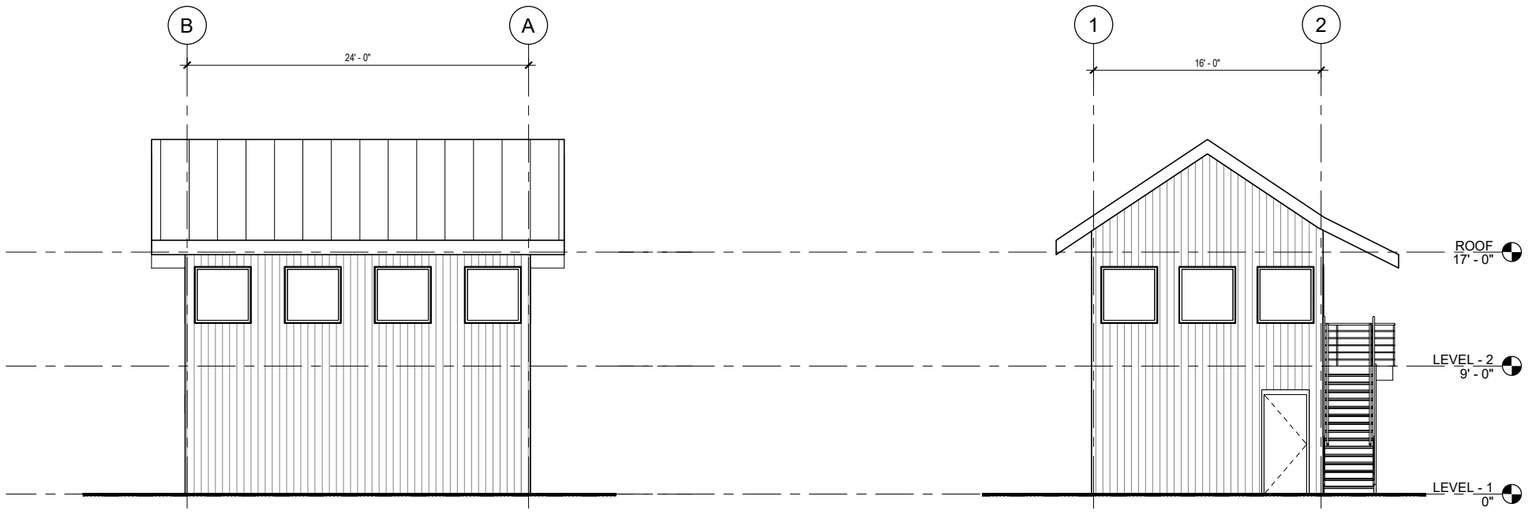
JOB NO.	20067.01
DATE	07.29.2021
DRAWN	TN
REVIEWED	JS

SHEET NAME
FLOOR PLANS

SHEET NO.
A1.02

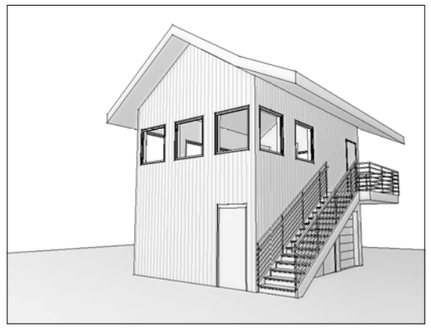
HALF-SCALE AT 11X17

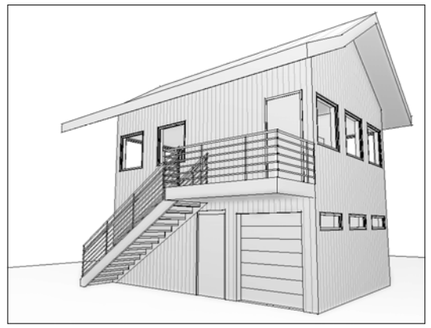
EXTERIOR MATERIAL LEGEND	
	DESCRIPTION
	STANDING SEAM METAL ROOF
	CEDAR SIDING

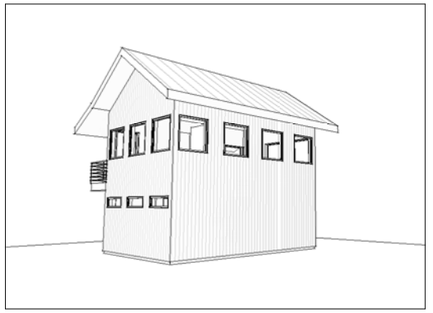


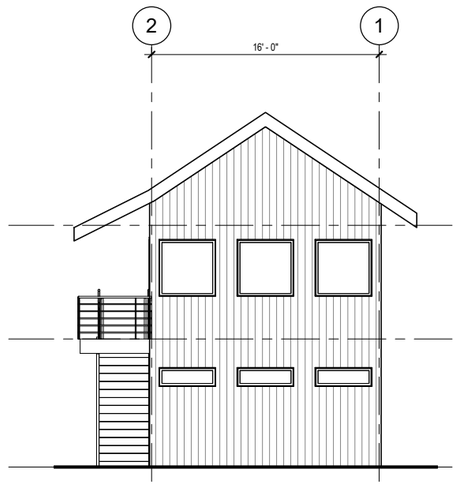
1 ELEVATION EAST NORTH
3/16" = 1'-0"

