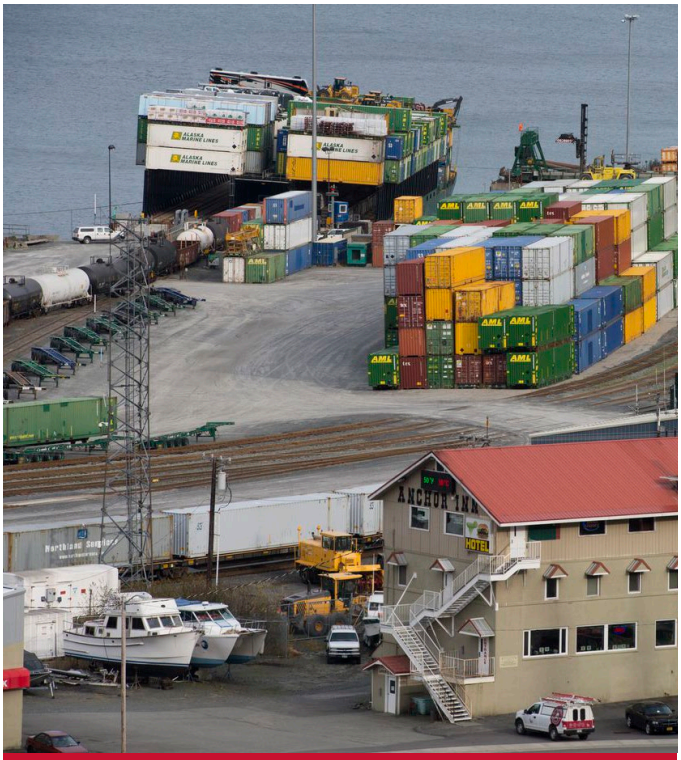

Whittier Terminal Master Plan (Final)

Alaska Railroad Corporation

Whittier Terminal Master Plan

Whittier, Alaska

August 29, 2025

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Contents

List of Tables

List of Figures

Appendices

Glossary

Alaska DOT&PF	Alaska Department of Transportation and Public Facilities
AML	Alaska Marine Lines
ARRC	Alaska Railroad Corporation
BCA	Benefit-cost analysis
CAGR	Compound Annual Growth Rate
COFC/TOFC	Container on flat car / Trailer on Flat Car
FHWA	Federal Highway Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
KPFF	KPFF Consulting Engineers
MARAD	Maritime Administration
NEPA	National Environmental Policy Act
PIDP	Port Infrastructure Development Program
PND	PND Engineers, Inc.
R&M	R&M Consultants, Inc
ROW	Right-of-Way
USACE	U.S. Army Corps of Engineers
U.S. DOT	United States Department of Transportation
WTMP	Whittier Terminal Master Plan

Executive Summary

The Whittier Terminal has long served as a critical multimodal gateway for freight and passenger movement in Southcentral Alaska. Originally developed as a military logistics base during World War II, the terminal now anchors the Alaska Railroad Corporation's (ARRC) rail barge connection to the Lower 48 via Seattle, facilitates regional trade, and supports seasonal passenger services through growing cruise ship traffic. Despite its strategic importance, much of the terminal's infrastructure is reaching the end of its useful life, and evolving operational demands are placing increasing pressure on its aging facilities. Recognizing the need for coordinated reinvestment, ARRC initiated the Whittier Terminal Master Plan (WTMP) to provide a long-term, phased framework for modernizing the terminal, improving operational resilience, and aligning infrastructure investment needs, guided by the strategic vision:

> *"To renew the Whittier Terminal as an efficient, resilient, and balanced facility that safely delivers customer needs and empowers economic growth for the railroad and the State of Alaska."*

Grounded by the Transportation and Waterfront Reconstruction studies, the WTMP pursues five overarching objectives:

1. Restore aging marine and rail infrastructure to a state of good repair;
2. Improve efficiency and reliability of freight-to-rail and passenger operations;
3. Enhance safety by reducing railroad conflicts and modernizing security;
4. Embed long-term resiliency and sustainability; and
5. Position the terminal for incremental expansion as demand grows.

The planning team identified several issues and constraints that jeopardize continued safe and efficient operations:

- **Aging marine assets –** the transfer span, barge slip, and marginal wharf are at or beyond design life.
- **Spatial and operational constraints –** limited railyard track length, limited terminal area, a single-track single lane roadway shared use tunnel, a rail tunnel which restricts the use of double-stack railcars, and an at-grade crossing regularly blocks community traffic.
- **Harsh environment –** extreme snowfall and exposure to wave action require robust snow management and hardened structures.

These constraints combined with steady freight growth and increasing cruise-related passenger volumes, underscore the need for a phased, fiscally realistic program.

Following a structured process of data collection, stakeholder engagement, alternatives development, and benefit-cost screening, four holistic improvement packages that integrate waterfront and landside elements were advanced: The No-Build Baseline, Alternative 1 (westerly relocation of barge berthing), Alternative 2A (in-place reconstruction), and Alternative 2B (in-place reconstruction with wharf expansion).

Of the four potential alternatives identified, the plan recommends Alternative 2A – Reconstruct Existing Berthing Facilities in Place with south terminal track realignment Option E (out of Options A, B, C, D, and E) as the recommended alternative:

- **Alternative 2A – Reconstruct Existing Berthing Facilities In-Place with Track Option E:** This alternative proposes reconstructing the transfer span, barge berthing facilities, and marginal wharf in their current locations; and replacing the deteriorating infrastructure while retaining the known operational benefits of the existing site. This alternative optimizes yard track lengths based on single-stacked railcars and configurations, relocates truck security gates away from the busy small boat harbor and ferry terminal, adds a second main track from the tunnel entrance to the yard, relocates passenger loading to dedicated tracks and facilities, and offers a proposed grade separation to remove the at-grade crossing conflict at Whittier Street. The alternative has a total probable construction cost of approximately $185 million.

