



Waterfront Reconstruction Study

Alaska Railroad Corporation

Whittier Terminal Master Plan

Whittier, Alaska

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Executive Summary

The objectives of the Whittier Terminal Waterfront Reconstruction Study (Study) are to assess existing conditions, review previous reports, and develop and recommend alternatives to reconstruct the Whittier Harbor waterfront. This facility is critical for maintaining safe and continuous rail and cargo operations for Alaska Railroad Corporation (ARRC) and Alaska Marine Lines (AML), continuing its role as a vital link in Alaska's transportation network.

The review of existing facilities revealed a range of conditions from poor to fair. The age and condition of the bulkhead, barge slip, mooring facilities, mechanical and electrical systems, and the unloading transfer span, which is approximately 50 years old, are areas of concern. Given the harsh conditions of the marine environment, heavy use of the facilities, and critical reliance on the barge operations to keep Alaska supplied, the project team prioritized developing practical solutions that could be constructed while minimizing operational impacts to the cargo/rail operations during construction.

The Study considered several alternatives for addressing the deteriorating infrastructure, including the No Build Alternative, Alternative 1, Alternative 2A, and Alternative 2B. This Study recommends Alternative 2A – Reconstruct Existing Berthing Facilities In Place as the preferred option due to its cost-effectiveness, acceptable disruption to operations, and long-term sustainability.

The following alternatives were considered:

- **No Build Alternative:** This option would involve taking no action to repair or reconstruct the waterfront facilities. While avoiding immediate costs, it would result in rapidly increasing infrastructure deterioration, significantly increased safety risks, problematic operational inefficiencies, and the failure of critical structural components. The No Build Alternative is not recommended due to the detrimental near- and long-term impact upon the viability of the terminal and its potential to fall out of use due to disrepair. This would also impact rail operations resulting in a greater likelihood that rail operations would cease.
- **Alternative 1 – Westerly Relocation of Barge Berthing:** This alternative proposes relocating the barge berthing facilities approximately 1,000 feet westward from the existing location. The plan includes constructing a new barge berth and transfer span and expanding the wharf by constructing a new shoreline bulkhead waterward of the existing bulkhead and reclaiming the land between the existing and new. While this option provides future flexibility for terminal expansion, it introduces significant construction costs (\$215 million opinion of probable construction cost), and operational risks related to potential increased wind and wave exposure. Additionally, the reduction in yard track lengths ahead of the barge transfer span could negatively affect operational efficiency.
- **Alternative 2A – Reconstruct Existing Berthing Facilities In Place:** This alternative has emerged as the preferred alternative. It proposes reconstructing the barge berthing

facilities in their current location, replacing the deteriorating infrastructure while retaining the known operational benefits of the existing site, including more favorable wind and wave conditions. This alternative also preserves the current yard track lengths, ensuring continued operational efficiency for loading and unloading barge cargo. With a total opinion of probable construction cost of \$50 million, Alternative 2A is the most cost-effective option. It presents fewer operational risks than relocation, as it retains the existing operational configuration allowing for incremental capital improvements without having to reconfigure the entire terminal. The lower costs, reduced risk, and retention of key operational features make Alternative 2A the best solution for ensuring the long-term functionality and sustainability of the terminal.

- **Alternative 2B – In-Place Reconstruction with Wharf Expansion:** This alternative builds upon Alternative 2A by expanding the marginal wharf to provide additional waterfront storage and rail loading capacity. While this alternative offers future growth potential and increased operational capacity, it comes at a higher cost (\$105 million opinion of probable construction cost). The additional scope of work could lead to temporary operational downtime during construction. Although Alternative 2B provides more flexibility for future growth, the increased costs and complexity may not justify its advantages over Alternative 2A for the immediate needs of the terminal.