2 ELEVATION WEST
3/16" = 1'-0"









3 ELEVATION EAST
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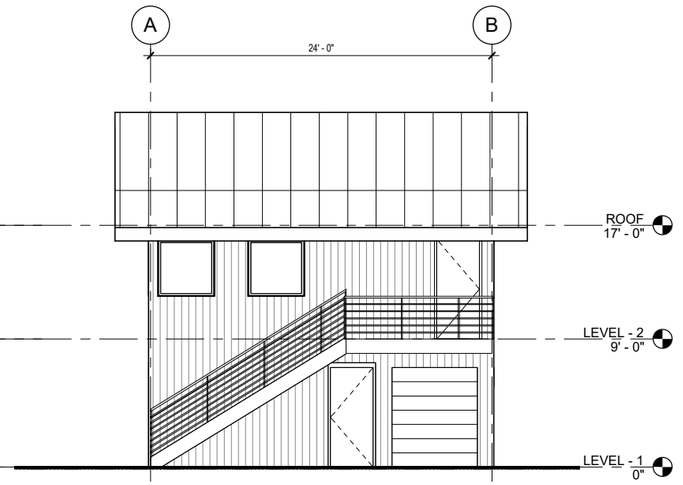

4 ELEVATION SOUTH
3/16" = 1'-0"

KPB ARCHITECTS
500 L STREET, SUITE 400
ANCHORAGE, AK 99501
(V)907.274.7443 (F)907.274.7407
WWW.KPBARCHITECTS.COM
AK CORPORATION # 34952 D