The key benefits of Alternative 2A include:

- **Cost-effectiveness:** The total estimated construction cost is $185 million, significantly lower than other alternatives.
- **Operational efficiency:** By retaining the current layout of barge facilities and optimizing operational features such as the yard track lengths and truck security gates, this alternative avoids the operational risks associated with relocation and ensures continued efficiency in barge loading and unloading.
- **Risk management:** The in-place reconstruction minimizes exposure to environmental risks such as increased wave action, which could hinder operations if the facilities were relocated westward. Additionally, many of the proposed improvements can be constructed independently as funds become available, reducing the risk of funding constraints from implementing the plan.

The WTMP provides background and additional analysis supporting the choice of a recommended alternative and outlines a vision for responsibly completing the proposed improvements. Refer to Exhibit Drawings (Appendix B) for alternative layouts.

1. Introduction

The Alaska Railroad Corporation (ARRC) provides a Class II railroad in Alaska that extends from Seward to Eielson Air Force Base (in Fairbanks) and provides freight and passenger services throughout the Railbelt. In addition to the railroad track and supporting infrastructure, ARRC has significant land reserves, including a 291-acre reserve in Whittier.

The City of Whittier is located in a fjord at the head of Passage Canal in Prince William Sound. It is approximately 47 air miles, and 62 road and rail miles, southeast of Anchorage. Road and rail access to Whittier is controlled by the Anton Anderson Memorial Tunnel from Portage Valley, a 2.5-mile-long, one-lane tunnel that is shared by cars and trains traveling in both directions on a scheduled opening basis. Trains arrive in Whittier via the 12.5-mile Whittier Subdivision (F-Branch), which connects to ARRC's mainline track at the Portage Wye. The subdivision includes two tunnels: the 1-mile-long Portage Tunnel and the shared-use Anton Anderson Memorial Tunnel (see Figure 1-1). The Whittier Terminal Reserve includes all active waterfront, track, yard, and reserve land areas on the Whittier side of the Anton Anderson Memorial Tunnel (see Figure 1-2).

Figure 1-1. Vicinity Map of Whittier Branch Line

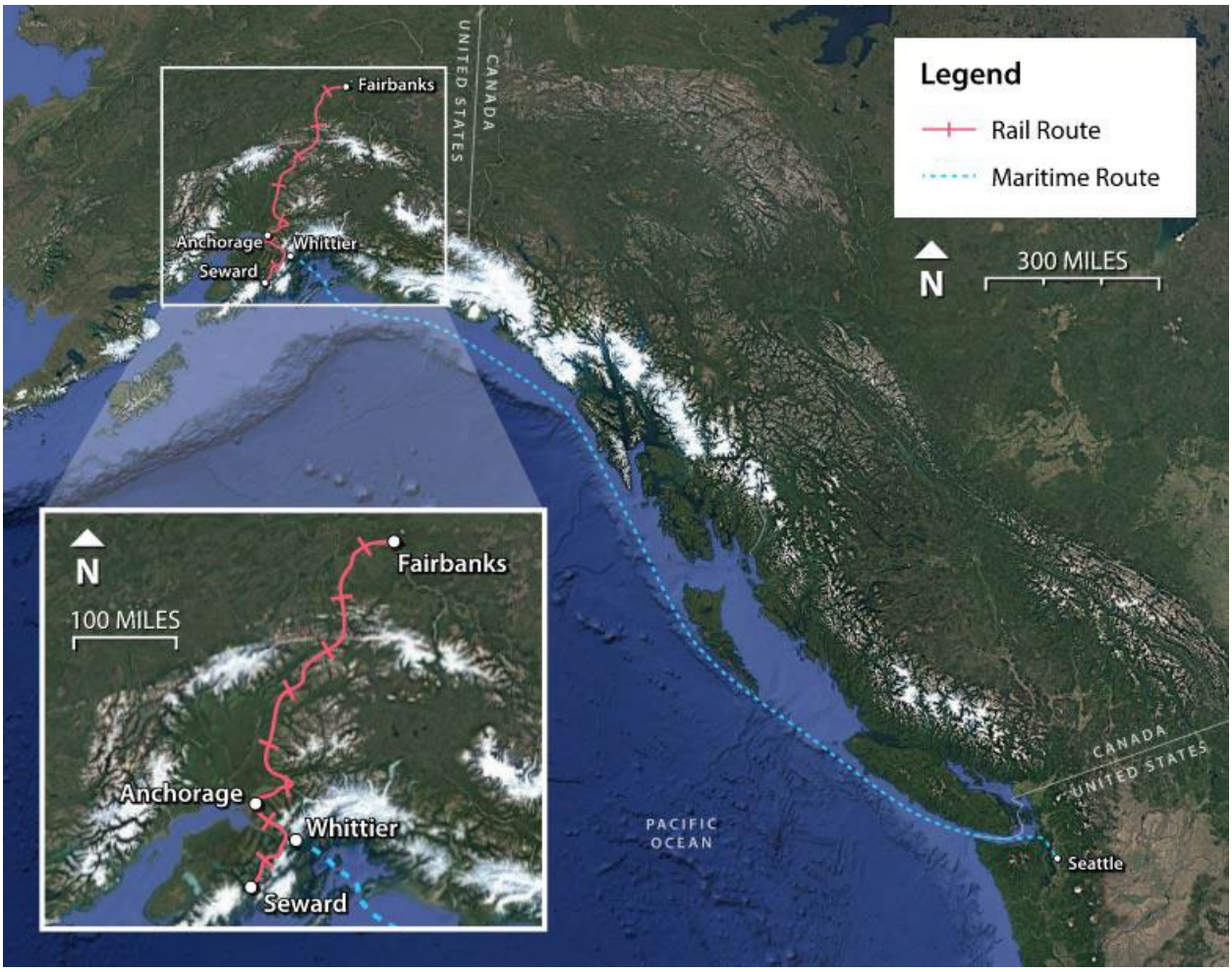
Figure 1-2. Vicinity Map of Whittier Terminal Reserve