As part of the assessment of the facility, the team reviewed the condition of the marginal wharf, which today has a remnant sheet pile bulkhead in very poor condition. The team developed several replacement alternatives and settled on a steel sheet pile bulkhead and tieback system installed outboard of the current shoreline. The benefits of a new bulkhead are many, including:

- a minimum service life expectancy of 50 years,
- increased safety, and
- an alternative for vessel and barge berthing.

The existing sheet pile bulkhead is failing and options for replacement include filling and adding riprap seaward, constructing a new bulkhead, or building a pile-supported wharf. Prior reviews suggested that constructing the wall 60 feet outboard of its current alignment provides better value than a 15- to 20-foot offset; however, construction cost and available funding will ultimately guide the decision.

The Study considers several other operational factors and how they interface with barge loading operations, such as: railcar movements, train lengths, loading zones, and landside cargo storage. Yard functionality and operations such as truck arrivals, traffic routes within the yard, cargo handling, and potential conflicts with adjoining waterfront users (Alaska Ferry Service and small barge service at DeLong Dock) were considered.

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1. Introduction

1.1 Purpose

The purpose of this Whittier Terminal Waterfront Reconstruction Study (Study) is to explore options to replace the marine terminal's deteriorating docks and barge slip with new berthing infrastructure. The Study addresses continuing the functionality of the aging facilities, improving operations, reducing maintenance requirements, providing for future development, and optimizing the cost/benefit of the restoration project.

This Study serves as a key component in modernizing the Whittier Terminal, an essential intermodal hub for Alaska's transportation network. This Study assesses the current state of the terminal's waterfront infrastructure and develops a comprehensive plan to address both existing deficiencies and future demands. The Study prioritizes sustainability, resiliency, and operational efficiency, ensuring that Whittier remains a vital connection point for rail, marine, and ground transportation systems in Alaska.

1.2 Objectives of Waterfront Reconstruction Study

The objectives of the Study are to review existing conditions from previous reports and develop and recommend alternatives to reconstruct the Whittier Terminal's waterfront. This facility is critical to the safe and continued rail/cargo operations of the Alaska Railroad Corporation (ARRC) and Alaska Marine Lines (AML).

This Study focuses on identifying and addressing the infrastructure needs of the Whittier Terminal's waterfront and related intermodal facilities. It evaluates current conditions, accounts for anticipated growth, and develops strategies to support the terminal's continued role in facilitating freight movements. The Study includes an assessment of ARRC's marine terminal, upland track, cargo handling, and yard configurations, with an emphasis on improving efficiency, reliability, and sustainability. Additionally, it explores long-term expansion opportunities, including reviewing the influence of nearby passenger facilities, while minimizing impacts on other stakeholders. Through this effort, the Study creates a roadmap for future investments, setting the stage for sustainable growth and operational improvements.

1.3 Project Description and Grant Requirements

The Whittier Terminal Master Plan Project, funded under the U.S. Department of Transportation's Maritime Administration (MARAD) Fiscal Year 2021 Port Infrastructure Development Program (PIDP), is designed to assess and improve the operational capacity and infrastructure of the Whittier Terminal, which serves as a critical transportation hub for the Alaska Marine Highway and the sole connection between ARRC and the rest of the North American rail network. The project evaluates the terminal's current condition, focusing on safety, performance, efficiency, reliability, resiliency, and sustainability.

This Study, a vital component of the project, explores options for rehabilitating or reconstructing critical waterfront infrastructure, including wharves, berths, and bulkheads. The Study addresses aging infrastructure, improves operational efficiency, and enhances long-term sustainability. Through the development of conceptual designs, cost-benefit analyses, and phasing plans, the Study prioritizes improvements that reduce operational conflicts between freight and passenger services, integrates with other transportation systems (i.e., the Alaska Marine Highway), and incorporates environmental considerations.

The Whittier Terminal Master Plan Project is essential in positioning the Whittier Terminal for future growth, ensuring that it continues to meet regional transportation needs and aligns with federal objectives for sustainable and resilient infrastructure.

For information on grant requirements see Appendix F, Grant Requirements.