SAINT PAUL
SAINT PAUL HARBOR
IMPROVEMENTS
CONCEPT
SAINT PAUL, AK

REVISION SCHEDULE		
#	DESCRIPTION	DATE

JOB NO.	20067.01
DATE	07.29.2021
DRAWN	TN
REVIEWED	JS

SHEET NAME
EXTERIOR ELEVATIONS

SHEET NO.
A2.01

CONCEPT-NOT FOR CONSTRUCTION

HALF-SCALE AT 11X17

APPENDIX C

Bering Sea Crab Vessels

Vessels from Dean	Notes	Year	ADFG Num	Year Built	Length	Gross Tons	Net Tons	Horse Pow	Hold Tank	Live Tank C	Fuel Capac	Home Port	Home Port	Coast Guar	Vessel Nan	Owner Nai	Name Type	Phone	File Numb	Street	City	State	Zip Code	Country	Effective Date	Engine	Hull Type	Refrigerati	Salmon Re
Adventure	Assume it's this one, since St. Paul is the h	2020	965	1970	81	198	145	725	5500	5500	15000	SAINT PAU	AK	525956	ADVENTUR	ADVENTUR	C	9073736734	484421	850 S ROBI	WASILLA	AK	99654		12/4/2019 0:00	D	S	Yes	N/A
Alaska Spirit		2020	35949	1978	98	193	131	850	32000	12000	34000	KODIAK	AK	605674	ALASKA SP	SCHMEIL		9074868587	843858	BOX 164	KODIAK	AK	99615		12/9/2019 0:00	D	S	Yes	N/A
Aleutian Lady		2020	56126	1966	165	189	135	1750	8500	8500	31000	SEATTLE	WA	504762	ALEUTIAN	SHELFORD	C	4257872576	890353	BOX 12946	MILL CREEI	WA	98082		43791	D	S	Yes	N/A
Aleutian Mariner (CDQ)		2020	35844	1979	118	199	126	1150	8300	8300	40000	SEATTLE	WA	602229	ALEUTIAN	ALEUTIAN	C	2067833018	810685	5470 SHILS	SEATTLE	WA	98107		12/3/2019 0:00	D	S	Yes	N/A
Aleutian Sable		2020	72318	1999	124	194	132	1320	8000	0	25000	JUNEAU	AK	1087790	ALEUTIAN	ARCTIC SAI	C	9074444008	331366	916 DELAN	ANCHORAC	AK	99501		12/9/2019 0:00	D	S	Yes	N/A
Arctic Hunter	Last CFEC registration in 2013	2013	32554	1978	102	193	131	940	4700	4000	42000	KODIAK	AK	592242	ARCTIC HU	ARCTIC HU	C	2535822580	694498	7216 INTEI	LAKEWOOI	WA	98499		##############	D	S	Yes	N/A
Arctic Lady		2020	37210	1979	131	192	97	1450	12000	9000	5800	PORTLAND	OR	604215	ARCTIC LAI	ARCTIC SUI	C	6024517752	974848	12042 SE S	CLACKAMA	OR	97015		12/2/2019 0:00	D	S	Yes	N/A
Arctic Mariner		2020	31792	1980	125	189	129	1125	0	9000	50000	SEATTLE	WA	618374	ARCTIC MA	FV ARCTIC	C	2067833018	931618	5470 SHILS	SEATTLE	WA	98107		12/3/2019 0:00	D	S	Yes	N/A
Arctic Sea		2020	33696	1978	134	485	145	1410	18000	18000	64000	SEATTLE	WA	596137	ARCTIC SEA	ARCTIC SEA	C	9072785151	469813	711 H ST #/	ANCHORAC	AK	99501		##############	D	S	No	N/A
Atlantico		2020	37	1969	98	185	55	850	5000	5000	10000	KODIAK	AK	524452	ATLANTICC	ATLANTA C	C	9075122938	579742	BOX 1546	KODIAK	AK	99615		##############	D	S	Yes	N/A
Barbara J	Two, but this is the only one with pots and	2020	44971	1982	110	190	145	800	6600	6600	43000	ANACORTE	WA	648690	BARBARA J	TRIDENT SI	C	2067814524	590175	5303 SHILS	SEATTLE	WA	98107		##############	D	S	Yes	N/A
Ballyhoo		2020	3645	1944	177	455	172	1200	0	12000	44900	JUNEAU	AK	501812	BALLYHOO	ARCTIC PA	C	9072294986	450838	916 DELAN	ANCHORAC	AK	99501		12/9/2019 0:00	D	S	Yes	N/A
Bering Hunter		2020	60865	1990	115	180	150	804	6000	6000	16000	KODIAK	AK	967014	BERING HU	BERING HU	C	5413748255	777599	BOX 98	CASCADE L	WA	97014		##############	D	S	Yes	N/A
Bering Sea		2020	52	1973	114	198	159	850	7500	7500	36000	SEATTLE	WA	554126	BERING SE	SNUG HAR	C	9073984938	484636	BOX 701	KENAI	AK	99611		12/5/2019 0:00	D	S	No	N/A
Bering Star		2020	4147	1978	108	198	135	850	7500	7500	45000	SEATTLE	WA	593310	BERING ST	BERING ST	C	2064921600	134117	5470 SHILS	SEATTLE	WA	98107		12/6/2019 0:00	D	S	Yes	N/A
Billikin		2020	20745	1973	132	389	281	1130	5000	3000	60000	SEATTLE	WA	550190	BILLIKIN	TRIDENT SI	C	2067814524	590175	5303 SHILS	SEATTLE	WA	98107		##############	D	S	Yes	N/A
Bountiful	Assume it's this one, since Trident is the o	2020	34053	1978	165	909	793	1700	50000	2500	130000	SEATTLE	WA	593404	BOUNTIFU	TRIDENT SI	C	2067814524	590175	5303 SHILS	SEATTLE	WA	98107		##############	D	S	Yes	N/A
Bristol Mariner (CDQ)		2020	8411	1979	125	185	160	1125	8600	8600	51000	DILLINGHA	AK	608397	BRISTOL M	FV ARCTIC	C	2067833018	931618	5470 SHILS	SEATTLE	WA	98107		43802	D	S	Yes	N/A
Cape Caution	Assume it's this one, since the other is lon	2020	46309	1983	90	169	152	700	5047	0	9432	HOMER	AK	656221	CAPE CAUT	FORTUNE S	C	9072991159	415468	4254 SVED	HOMER	AK	99603		12/6/2019 0:00	D	S	Yes	N/A
Cascade Mariner (CDQ)		2020	64	1974	100	185	126	905	4500	4500	25000	SEATTLE	WA	557441	CASCADE M	CASCADE M	C	2067833018	269880	5470 SHILS	SEATTLE	WA	98177		12/3/2019 0:00	D	S	Yes	N/A
Constellation	Assume it's this one, since it has pots	2020	35629	1979	127	194	132	1100	8800	8800	33000	SEATTLE	WA	604998	CONSTELL/	RSD FISHEI	C	4257872576	356733	BOX 12946	MILL CREEI	WA	98082		##############	D	S	Yes	N/A