Whittier was established as a strategic military facility during World War II, when the U.S. Army constructed a terminal and railroad terminus for the transportation of fuel and other supplies. The railroad branch and two tunnels were completed in 1943, and the terminal became the entrance for troops and dependents of the Alaska Command. Following the withdrawal of the military from Whittier, much of the land reserve in Whittier was assumed by ARRC.

Whittier is ARRC's point of connection to rail systems in Canada and the Lower 48 states by way of rail barges for freight (see Figure 1-3). Due to more favorable ice conditions than the Port of Anchorage, this presents opportunities for ongoing and increasing freight business at Whittier as an ice-free port.

Passenger traffic has also increased in the last several years, owing to the increasing popularity of cruise ship travel and the growing number and size of cruise ships calling at Whittier. This is a significant opportunity for ARRC, but it also generates challenges due to constrained rail facilities and potential conflicts between passenger and freight operations.

Figure 1-3. Rail Barge Connection Map



1.1. Plan Description

This Whittier Terminal Master Plan (WTMP) is a comprehensive master plan that evaluates the condition, performance, safety, efficiency, state of good repair, reliability, resiliency, intermodality, and sustainability of the Whittier Terminal. The plan identifies areas for potential rehabilitation of marine, terminal, and upland infrastructure, as well as potential operational improvements to support the terminal.

Plan objectives included the following:

- Identify and prioritize options for rehabilitation or improvement to terminal facilities in Whittier. This effort models phasing and funding strategies, and results in conceptual designs, estimates, phasing, and benefit-cost analyses (BCAs) for priority improvements.
- Explore and identify alternatives for infrastructure elements including waterfront facilities, track layouts, vehicle access, and cargo staging and integration with other area users such as the Alaska Marine Highway System. The WTMP includes a transportation study, a waterfront reconstruction study, stakeholder engagement, improvement alternatives and environmental considerations, and prioritized development options. Special emphasis is placed on operational efficiency, cost-saving alternatives, long-term sustainability, and funding strategies.
- Identify and evaluate alternatives, develop phasing plans where applicable, and develop preliminary design of critical elements or facilities. The WTMP identifies and prioritizes issues, generates alternatives to address issues, identifies impacts to other terminal operations and stakeholders, and recommends preferred alternatives. It addresses potential improvements including terminal rail operations, reduced conflicts with road crossings, reduced conflicts between passenger and freight trains, and improved roadway access and movement to and within the terminal.

1.2. Literature Review

As part of the WTMP development, relevant historical documents were reviewed and available data from previous studies for the ARRC's Whittier Terminal were analyzed. The following are the previous studies and available data reviewed and incorporated into the WTMP and are available in Reference Documents (Appendix G):

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.
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 alternatives for the reconstruction of the ARRC's Whittier Terminal marine facilities.
Draft Submittal – Whittier Intermodal Development Concept and Design, prepared by PND in September 2004. This report presented a study of intermodal transportation.
2020 Structural Condition Assessment of Whittier Marine Terminal – Report of Findings and Recommendations, prepared by PND on December 10, 2020. This report assessed the structural conditions of the Whittier Marine Terminal.
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.

Port of Whittier Freight Study, prepared by ARRC with support from DOWL and PND in May 2020.
Alaska State Rail Plan, prepared for the Alaska Department of Transportation and Public Facilities (Alaska DOT&PF), prepared by HDR Engineering, Inc., in association with CDM Smith, in November 2016.
City of Whittier Comprehensive Plan, prepared by Catalyst Consulting, January 21, 2020. https://www.whittieralaska.gov/media/706.
Alaska Railroad Timetable No. 143, May 2021 [CONFIDENTIAL – available upon request].
Whittier Barge Operations Report 2020-2024, prepared for Alaska Railroad providing an overview of barge traffic departing Seattle, Washington and arriving in Whittier, Alaska. The transportation of Interchange and Container on flat car / Trailer on Flat Car (COFC/TOFC) to Anchorage and then on to Fairbanks. As well as freight volumes, operation times, COFC/TOFC, and more.

1.3. Goals

As mentioned above, the Whittier Terminal Transportation Study (Appendix C) and the Waterfront Reconstruction Study (Appendix D) are essential elements of the WTMP. They aim to assess, enhance, and develop sustainable strategies for improving the Whittier Terminal's intermodal and waterfront infrastructure. These studies evaluate existing conditions and propose solutions to ensure the terminal's continued role in facilitating freight and passenger movements.

Both studies establish a roadmap for future investments, aligning transportation and waterfront goals to support Whittier Terminal's long-term development. By integrating infrastructure improvements with sustainable operational strategies, these efforts pave the way for enhanced efficiency, resilience, and continued economic viability and inform the WTMP's goals.