1.4 Previous Studies and Available Data Review

The HDR team, as part of the Study, reviewed relevant and available data from previous studies performed for the ARRC's Whittier Terminal. The following are the previous studies and available data reviewed for the new Study:

1. **“ARRC Whittier Terminal Reconstruction Barge Ramp – Draft Barge Ramp Alternatives Analysis – Contract No. 117853,”** prepared by KPFF Consulting Engineers (KPFF) on March 22, 2021. This analysis includes the previous cost discussion of the barge rail transfer span's replacement alternatives at Whittier Terminal.
2. **“Alaska Railroad Whittier Terminal Waterfront Reconstruction – Alternatives Study,”** prepared by ARRC with support from PND Engineers, Inc. (PND), R&M Consultants, Inc. (R&M), and KPFF on May 13, 2021. This study examined previous alternatives for the reconstruction of the ARRC's Whittier Terminal marine facilities.
3. **“Draft Submittal – Whittier Intermodal Development Concept and Design – Alaska Railroad Corporation,”** prepared by PND in September 2004. The study of intermodal transportation was performed in this previous report.
4. **“2020 Structural Condition Assessment of Whittier Marine Terminal – Report of Findings and Recommendations,”** prepared by PND on December 10, 2020. In this report, the structural conditions of the Whittier Marine Terminal were previously assessed.
5. **“Survey Report – R&M Project No. 2852.01, Task 2 – Whittier Planning Survey, Phase 1 – Whittier, Alaska,”** prepared by R&M in 2021. This survey report was done based on historic and field survey information at Whittier to create a basemap of existing conditions including site bathymetry for planning purposes.
6. **“Port of Whittier Freight Study,”** prepared by ARRC with support from DOWL and PND in May 2020.

1.4.1 Port of Whittier Freight Study 2020

The Port of Whittier Freight Study, conducted by the ARRC in 2020, evaluated existing facilities and their condition, operations and activities, recent and historic business trends, future

business opportunities, and potential for existing facilities to support future freight operations and improvements needed to accommodate anticipated freight operations.

The Port of Whittier Freight Study addresses several objectives:

- **Establishes a freight facility and user baseline:** The ARRC Whittier facilities include a barge slip providing for Roll-On/Roll-Off (Ro/Ro) barge freight, and rail yard and track. The upland area is currently used by Alaska Marine Trucking on a permit basis for laydown, storage, and staging.
- **Identify issues with the existing facilities and services:** The ARRC Whittier marine facilities provide a range of functions and services and are 50 years or older. The current facilities have been adapted over time, and compromises have been made to adapt to changes in usage and demand.
- **Identify opportunities based on a comparative analysis with other ports on the Railbelt:** An analysis has been completed of activities and plans at other southcentral ports located on the Railbelt (Anchorage to/from Seward) to identify whether these create opportunities to secure new business at Whittier.
- **Identify options to address issues and opportunities:** A range of options was developed to address identified issues and opportunities.
- **Refine options to generate a preferred approach:** The comprehensive economic analysis completed as part of the Seward Marine Terminal Expansion Planning project was updated to summarize the existing market, current trends, and potential growth trends over the next 20 years and beyond. The analysis explored the relative advantages of the Whittier freight facility to enable the recommendation of a preferred approach based on two potential improvement options. Options were developed to allow a flexible delivery of improvements, dependent on future demand, with a “cafeteria-style” approach laid out to provide freight services and facilities in response to demand and market trends over the next 20 years.

The study identifies potential opportunities to increase the level of freight activity in Whittier, such as attracting businesses from other ports and integrating cruise operations with freight facilities, net impacts of expanded freight activities at Port of Seward, and the Port of Alaska (Anchorage) modernization and the associated cost of redeveloping facilities in this location and associated funding uncertainty.

The study also outlines infrastructure improvement options, including redeveloping the Marginal Wharf to support either container freight or combined breakbulk and cruise operations. These projects aim to maximize flexibility and adapt to future market demands. The conceptual plans for these upgrades are based on an economic analysis projecting freight trends over the next 20 years.