Controller Bay	Not sure; two, neither of which is local nor pots																												
Cornelia Marie		2020	59109	1989	125	0	136	660	6200	6200	26000	KODIAK	AK	957458	CORNELIA	CORNELIA	C	2069533149	590138	15454 266	ISSAQUAH	WA	98027		12/4/2019 0:00	D	S	No	N/A
Determined		2020	33392	1973	31	15	12	300	0	0	300	WRANGELL	AK	549200	DETERMIN	SOBJACK		3602203783	98223	2422 CRES	BELLINGHA	WA	98229		##############	D	F	No	N/A
Fararra Sea	Can't locate any records at CFEC																												
Fierce Allegiance		2020	55111	1977	166	198	190	3000	15500	15500	65000	SEATTLE	WA	588849	FIERCE ALL	FIERCE ALL	C	2067694047	889567	7215 156TI	EDMONDS	WA	98026		##############	D	S	Yes	N/A
Farwest Leader		2020	35683	1979	110	187	152	750	4000	5000	18000	SEATTLE	WA	606083	FARWEST L	TRIDENT SI	C	2067814524	590175	5303 SHILS	SEATTLE	WA	98107		##############	D	S	Yes	N/A
Handler		2020	62436	1991	125	198	175	1250	0	0	0	KODIAK		970937	HANDLER	SONGSTAD		5412138580	432700	2520 NW P	BEND	OR	97701		##############	D	S	Yes	N/A
Incentive		2020	63000	1991	88	177	53	1000	4000	4000	30000	KODIAK	AK	978133	INCENTIVE	INCENTIVE	C	9075384595	407393	BOX 635	NAKNEK	AK	99633		4/16/2020 0:00	D	S	Yes	Peninsula/
Island Mist		2020	61791	1991	124	194	160	1250	7200	7200	25000	KODIAK	AK	973478	ISLAND MI	ISLAND MI	C	5413748255	514504	BOX 98	CASCADE L	OR	97017		##############	D	S	Yes	N/A
Jennifer A		2020	35277	1979	103	194	132	800	5890	0	27000	KETCHIKAN	AK	597611	JENNIFER /	ST GEORGE	C	4254868173	887602	23929 22N	BOTEHLL	WA	98021		12/3/2019 0:00	D	S	Yes	N/A
Kari Marie		2020	50501	1983	115	199	169	1300	8000	8000	20000	SEATTLE	WA	664175	KARI MARI	KARI MARI	C	4254868173	959484	23929 22N	BOTHELL	WA	98021		12/4/2019 0:00	D	S	Yes	N/A
Keta	Several, but it looks to be this one since it	2020	7189	1976	97	191	122	560	4500	4500	25550	ANCHORAC	AK	576029	KETA	KETA ENTE	C	4254868173	387602	23929 22N	BOTHELL	WA	98021		##############	D	S	Yes	N/A
Kevleen K		2020	960	1968	104	196	138	704	6125	6125	23000	SEATTLE	WA	517481	KEVLEEN K	KEVLEEN K	C	2066697163	71667	8941 179TI	EDMONDS	WA	98026		##############	D	S	Yes	N/A
Karin Lynn		2020	524	1978	127	0	0	0	0	0	0	SEATTLE	WA	592291	KARIN LYN	KARIN LYN	C	2067935748	410003	1308 DINE	GREENBAN	WA	98253		##############	D	S	No	N/A
Kiska Sea		2020	61154	1990	125	442	132	1350	12000	12000	70000	NEWPORT	OR	965726	KISKA SEA	KISKA SEA	C	2067845000	51053	2157 N NO	SEATTLE	WA	98103		##############	D	S	No	N/A
Kodiak	Two, but this is the only one with pots	2020	3525	1978	103	197	134	730	7940	7940	20000	KODIAK	AK	600072	KODIAK	JLAX FISHE	C	4254446816	690568	BOX 310	EDMONDS	WA	98026		##############	D	S	Yes	N/A
Kustatan	Two, but this is the only one with pots	2020	60210	1990	100	210	73	700	5000	5000	18000	HOMER	AK	959432	KUSTATAN	REHDER		9072357586	930340	BOX 2065	HOMER	AK	99603		##############	D	S		N/A
Mystery Bay	Can't locate any records at CFEC																												
North American		2020	25216	1975	110	199	138	1200	7500	7500	46000	SEATTLE	WA	566067	NORTH AN	NORTH AN	C	9075862442	364237	250 NW 39	SEATTLE	WA	98107		5/12/2020 0:00	D	S	Yes	N/A
Nordic Mariner		2020	222	1978	120	198	139	1100	8500	8500	0	SEATTLE	WA	591077	NORDIC M	NORDIC M	C	2067833018	764986	5470 SHILS	SEATTLE	WA	98107		12/3/2019 0:00	D	S	Yes	N/A
North Sea	Using 2021 data since not active in 2020	2021	36047	1979	126	193	135	1410	9600	9600	50000	SEATTLE	WA	606565	NORTH SE/	ARCTIC SE/	C	9072785151	469813	711 H ST #/	ANCHORAC	AK	99501		##############	D	S	No	N/A
Northwestern		2020	29962	1977	125	197	134	1280	7500	7500	60000	SEATTLE	WA	587816	NORTHWE	FV NORTH	C	4254868173	186245	23929 22N	BOTHELL	WA	98021		##############	D	S	Yes	N/A
Nuka Island		2020	35640	1978	105	199	140	700	5000	5000	15590	HOMER	AK	604208	NUKA ISLA	LENON		9079423593	620066	522 SUT LA	KODIAK	AK	99615		##############	D	S	Yes	N/A
Ocean Fury	Two, but this is the only one with pots	2020	97	1977	124	196	136	850	8814	0	49770	SEATTLE	WA	586441	OCEAN FUI	OCEAN FUI	C	2067833844	576776	4005 20TH	SEATTLE	WA	98119		##############	D	S	Yes	N/A
Ocean Hunter	Two, but this is the only one with pots, pl	2020	40924	1980	95	189	128	850	4642	4642	15000	KODIAK	AK	622324	OCEAN HU	OCEAN FIS	C	2535822580	645902	BOX 98929	LAKEWOOI	WA	98496		12/5/2019 0:00	D	S	Yes	N/A
Pacific Mariner		2020	7	1974	126	197	135	850	8100	8100	46000	SEATTLE	WA	560501	PACIFIC M/	PAC MARIN	C	9073595102	12109	5470 SHILS	SEATTLE	WA	98107		12/3/2019 0:00	D	S	Yes	N/A
Pacific Sounder		2020	991	1969	98	194	132	580	7300	7300	2800	SEATTLE	WA	522870	PACIFIC SO	LONE		2067698008	496624	3315 150TI	MILL CREEI	WA	98012		##############	D	S	Yes	N/A