The work includes, but is not limited to the following goals:

- Assess the existing terminal intermodal facilities and waterfront infrastructure based on current and future demands.
- Review connectivity within upland transportation facilities with regard to both freight and passenger traffic (Transportation Study, Appendix C).
- Develop alternative recommendations to reconstruct the Whittier Terminal's waterfront infrastructure (Waterfront Reconstruction Study, Appendix D).
- Explore long-term expansion opportunities for the Whittier Terminal.
- Improve efficiency, reliability, and sustainability of the Whittier Terminal.

1.4. Planning Area

The project is located in the City of Whittier, Alaska. The project study area limits include all facilities within the ARRC right-of-way (ROW) from the western end of the Anton Anderson Memorial Tunnel to the eastern end of the rail terminal facilities and docks. Consideration is given to the impacts from the recently constructed Head of the Bay cruise ship terminal and proposed rail connection to the mainline, and the operational limitations of the Portage Tunnel

located less than a mile west of the Anton Anderson Memorial Tunnel. Figure 1-2 shows the project study area and indicates ARRC ROW/Reserve limits and track locations within the study area.

For additional information, see the Transportation Study (Appendix C).

1.5. Planning Process

The WTMP followed a structured planning process incorporating data collection, stakeholder engagement, and iterative analysis to develop viable long-term solutions. The process included:

- Data collection and review
- Stakeholder engagement
- Needs assessment and issue identification
- Alternatives development
- Preliminary design and cost estimation
- Final recommendations and phasing plan

1.5.1. Economic Development

Whittier Terminal inbound and outbound cargo tonnage data was reviewed for 2004–2022. The Alaska Railroad and Alaska Marine Lines (AML) were interviewed for their input on market trends. Inbound cargo growth as reported by the U.S. Army Corps of Engineers (USACE) over this period has been healthy at an approximate compound annual growth rate (CAGR) of 5.8 percent. Outbound tonnage was more volatile and grew at a modest 1 percent CAGR. If sustained, this trend of inbound growth could result in Whittier tonnage doubling in 12 years. Alternatives developed and evaluated use this basis as a key driver for determining improvements that not only maintain existing capacity but also provide growth opportunities in the future.

1.5.2. Infrastructure Development and Improvement

The Whittier Terminal faces numerous infrastructure challenges, including aging marine facilities, limited rail capacity, inability to operate double-stack railcars, and constrained landside space. To address these challenges, the WTMP evaluates a range of infrastructure improvement projects, such as:

- Marine terminal upgrades
- Railyard expansion
- Railroad-road grade separations
- Terminal access enhancement
- Sustainability and resiliency measures

1.5.3. Intermodal Transportation Facilities

Given Whittier's role as a critical link in Alaska's freight and passenger transportation network, the WTMP examines intermodal connectivity and opportunities to improve modal integration. Key intermodal facility enhancements include:

- Barge-to-rail efficiency
- Coordination with Alaska Marine Highway System
- Rail connectivity improvements
- Cruise ship and passenger rail coordination improvements

1.5.4. Physical, Environmental, and Regulatory Constraints

Several physical, environmental, and regulatory factors impact Whittier Terminal operations and future development plans:

- Physical constraints imposed by features such as mountains, ocean, and adjacent infrastructure.
- Operational constraints such as inability to double-stack railcars.
- Regulatory and Environmental considerations such as local, state, and federal permitting requirements and National Environmental Policy Act (NEPA) reviews for proposed improvements.
- Constraints and challenges due to lease agreements, federal funding requirements, and federal terminal security requirements.
- Land use conflicts with leaseholders and adjacent landowners.

The WTMP incorporates mitigation strategies for these constraints, ensuring that proposed improvements are feasible and sustainable within the regulatory framework.

1.6. Other Studies Within the Project Area

In addition to the Whittier Terminal Master Plan study, these two other studies are currently in progress at the time of publishing this plan, which may affect future developments within Whittier and potentially the implementation of portions of this plan:

1. Whittier Transportation Plan
2. Waterfront and Economic Development Plan

The Whittier Transportation Plan is a joint effort between the Alaska Department of Transportation and Public Facilities (Alaska DOT&PF) and the City of Whittier, whose purpose is to evaluate transportation improvements needed within the City of Whittier and will recommend improvements based on anticipated increased transportation impacts from the newly constructed Head of the Bay cruise ship terminal. Overlap with the ARRC WTMP may include further analysis and refinement or additional alternatives for a grade-separated crossing of road and rail traffic; modifications to schedules and operations of the Anton Anderson Memorial Tunnel; and modifications to traffic patterns, parking areas, and pedestrian facilities within the

City of Whittier. Due to the interconnectedness of the rail network to the transportation facilities, coordination between the plans is ongoing.

The Waterfront and Economic Development Plan is an initiative by the City of Whittier to develop a plan for identifying opportunities for growth and resiliency improvements of the City of Whittier's waterfront land areas. The key project goals include:

- Economic Development and Expansion;
- Tideland Control and Protection; Access, Recreation, and Connections; and
- Resilience and Extreme Weather.

Overlap with the ARRC WTMP may include alterations to waterfront facilities adjacent to the Terminal Reserve such as the ferry terminal, parking areas, small boat harbor, and waterfront businesses. The existing railroad bisects the City of Whittier currently between the waterfront business district and the upland residential district which also includes some business areas immediately adjacent to the terminal along Whittier Street. Due to the interconnectedness of the rail terminal and the business districts of Whittier, coordination between the plans is ongoing.

2. Existing Conditions

2.1. Introduction

The Whittier Terminal is a vital transportation hub for the ARRC and the state of Alaska, linking maritime and rail operations to support freight and passenger movement throughout Alaska. The terminal is the only rail connection in Alaska to the greater North American rail network via Seattle, Washington, making its functionality crucial for economic stability and growth (see Figure 1-3). This section examines the existing conditions of the terminal infrastructure, identifying deficiencies that limit operational efficiency and assessing their impacts on the region's transportation network.