2. Existing Conditions of Waterfront

ARRC’s existing facilities in Whittier include a barge slip, marginal wharf bulkhead, Integrated Tug-Barge Ro/Ro Dock (ITB), and related nearby facilities such as rail yard, tracks, and associated uplands features that support the cargo-handling operations.

In Appendix A, Figure 16 (Project Study Area; see below) shows the Alaska Marine Highway Ferry pier at left (west), former marginal wharf (center), barge slip, DeLong Dock (right and east), and Smitty’s Cove pier (far right). Landside of the waterfront is ARRC’s intermodal rail yard, container storage, and barge-loading switching tracks, shown in green. Property lines are shown in yellow.

Appendix A, Figure 16. Project Study Area.



2.1 General Condition of Facilities

Whittier is an ice-free terminal and thus is a critical link for year-round cargo operations in Alaska. The terminal was created by the USACE in the early 1940s in response to wartime efforts to supply Alaska. The barge facilities were updated in the 1970s, including installation of the current barge transfer span.

Condition assessments of the facilities are documented in recent reports, including PND’s Report No. 4, *2020 Structural Condition Assessment of Whittier Marine Terminal – Report of Findings and Recommendations*. In general, the facilities have reached, or are nearing the end

of, their useful life and require replacement or extensive repairs to remain operational. The planning horizon for this effort is 20 years.

2.2 Marginal Wharf

A pile-supported marginal wharf, comprised of a 1,100-foot-long by 60-foot-wide dock with steel piles and a concrete deck, was initially constructed in the 1950s and used for freight operations until 2002. The wharf was closed and then later demolished due to advanced deteriorated conditions. The wharf's shoreside bulkhead remains and is in poor condition (Appendix A, Figures 17 through 19). Report No. 4, *2020 Structural Condition Assessment of Whittier Marine Terminal – Report of Findings and Recommendations*, documents the condition of this wharf remnant.

In Appendix A, Figure 19 (East end of marginal wharf where it connects to barge transfer span), note the condition of bulkhead, rip rap, and deteriorated cells.

2.3 Barge Berthing Facilities

The barge slip at the Whittier Terminal provides a critical rail link with the Lower 48 states. The slip accommodates berthing and loading operations of the AML barges that call at the facility. The barge is moored via a hydraulic cable system that holds the vessel against the transfer span (ramp) and slews it laterally within the slip to align the tracks on the barge with the tracks on the ramp to facilitate loading and unloading of railcars. The moveable transfer span acts as a bridge from land to barge (Appendix A, Figures 20 through 25) and is hinged on the pile-supported abutment while the offshore end rests on the barge during loading and unloading operations. The offshore end of the transfer span moves vertically with hydraulic controls to accommodate tides and the changing freeboard of the barge as it is loaded or unloaded.

To accommodate container handling equipment on the transfer span, the transfer ramp mechanical and electrical systems were upgraded in 2008–2010 and the lifting mechanism was revised to a hydraulic system. Refer to Appendix A, Figures 20 through 25, for recent photographs of the barge ramp, berth, and rail operations. Refer to Section 2.1 of the Whittier Terminal Transportation Study for more detail of the rail and barge loading and unloading process.

The absence of railcars and racks on this barge is shown below in Appendix A, Figure 21 – (Other configurations - Alaska Marine Lines (AML) barge fully loaded with containers).

Appendix A, Figure 21. Other configurations - Alaska Marine Lines (AML) barge fully loaded with containers.



2.4 Other Whittier Marine Facilities (non-ARRC Owned)

Other non-ARRC waterfront facilities are nearby, including the DeLong Dock cargo ramp used to serve other Alaska harbors like Valdez and Cordova. This cargo is trans-shipped in Whittier. Additionally, the Alaska Ferry landing serves Southcentral and Southeast Alaska communities with passenger and vehicle traffic. While not part of this Study, these operations must be considered with adjacent ARRC barge, rail, and trucking activities. Future planning must consider barge traffic as well as cargo and vehicular traffic growth to and from those destinations.