Pacific Sun	Three, but this is the only one with pots	2020	35977	1979	121	184	125	1050	0	9100	42000	SEATTLE	WA	604581	PACIFIC SU	PACIFIC SU	C	5105027825	494639	1628 PALM	SEATTLE	WA	98116		12/3/2019 0:00	D	S	Yes	N/A
Paragon	Three, but this is the only one with pots	2020	20734	1973	110	196	133	1125	7500	7500	52000	SEATTLE	WA	548750	PARAGON	RAINIER IN	C	2067753235	898391	605 12TH /	EDMONDS	WA	98020		##############	D	S	No	N/A
patricia lee		2020	35767	1978	116	195	132	1700	10000	7000	48000	DUTCH HAI	AK	597612	PATRICIA L	PATRICIA L	C	2067293125	658127	BOX 31091	SEATTLE	WA	98103		##############	D	S	Yes	N/A
Pinnacle	Two, but this is the only one with pots	2020	71174	1998	140	198	0	2000	15000	350000	70000	SEATTLE	WA	1075512	PINNACLE	FV PINNAC	C	4254868173	212717	23929 22N	BOTHELL	WA	98021		12/3/2019 0:00	D	S	No	N/A
Polar Sea		2020	303	1978	90	195	139	940	7945	7945	20000	KODIAK	AK	589317	POLAR SEA	ARCTIC HU	C	2535822580	694498	BOX 98929	LAKEWOOI	WA	98496		12/5/2019 0:00	D	S	Yes	N/A
Provider	This one? Vessel size is consistent with otl	2020	58	1973	136	186	123	1125	9300	9300	53000	KODIAK	AK	549174	PROVIDER	PROVIDER	C	4257759988	816862	BOX 37	KODIAK	AK	99615		##############	D	S	No	Bristol Bay
Ramblin Rose		2020	59686	1990	103	166	49	730	5000	5000	18000	JUNEAU	AK	957380	RAMBLIN F	DIAMONDI	C	9074444008	913325	916 DELAN	ANCHORAC	AK	99501		12/9/2019 0:00	D	S	Yes	N/A
Rollo		2020	30	1974	105	150	125	905	7500	7500	34000	SEATTLE	WA	555403	ROLLO	NYHAMME	C	2065425398	119398	18504 RIDC	SHORELINE	WA	98177		##############	D	S	Yes	N/A
Saga	Not sure; there are three, two with pots, l	2020	11022	1979	107	198	134	1040	7000	7000	35500	HOMER	AK	606800	SAGA	FV SAGA LL	C	9074444008	623150	916 DELAN	ANCHORAC	AK	99503		12/9/2019 0:00	D	S	Yes	N/A
Sandra 5		2020	70770	1998	113	0	0	1000	6600	6600	30000	WARRENDA	OR	1068196	SANDRA FI	HEUKER BF	C	5413748255	903678	BOX 98	CASCADE L	OR	97014		##############	D	S	Yes	N/A
Scandies Rose		2020	35318	1978	116	195	132	1600	0	0	0	DUTCH HAI	AK	602351	SCANDIES I	SCANDIES I	C	3608507655	343942	BOX 379	BREMERTC	WA	98337		12/4/2019 0:00	D	S	Yes	N/A
Seabrooke		2020	36800	1979	109	198	134	1350	6800	6800	27600	KODIAK	AK	614410	SEABROOK	SEABROOK	C	5095200911	387780	83972 EAS	MILTON FR	OR	97862		12/3/2019 0:00	D	S	Yes	N/A
Silver Dolphin		2020	121	1973	126	237	71	1300	7500	7500	48000	SEATTLE	WA	547726	SILVER DOI	BREKKAA		4257429133	222818	17403 5TH	BOTHELL	WA	98012		##############	D	S	Yes	N/A
Silver Spray		2020	60860	1990	116	197	134	850	9400	9400	25000	KODIAK	AK	964016	SILVER SPR	SILVER SPR	C	2063991822	422542	BOX 69	KODIAK	AK	99615		##############	D	S	Yes	N/A
Southern Wind	Two, but this is the only one with pots and	2020	40921	1981	144	493	147	1350	11000	0	72000	SEATTLE	WA	625927	SOUTHERN	TRIDENT SI	C	2067814524	590175	5303 SHILS	SEATTLE	WA	98107		##############	D	S	Yes	N/A
Storm Bird		2020	46854	1983	90	164	141	600	6000	4800	16000	KODIAK	AK	656842	STORM BIR	DOCHTERN		2062455153	888820	BOX 714	KODIAK	AK	99615		##############	D	S	Yes	N/A
Tempo Sea		2020	40817	1980	134	195	113	800	11000	11000	40000	JUNEAU	AK	620538	TEMPO SE/	TEMPO SE/	C	9074444008	620221	916 DELAN	ANCHORAC	AK	99501		12/9/2019 0:00	D	S	Yes	N/A
Time Bandit		2020	65577	1991	113	198	98	1200	0	6000	20000	JUNEAU	AK	973238	TIME BANI	TIME BANI	C	7037272858	231581	BOX 2270	ASHBURN	VA	20146		5/8/2020 0:00	D	S	Yes	N/A
Trailblazer		2020	33704	1978	134	197	134	1350	9000	9000	50000	KODIAK	AK	596514	TRAIL BLA	TRAILBLAZ	C	5419618137	426650	BOX 1027	NEWPORT	OR	97365		12/9/2019 0:00	D	S	Yes	N/A
Valiant	Three, but this is the only one with pots	2020	996	1969	111	199	195	1350	8500	8500	20000	SEATTLE	WA	522574	VALIANT	VALIANT FI	C	4254446816	583850	18211 85TI	EDOMNDS	WA	98026		##############	D	S	Yes	N/A
Viekoda Bay		2020	57971	1988	102	192	130	700	5200	5200	12000	KODIAK	AK	939078	VIEKODA B	NORTON		9075126073	112404	BOX 3282	KODIAK	AK	99615		##############	D	S	Yes	N/A
Western Mariner		2020	963	1977	115	197	138	850	7200	7200	40000	SEATTLE	WA	585926	WESTERN I	WESTERN I	C	2067833018	286386	5470 SHILS	SEATTLE	WA	98107		12/3/2019 0:00	D	S	Yes	N/A
Wizard	Three, two with pots, but I think it's this o	2020	35265	1978	156	499	371	1200	14000	14000	50000	SEATTLE	WA	594470	WIZARD	COLBURN		2068504212	266711	PMB 257-1	REDMOND	WA	98052		##############	D	S	No	N/A
Zone Five		2020	61718	1991	105	193	131	806	5500	5500	18000	WARRENDA	OR	974423	ZONE FIVE	HEUKER BF	C	5413748255	903678	BOX 98	CASCADE L	OR	97014		##############	D	S	Yes	N/A