The terminal faces several challenges stemming from aging infrastructure, spatial constraints, and increased operational demands. Key facilities such as the barge slip, bulkhead, and rail transfer span have exceeded or are nearing the end of their useful lives. Landside operations are further complicated by conflicts between passenger and freight movements, restricted access via the Anton Anderson Memorial Tunnel, limited clearance at the Portage Tunnel restricts the use of double-stacked railcars, and the presence of at-grade rail crossings. These conditions necessitate immediate attention to maintain operational continuity, improve safety, and accommodate future growth. This section provides a comprehensive analysis of the terminal's current state, focusing on transportation connectivity, terminal access, and infrastructure limitations, as well as their implications for ongoing operations and long-term development.

2.1.1. Transportation Plan Discussion

The primary objectives of the Whittier Terminal Transportation Study (Appendix C) are the identification, evaluation, and selection of landside transportation improvements. The study includes review of previous studies, assessment of recent cargo data, observation of current operations, and evaluation of future scenarios based on known information about development in the region. The study was completed in tandem with the Waterfront Reconstruction Study (Appendix D), where applicable, to best serve the transportation needs of the region during the construction of selected alternatives.

While the Whittier Terminal is needed for the safe and continued rail and cargo operations of the ARRC, it is equally important to ensure that the connections to the terminal, be they rail or road, are considered to increase the efficiency of the critical barge-to-rail modal shift that occurs at Whittier.

The study revealed several key operational conflicts that are preventing optimal yard operations and transportation movement through the area, including the at-grade crossing at Whittier Street and the north end of the yard, insufficient capacity for passenger loading and unloading operations without impacting freight operations, restricted use of double-stack railcars, and inefficient yard track layouts that result in “dead space” within the terminal. The study prioritizes the development of practical solutions that could be constructed while minimizing operational impacts to rail and road operations during construction.

The WTMP Transportation Study and its proposed improvements can be found in Appendix C.

2.1.2. Waterfront Plan Discussion

The objectives of the Whittier Terminal Waterfront Reconstruction Study (Appendix D) are to assess existing conditions, review previous reports, and develop and recommend alternatives to reconstruct the Whittier Terminal waterfront. This facility is critical for maintaining safe and continuous rail and cargo operations for ARRC and 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 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 study prioritizes the development of practical solutions that could be constructed while minimizing operational impacts to barge and rail operations during construction.

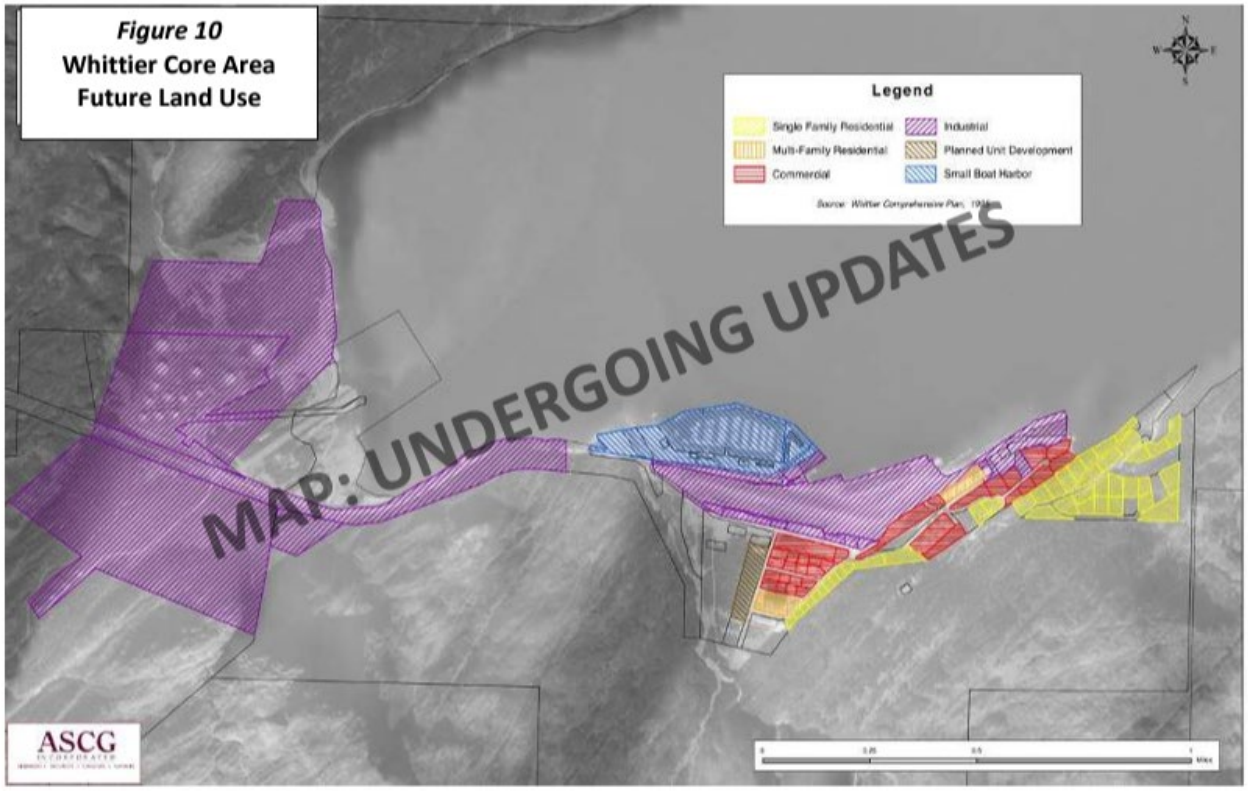
The WTMP Waterfront Reconstruction Study and its proposed improvements can be found in Appendix D.