2.5 Stakeholder Engagement

The City of Whittier's community and economy are inexorably tied to the Alaska Railroad. Over the last 60 years, the City has grown around the ARRC's Terminal facilities, and both the City and local businesses hold long-term leases for waterfront and upland property. Because of the close association between the ARRC and the City, input from key stakeholders was critical to identifying opportunities and issues to be considered in the Whittier Terminal Master Plan's development. Internal and external stakeholders were engaged early in the process to identify a vision for the Plan's development and to provide their perspective on land use, the transportation network, opportunities for development, and infrastructure needs.

See Appendix E, Stakeholder Engagement, for combined documentation from stakeholder activities for the Plan.

3. Proposed Alternatives for Waterfront Reconstruction

The Whittier Terminal waterfront plays a vital role in Alaska's transportation network; hence, its aging infrastructure requires consideration of reconstruction options. This section outlines alternatives for redevelopment, including a No-Build scenario, based on a review of the current facility, future growth requirements, stakeholder input, and cost evaluations.

In this planning phase, critical factors such as coastal resilience, tsunami and earthquake vulnerability, and long-term operational needs were evaluated. These considerations informed the prioritization of reconstruction efforts, the selection of design concepts, and the estimation of probable construction costs.

The proposed alternatives focus on replacing or upgrading the marginal wharf with one of two primary design concepts: a pile-supported dock or a rock-filled dock. These designs were assessed for their suitability to Alaska's environmental conditions, cost-effectiveness, and feasibility given available materials and construction methods.

The following sections describe each alternative, beginning with the No-Build scenario and progressing to specific reconstruction concepts. Each alternative highlights the associated costs, benefits, and potential challenges to ensure informed decision-making and alignment with the terminal's long-term goals.

3.1 No-Build Alternative

Under the No-Build Alternative, the facility would be left as is and no modifications would be implemented. The current state of the Whittier Terminal's infrastructure is a cause for concern. The deteriorating marginal wharf, barge slip, transfer span, and associated waterfront elements would remain as they are with no upgrades or repairs. While avoiding immediate capital expenditures, this scenario presents significant risks and challenges. Key concerns include:

- **Structural Deterioration:** The existing marginal wharf is in very poor condition, and its bulkhead is near failure. The transfer span is in similar poor condition and needs immediate upgrades to continue operation. Without intervention, the structural integrity of the waterfront facilities will continue to degrade, leading to safety hazards, operational inefficiencies, and, eventually, a complete loss of functionality. The failure of critical infrastructure could result in expensive emergency repairs, loss of the primary access road into the Whittier Terminal, and/or the total shutdown of operations.
- **Operational Disruption:** The deteriorating condition of the barge slip and mooring facilities, which are essential for ARRC and AML cargo operations, will lead to increasing operational disruptions. As the facilities age, they will become more prone to mechanical and structural failures, leading to delays in barge and rail operations, increased maintenance costs, and reduced reliability for cargo movements.
- **Safety Risks:** The declining condition of the marginal wharf bulkhead and transfer span poses significant safety risks to workers, vessels, and cargo handling operations.

Without remediation, the risk of accidents or structural failures increases, putting personnel and equipment at risk.

- **Lost Opportunities for Expansion and Modernization:** The No-Build Alternative would prevent the terminal from capitalizing on opportunities to modernize and expand operations. There would be no improvements to accommodate longer trains, larger barges, or additional waterfront storage, limiting the terminal's ability to support future freight and passenger traffic growth.
- **Environmental Concerns:** Continuing to operate with aging and deteriorating infrastructure increases the likelihood of environmental impacts (i.e., unintended spills or failures), which could affect the surrounding marine environment. Additionally, the lack of investment in more sustainable and resilient infrastructure would leave the terminal vulnerable to the long-term effects of climate change, including fluctuating sea levels and increased storm intensity.