Freezer Ca	Tender Pa	Charter	Fishing	Purse Sein	Beach Sein	Drift Gill N	Set Gill Ne	Hand Troll	Long Line	Otter Traw	Fish Wheel	Pots	Power Trol	Beam Traw	Scallop Dr	Mechanica	Double Ot	Herring Gil	Pair Trawl	Diving Han	Active Date	Active End	Hull ID	Last name	First name	Middle
No	No	No	Yes	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	12/4/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00		SCHMEIL	ALBERT	T
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	43791	2958465				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
Yes	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	#############	12/31/9999 0:00	HULLID592242			
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/2/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/5/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/6/2019 0:00	12/31/9999 0:00				
Yes	No	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
Yes	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	43802	2958465				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/6/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/4/2019 0:00	12/31/9999 0:00				
No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00		SOBJACK	BRAD	
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	Yes	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00		SONGSTAD	JOSHUA	
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	4/16/2020 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/4/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00		REHDER	CHARLES	M
No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	5/12/2020 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
No	No	No	Yes	No	No	No	No	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	No	12/5/2019 0:00	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00				
No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/4/2019 0:00	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	5/8/2020 0:00	12/31/9999 0:00	8852356			
No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes	No	No	No	No	No	No	No	No	12/9/2019 0:00	12/31/9999 0:00				
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No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	12/3/2019 0:00	12/31/9999 0:00				
No	Yes	No	Yes	No	No	No	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00		COLBURN	KEITH	
No	Yes	No	Yes	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	#############	12/31/9999 0:00				