2.2. Land Use

As indicated in Figure 2-1, the terminal property is zoned for industrial use. Approximately 58 percent of the City of Whittier's developed land is used for industrial purposes. Industrial use occurs within the combined 212 acres of the Whittier Core Area and Head of Passage Canal. Major industrial land use includes the ARRC's industrial and passenger operations, the roll-on and roll-off barge next to the Whittier Small Boat Harbor, and a privately owned seafood processing plant. The ARRC leases approximately 5,000 feet of its waterfront property in the Whittier Core Area to the City.[1]

The terminal's land use is highly specialized, with designated areas for cargo handling, rail operations, and storage. The upland track configurations support barge-to-rail intermodal transfers but face challenges from spatial constraints and weather conditions. Additionally, the terminal must balance operational demands with its proximity to residential areas, which occasionally leads to conflict points at at-grade crossings.

Figure 2-1. City of Whittier Core Area Future Land Use/Zoning Map



2.3. Terminal Access

Access is critical to maintaining the terminal's role as a key intermodal hub. This section examines the waterfront, landside, and rail connections that support freight and passenger

[1] City of Whittier 2020 Comprehensive Plan, Catalyst Consulting, January 21, 2020. https://www.whittieralaska.gov/media/706.

operations and identifies challenges and opportunities for improvement. Access to the terminal is currently constrained by aging infrastructure and limited capacity, which impact overall operational efficiency and connectivity.

2.3.1. Waterfront

The Whittier Terminal area contains significant waterfront infrastructure, all of which is critical to the operation of the rail barge service operated by AML and other local operations, which include:

- Whittier Boat Harbor
- Ferry terminal
- Cruise docks

See Figure 1-1 for waterfront and landside features. More detailed information about these critical facilities can be found in the Transportation Study (Appendix C) and the Waterfront Reconstruction Study (Appendix D).

2.3.2. Landside Roads

Vehicular and pedestrian transportation in Whittier faces its own unique challenges that are critical to analyze alongside the Whittier Terminal in order to ensure efficient operations and connections with local and freight traffic. Many of these roadways and pathways share modal use, leading to conflicts at or near the Whittier Terminal. These facilities are divided by need and use case as follows:

- Residential
- Commercial
- Tourism
- Conflict points
- Pedestrian issues

Analysis and details regarding these issues can be found in the Transportation Study (Appendix C).

2.3.3. Landside Rail

The Whittier Terminal landside rail operations are critical for connecting maritime cargo to inland destinations. The railyard's layout, however, is constrained by limited track lengths and a lack of space for efficient switching operations. Railcars must often be moved multiple times to complete loading and unloading processes, resulting in operational inefficiencies and increased turnaround times. These constraints also hinder the terminal's ability to handle larger cargo volumes, posing a challenge to its long-term viability.

For additional information, see the Transportation Study (Appendix C).

2.3.4. At-Grade Rail Crossings

The Whittier Street at-grade rail crossing is a significant conflict point within the terminal's landside access network. This crossing, which serves as the primary connection between the terminal and the surrounding community, is often blocked by freight operations during train building and barge unloading activities. Extended delays at the crossing disrupt vehicular traffic and pedestrian movement, underscoring the need for improved infrastructure such as grade separation or alternative routing. These disruptions can also impact emergency response times and local businesses, further highlighting the importance of addressing this critical issue.

For additional information, see the Transportation Study (Appendix C).

2.3.5. Tunnel Restrictions

The Anton Anderson Memorial Tunnel provides the only land access to the Whittier Terminal and is shared by highway vehicles and trains. This tunnel allows for only one mode, train or car, in one direction at a time requiring a strict schedule of tunnel opening windows to accommodate both modes of traffic into and out of Whittier. This results in limited available operating windows to move trains into and out of the Whittier Terminal.

The Portage Tunnel is a rail only tunnel, just north of the Anton Anderson Memorial Tunnel (see Figure 1-1). There are rules, regulations, and clearance limitations regarding their operations and, by extension, operations at the terminal. The current most stringent clearance limitations are on the Portage Tunnel which prevents the use of double-stack railcars traveling in and out of the Whittier Terminal. More details can be found in the Transportation Study (Appendix C).

2.4. Existing Berths

The existing berths at the Whittier Terminal are fundamental to its marine operations, supporting the transfer of cargo between barges and the rail network. A detailed assessment of the barge slip, rail transfer span, bulkhead infrastructure, and former marginal wharf highlights their current conditions and operational limitations. More details can be found in the Waterfront Reconstruction Study (Appendix D).

2.5. Railyard

2.5.1. Railyard Tracks and Rail Operations

The railyard is a central component of the Whittier Terminal's operations, serving as the primary area for railcar storage, switching, and cargo transfers. With limited track lengths and constrained spatial configurations, the railyard must handle both incoming and outgoing railcars efficiently to support intermodal operations. The terminal's proximity to residential areas and other commercial activities further complicates railyard operations, requiring careful scheduling and operational precision to minimize disruptions. Additionally, snow maintenance during winter months poses significant challenges, necessitating the use of specialized equipment and strategies to maintain operational continuity.

For additional information, see the Transportation Study (Appendix C).