In summary, the No-Build Alternative saves costs in the short term but leads to compounding issues over time, including higher future repair costs, operational inefficiencies, safety risks, and the inability to support long-term economic growth. Given the critical role that the Whittier Terminal plays in Alaska's transportation network, the No-Build Alternative is not recommended to ensure the terminal's long-term viability and functionality.

3.2 Alternative 1 – Westerly Relocation of Barge Berthing

Alternative 1 proposes relocating the barge berthing operation approximately 1,000 feet westward from the existing location. This waterfront reconstruction alternative includes constructing a new shoreline bulkhead, new barge berth, and transfer span, and expanding the wharf to provide an additional 3.9 acres (170,000 square feet) of yard area for cargo handling and storage. The overall reconstruction would be carried out in two phases to minimize disruption to operations:

- **Phase 1:** This phase would prioritize the essential waterfront structures required for barge berthing operations, including the construction of a new bulkhead to replace the deteriorating existing bulkhead.
- **Phase 2:** The second phase would focus on the wharf expansion and removal of the old barge facilities, ensuring operational continuity throughout the construction process.

As shown on Appendix A, Figure 27 (Layout of westerly relocation of barge berthing), the barge approach would be extended from the shoreline to accommodate the new rail tracks connecting to the barge transfer span. The angle of the new berth is modified to optimize the new barge lead track alignment. The structural options considered for the new wharf configuration are a pile-supported dock and a rock-filled bulkheaded dock. The new bulkhead wall would be constructed outboard of the existing bulkhead using steel sheet pile walls with tiebacks and a reinforced concrete cap. The space between the existing and new bulkheads would be filled with well-graded rock.

The dimensions of the existing transfer span are well optimized; thus, the new transfer span would maintain a similar length and width to accommodate three tracks. The hydraulic lifting

mechanism is recommended to be changed to a wire-rope mechanism for easier maintenance. The new barge berth and wharf expansion are planned to accommodate the largest barge size (up to 125 by 460 feet) with a 25-foot draft in consideration of the tidal ranges at Whittier.

The opinion of probable construction cost for this alternative includes:

- \$40 million for the new shoreline bulkhead,
- \$50 million for the new barge berth and transfer span, and
- \$125 million for the wharf expansion, which includes the removal of the existing barge facility.

Total: \$215 million

The total construction cost is based on a pile-supported dock with steel piles and a concrete deck and includes the cost of removing the existing barge facility. All costs are in 2024 dollars.

This alternative is not desired by the community or ARRC unless the grade separation between ARRC tracks and Whittier Street is included. The community has concerns that these changes would result in a potential increase in traffic during construction and after completion that would block the crossing to the terminal.

3.3 Alternative 2A – Reconstruct Existing Berthing Facilities In Place (Preferred Alternative)

Alternative 2A, the preferred alternative, proposes reconstructing the existing barge berth facility in its current location. To accomplish this, construction phasing will be undertaken between barge calls to the extent possible to minimize impacts on barge and yard operations. In this manner, new dolphins with fenders would be installed adjacent to the existing dolphins; a new bulkhead, new transfer span abutment, and new lifting platform would be installed outboard of the existing structures; and the side ramp would be relocated/reconstructed in its new location (to account for the shift of the transfer span). To minimize downtime, as much work as possible would be accomplished prior to replacement of the transfer span. Replacing the transfer span would require an approximate 2-week barge call outage to allow installation and commissioning of the new span and removal of existing dolphins and electrical and mechanical systems.

This alternative emerged from discussions with ARRC regarding the potential disadvantages of relocating the barge slip westward, as proposed in Alternative 1. Concerns were raised about the reduction in yard track lengths and operational difficulties in loading and unloading a barge positioned farther west. Additionally, the wind and wave conditions at the current location are more predictable and manageable for barge operations, whereas relocating westward would expose the barge to increased wave action, potentially hindering efficient operations, especially during adverse weather conditions.