APPENDIX D

Phase 1 Rough Order Magnitude Cost Estimates

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - PHASE 1 SUMMARY

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	MOB AND DEMOB	LS	1	$5,970,000	$5,970,000
2	DEMOLITION OF MISC STRUCTURE	LS	1	$500,000	$500,000
3	REFURBISH SOUTH DOCK	LS	1	$999,800	$999,800
4	FURNISH AND INSTALL 3 PILE DOLPHINS	EA	23	$647,500	$14,892,500
5	FURNISH AND INSTALL PLATFORM DOCK / ACCESS TRESTLE	EA	3	$3,575,000	$10,725,000
6	FURNISH AND INSTALL HARBORMASTER OFFICE	LS	1	$1,523,652	$1,523,652
7	FURNISH AND INSTALL TRIDENT TO SOUTH DOCK CONNECTION	SF	9,000	$750	$6,750,000
8	FURNISH AND INSTALL PLATFORM DOCK AT VESSEL REPAIR FACILITY	SF	27,000	$750	$20,250,000
9	FURNISH AND INSTALL ELECTRICAL AND LIGHTING	LS	1	$2,500,000	$2,500,000
	SUB TOTAL CONSTRUCTION PROJECT				$64,110,952
	ENGINEERING AND ADMIN	LS	1	$10,800,000	$10,800,000
	SUB TOTAL PROJECT				**$74,910,952**
				25% CONTINGENCY:	$18,727,738
				TOTAL PROJECT:	$93,638,690

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - HARBORMASTER OFFICE

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT	AMOUNT
1	DEMOLTION	LS	1	$50,000	$50,000
2	FURNISH AND INSTALL NEW HARBORMASTER OFFICE	LS	1	$700,000	$700,000
3	EXTEND ELECTRICAL TO HARBORMASTER OFFICE	LF	687	$243	$166,880
4	EXTEND SEWER TO HARBORMASTER OFFICE	LF	509	$374	$190,540
5	EXTEND WATER TO HARBORMASTER OFFICE	LF	1,356	$307	$416,232
	SUB TOTAL HARBORMASTER OFFICE				**$1,523,652**

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - REFURBISH SOUTH DOCK

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT	AMOUNT
1	FURNISH AND INSTALL NEW FENDERS ON DOCK	EA	9	$100,000	$900,000
2	FURNISH AND INSTALL NEW BOLLARDS ON DOCK	EA	3	$25,000	$75,000
3	FURNISH AND INSTALL NEW LADDERS ON DOCK	EA	2	$10,000	$20,000
4	FURNISH AND INSTALL NEW LIFE RINGS ON DOCK	EA	2	$1,200	$2,400
5	FURNISH AND INSTALL NEW FIRE EXTINGUSHERS ON DOCK	EA	2	$1,200	$2,400
	SUB TOTAL REFURBISH S DOCK				**$999,800**

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - PHASE 1 MOBILIZATION

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	MOB AND DEMOB	LS	1	$5,500,000	$5,500,000
2	CONSTRUCTION SURVEY	LS	1	$150,000	$150,000
3	PROTECTED SPECIES OBSERVER	LS	1	$150,000	$150,000
4	EROSION AND POLLUTION CONTROL	LS	1	$45,000	$45,000
5	SILT CURTAIN - BOOM	LS	1	$125,000	$125,000
	SUB TOTAL MOB AND DEMOB				**$5,970,000**