2.6. Existing Operations

Operations at the Whittier Terminal encompass a range of activities such as:

- Barge Slip Operations
- Intermodal Slip
- Intermodal Rail
- Delong Dock
- Alaska Marine Highway
- Passenger Rail
- Cruise Passenger Operations

Further details on these operations can be found in the Transportation Study (Appendix C) and the Waterfront Reconstruction Study (Appendix D).

3. Economic Analysis and Environmental Effects

3.1. Overview

A data review of the Whittier Terminal reveals significant growth in inbound freight, with imports rising from approximately 208,000 tons in 2004 to nearly 596,000 tons in 2019, an increase of 186 percent. This growth was driven primarily by the import of manufactured equipment, machinery, and products, which accounted for over 50 percent of total inbound tonnage.

The terminal's operations face challenges due to Whittier's extreme weather, including significant snow accumulation that requires specialized snow management to maintain efficient terminal operations.

3.2. Economic Development

Trade through Alaska’s Southcentral ports, including Whittier, is sensitive to local, domestic, and international economic conditions. It can be affected by slow-cycle economic trends, including population growth, job creation, disposable income, natural resource/commodities costs, mineral or other extraction output, and retail trade activity. Short-term increases or disruptions can occur due to singular events; a good example was the COVID-19 pandemic. Whittier can also be affected by large-scale project cycles such as work on Alaska’s North Slope, resulting in the movement of industrial equipment either in or out of Alaska.

The Whittier Terminal has traditionally been an import-centric gateway. Imports serve consumers and the industry base in Alaska, including the mining, oil and gas, fishing, and tourism sectors. Imports account for a significant cargo volume by weight handled at the terminal.

This study relied on interviews with the ARRC and Alaska Maritime Lines, and open source reports on trade trends into Alaska. It also reviewed USACE data sources.

Recent detailed reported market cargo data has been drawn from the *United States Army Corps of Engineers (USACE) Institute for Water Resources Five-Year Cargo Reports* for 2018 to 2022. This information supplements previous USACE data gathered as part of the economic analysis completed for the *Port of Whittier Freight Study, May 2020,* for 2004–2018. These two data sets comprise nearly 20 years of cargo tonnage moved through Whittier. They include important data for years that experienced economic impacts such as the financial crisis of 2008–2009 and the COVID-19 pandemic of 2020–2022. The USACE reported amounts do not yet include calendar year 2023 or 2024. They do include imports and exports on a total terminal basis and are not data exclusively from or for ARRC operations. Refer to Figure 3-1, and Figure 3-2.

Figure 3-1. Whittier Inbound Freight Trends 2004–2022

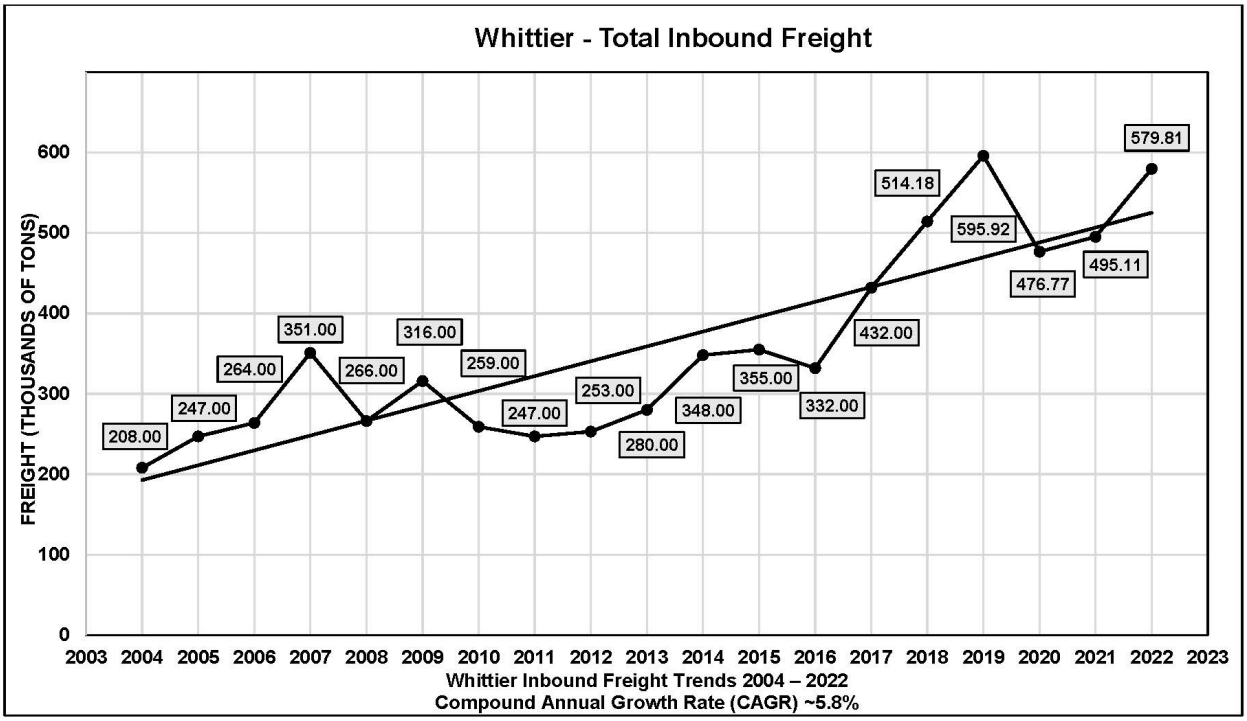
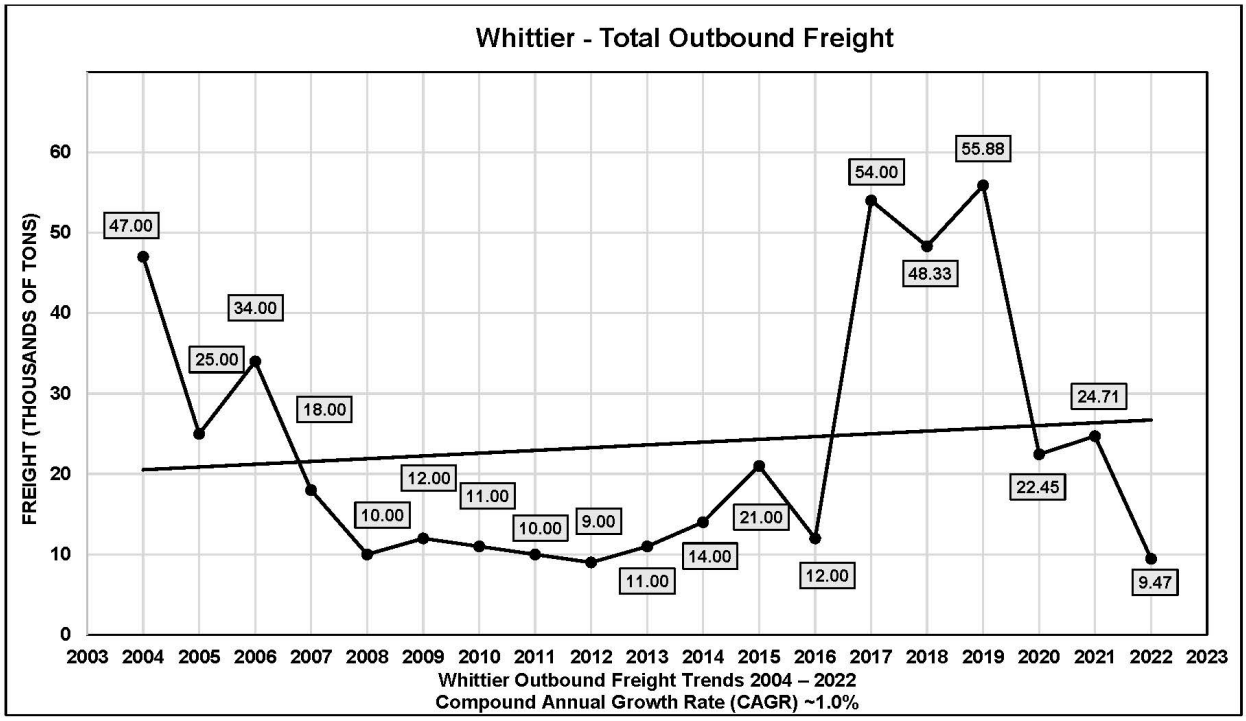