Given these advantages, the reconstruction in-place Alternative 2A concept was conceived. This approach not only maintains the known benefits of the current site—such as favorable wind and wave conditions—but also replaces the deteriorating infrastructure. This option leverages

existing track layouts and maintains existing operational efficiency for ARRC and AML while avoiding the operational risks associated with a relocation, reinforcing the confidence in the project's location.

The key benefits of Alternative 2A include lower costs compared to relocation, with an opinion of probable construction cost of \$50 million, and reduced risks due to maintaining operations at a known and reliable site. The use of existing long tracks, which have proven value for efficient rail loading, further enhances the terminal's functionality. Although there may be temporary disruptions during construction, these would be managed through a phased approach to constructing new dolphins, abutment, transfer span, and steel sheet pile bulkhead.

The opinion of probable construction cost for this alternative includes:

- \$20 million to reconstruct the marginal wharf (including bulkhead replacement),
- \$15 million to replace the existing transfer span in place, and
- \$15 million to reconstruct the barge berthing facilities.

Total: \$50 million

These costs include rock fill to support the dock pavement and environmental mitigation for in-water fill. The cost for the barge berth facility includes the construction of a slewing dolphin, berthing dock, and fenders. All costs are in 2024 dollars.

Overall, Alternative 2A stands out as the most cost-effective and low-risk option, making it the preferred alternative. Its financial viability provides reassurance about the project's feasibility and long-term benefits.

3.4 Alternative 2B – In-Place Reconstruction with Wharf Expansion

Alternative 2B builds upon Alternative 2A by not only reconstructing the existing barge berth facility in place and expanding the marginal wharf to provide additional space for waterfront storage and rail loading. This approach increases the operational capacity of the terminal, allowing for more efficient cargo handling and future growth. The wharf expansion not only creates additional space for rail operations but also enhances the overall flexibility of the terminal, retaining the advantages of the current site's known environmental conditions. Similar to Alternative 2A, the construction would be phased to minimize disruptions.

The benefits of Alternative 2B include increased operational capacity and the ability to accommodate future growth while still retaining the advantages of the current site. However, the expanded scope of the wharf construction would result in higher costs (of \$85 million) compared to Alternative 2A, and the additional work may require temporary operational downtime during the expansion phase. While Alternative 2B offers growth potential, its increased costs and complexity make it a more expensive option than simply reconstructing the existing facilities.

The estimated construction costs for this alternative include:

- \$75 million to reconstruct the marginal wharf (including wharf expansion and bulkhead replacement),
- \$15 million to replace the existing transfer span in place, and
- \$15 million to reconstruct the barge berthing facilities.

Total: \$105 million

These costs include rock fill to support the dock pavement and environmental mitigation for in-water fill. The cost for the barge berthing facilities includes the construction of a slewing dolphin, berthing dock, and fenders. All costs are in 2024 dollars.

3.5 Other Reconstruction Considerations

Other reconstruction alternatives were reviewed and ultimately discarded. Below is a short list and considerations that ultimately made the team discard them.

- **Moving barge berth to DeLong Dock area:** This alternative was rejected due to the costs, disruption, and relocations required to ongoing operations on the far east side of the waterfront.
- **Moving barge berth to mid-point of wharf:** This alternative was considered and rejected. It had all the costs of Alternative 1 but was rejected due to shorter working yard rail tracks.
- **Pile-supported concrete deck alternative:** This alternative was part of initial concepts for a new marginal wharf. It was compared to and rejected for a lower-cost sheet pile bulkhead alternative with an earthen or rock material backfill. Proximity to apparently competent rock material and short borrow distances made the fill alternative superior.