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - PHASE 1 ENGINEERING

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
A	DESIGN UPLAND SURVEY	LS	1	$150,000	$150,000
B	DESIGN GEOTECH PROGRAM	LS	1	$250,000	$250,000
C	DESIGN (10% OF CONSTRUCTION)	LS	1	$6,114,500	$6,114,500
D	PERMITTING CLEAN WATER ACT SECTION 10 AND 404	LS	1	$20,000	$20,000
E	PERMITTING NMFS IHA	LS	1	$80,000	$80,000
F	PERMITTING NEPA	LS	1	$100,000	$100,000
G	CONSTRUCTION ADMINISTRATION (6% OF CONSTRUCTION)	LS	1	$3,668,700	$3,668,700
	SUB TOTAL ENGINEERING AND ADMIN				**$10,383,200**

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - DOLPHIN

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	FURNISH 24" DIAMETER x 80' LONG PIPE PILES (Dolphin)	EA	2	$15,000	$30,000
2	INSTALL 24" DIAMETER PILING IN ROCK SOCKET	EA	2	$25,000	$50,000
3	FURNISH 36" DIAMETER x 80' LONG PIPE PILES (Dolphin)	EA	1	$25,000	$25,000
4	INSTALL 36" DIAMETER PILING IN ROCK SOCKET	EA	1	$35,000	$35,000
5	FURNISH AND INSTALL TENSION ANCHOR	EA	3	$35,000	$105,000
6	FURNISH AND INSTALL 3 PILE DOLPHIN CAP	EA	1	$250,000	$250,000
7	FURNISH AND INSTALL NEW DOLPHIN FENDERS	EA	1	$100,000	$100,000
8	FURNISH AND INSTALL NEW CATWALK	LF	50	$750	$37,500
9	FURNISH AND INSTALL 150# ANODES	EA	10	$1,500	$15,000
	SUB TOTAL DOLPHIN				**$647,500**

ROUGH ORDER OF MAGNITUDE COST ESTIMATE

SAINT PAUL HARBOR - 120' x 40' PLATFORM DOCK / TRESTLE

NO.	PAY ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	FURNISH AND INSTALL LEVELING COURSE	CY	100	$60	$6,000
2	FURNISH AND INSTALL GRAVEL FILL	CY	250	$40	$10,000
3	FURNISH AND INSTALL RIP RAP SLOPE PROTECTION	CY	500	$200	$100,000
4	FURNISH 24" DIAMETER x 80' LONG PIPE PILES	EA	30	$12,000	$360,000
5	INSTALL 24" DIAMETER PILING IN ROCK SOCKET	EA	30	$20,000	$600,000
6	FURNISH ABUTMENT SHEET PILING	SF	2,000	$45	$90,000
7	INSTALL ABUTMENT SHEET PILING, PER PAIR	EA	15	$2,500	$37,500
8	FURNISH AND INSTALL GRATE / EXPANSION JOINT	LF	40	$750	$30,000
9	FURNISH AND INSTALL CONCRETE GRADE BEAM	LF	50	$1,500	$75,000
10	FURNISH AND INSTALL PLATFORM DOCK ABUTMENT PILE CAP	LF	50	$2,000	$100,000
11	FURNISH AND INSTALL DOCK PILE CAPS	LF	240	$1,500	$360,000
12	FURNISH AND INSTALL DECK PANELS	SF	5,000	$250	$1,250,000
13	FURNISH AND INSTALL FACE BEAM - BULLRAIL	LF	40	$3,000	$120,000
14	FURNISH AND INSTALL CLEATS	EA	2	$5,000	$10,000
15	FURNISH AND INSTALL BOLLARDS	EA	2	$10,000	$20,000
16	FURNISH AND INSTALL NEW FENDERS	EA	3	$100,000	$300,000
17	FURNISH AND INSTALL LIFE RINGS	EA	1	$1,500	$750
18	FURNISH AND INSTALL FIRE EXTINGUISHERS	EA	1	$1,500	$750
19	FURNISH AND INSTALL FIRE STANDPIPE	LF	100	$150	$15,000
20	FURNISH AND INSTALL 150# ANODES	EA	60	$1,500	$90,000
	SUB TOTAL DOCK				**$3,575,000**

CITY OF
Saint Paul
ALASKA

Saint Paul Harbor | Improvement and Expansion Feasibility Report

AUGUST 2021

photo credit: Aaron P. Lestonkof