4. Summary and Recommendations

This Whittier Terminal Waterfront Reconstruction Study provides a detailed assessment of the existing conditions of the marine terminal's aging infrastructure, including the deteriorating barge slip, marginal wharf, and associated waterfront facilities. This Study explores several reconstruction alternatives to modernize the terminal, improve its operational efficiency, and ensure its long-term sustainability. Each alternative was evaluated based on its ability to address current deficiencies, optimize costs, minimize operational disruptions, and support the future growth of the terminal, which plays a vital role in Alaska's intermodal transportation network.

The **No-Build Alternative** presents significant risks and challenges that demand immediate attention. While it avoids upfront capital expenditures, it would lead to the continued deterioration of critical infrastructure, increasing the likelihood of structural failures, operational inefficiencies, and potential safety hazards. The terminal would face escalating maintenance costs, higher future repair expenses, and reduced capacity to accommodate growing freight traffic. Given the strategic importance of Whittier as a year-round ice-free port, there are other

options besides the No-Build Alternative for ensuring the terminal's long-term operational viability.

Alternative 1 – Westerly Relocation of Barge Berthing proposes relocating the barge berth facility approximately 1,000 feet westward; constructing a new bulkhead, barge berth, and transfer span; and expanding the wharf. This alternative would provide greater flexibility for future terminal expansion and more optimized alignment of rail tracks for barge loading. However, this option also comes with significant costs, estimated at \$215 million, and introduces operational risks associated with increased exposure to wind and wave action at the new location. Additionally, reducing available yard track lengths would negatively impact overall operational efficiency. As a result, this alternative may not be the most favorable in balancing cost, risk, and operational improvements.

Alternative 2A – Reconstruct Existing Berthing Facilities In Place has emerged as the preferred alternative. It proposes reconstructing the barge berth facility in its current location and replacing the deteriorating infrastructure while retaining the known operational benefits of the existing site, including more favorable wind and wave conditions. This alternative also preserves the current yard track lengths, ensuring continued operational efficiency for loading and unloading barge cargo. With an opinion of probable construction cost of \$50 million, Alternative 2A is the most cost-effective option. It presents fewer operational risks than relocation, as it maintains operations at a familiar site while phasing the reconstruction to minimize disruptions. The lower costs, reduced risk, and retention of key operational features make Alternative 2A the best solution for ensuring the long-term functionality and sustainability of the terminal.

Alternative 2B – In-Place Reconstruction with Wharf Expansion builds upon Alternative 2A by expanding the marginal wharf to provide additional waterfront storage and rail loading capacity. While this alternative offers future growth potential and increased operational capacity, it comes at a higher cost, estimated at \$105 million. The additional scope of work could lead to temporary operational downtime during construction. Although Alternative 2B provides more flexibility for future growth, the increased costs and complexity may not justify its advantages over Alternative 2A for the immediate needs of the terminal.

4.1 Recommendations

Based on the analysis conducted in this Study, it is recommended that Alternative 2A – Reconstruct Existing Berthing Facilities In Place be adopted as the preferred solution. This alternative strikes the best balance between cost, operational efficiency, and risk management. By addressing the immediate need for infrastructure improvements, maintaining operational continuity, and ensuring that the terminal remains viable for future growth, Alternative 2A presents the most practical and cost-effective path forward.

Implementing this alternative will allow the ARRC and AML to continue efficiently supporting Alaska's freight movements while minimizing risks and ensuring long-term sustainability. As the preferred alternative, it not only aligns with but also advances the goals of the U.S. Department of Transportation's Port Infrastructure Development Program, ensuring that the Whittier Terminal remains a key component of Alaska's transportation network.

To incorporate these recommendations and findings into the Whittier Terminal Master Plan, this Study will be presented to the public and the terminal and rail partners for their input. After their input is received, it will be incorporated into the Study, and any changes implemented will be analyzed and corrected for potential recommendations. That finalized Study will then be incorporated into the Whittier Terminal Master Plan with an action plan for the investments to guide their implementation. A funding and action plan will be written to lay out the process and potential funding sources for Alternative 2A.