Figure 3-2. Whittier Outbound Freight Trends 2004–2022



A data review indicates that approximately 208,000 tons of goods were imported through Whittier in 2004, which grew to about 596,000 tons in 2019, an increase of 186 percent. Most of this inbound freight included manufactured equipment, machinery, and products, which amounted to more than 50 percent of the total import tonnage. The other two primary categories of imports include food other than fish (13 percent) and fish (6 percent), much of which came from other Alaska harbor origins. The year 2019 (before the COVID pandemic) saw an all-time high of just under 596,000 tons. The year 2020 saw a dip to about 477,000 tons, a decrease of 20 percent. Since then, cargo tonnage has regained ground and, in 2022, reached 580,000 tons, nearing the 2019 peak.

During the 19 years from 2004 to 2022, Whittier has seen a 179 percent import increase, or a 5.8 percent CAGR. This was driven primarily by an increase in imports of manufactured equipment, machinery, and products. A CAGR of 5.8 percent is a healthy growth rate, and if sustained, it could result in a doubling of import tonnage (resulting in over 1 million tons of cargo) in the next 12 years.

As for exports, a peak of approximately 56,000 tons of outbound freight passed through Whittier in 2019 (Figure 3-2). The main export category was manufactured equipment, machinery, and manufactured wood products. Note that peak export tonnage is only 10 percent of import tonnage, so most containers or railcars return to the Lower 48 empty.

Some interesting trends emerge from the review of the data. From 2004 to 2022, outbound freight fluctuated from a low of 10,400 tons to a high of 56,000 tons. From 2016 to 2017, Whittier experienced a 41,800-ton increase, or 329 percent. This was driven primarily by a sudden surge of manufactured equipment, machinery, and products exported from Whittier. The reasons for this are unclear but likely relate to equipment being used in extraction activities being sent out of Alaska.

Containerized trade into Whittier includes many commodities. In general, if a product can be containerized, it can usually be shipped at a lower total cost. Therefore, container growth rates over time can outpace growth in bulk and breakbulk goods. Container trade volumes are also influenced by fluctuations in economic cycles. Containerized commodities can include finished and/or semi-finished consumer, manufacturing, and food/beverage-related goods, which are sensitive to changes in local consumer behavior and shipped in smaller increments. Bulk shipments are generally made up of singular or closely related raw commodities including liquid bulk, aggregates, steel, ore, or petroleum products. These commodities can be stored in bulk railcars (dry or wet) and are often routinely distributed in larger segments to a smaller set of end-users, which makes their demand cycles more predictable and less volatile. This is the case and an advantage when bulk cargo is shipped via railcar on barge to Whittier.

3.3. Resiliency

3.3.1. Snow Maintenance

The often-inclement weather in Whittier has a large impact on terminal operations. Whittier receives an average of 196 inches of precipitation annually, much of which comes in the form of

snow that can total 20 feet in a season. The primary issue is where to put that snow after the tracks and yard are cleared. By regulation, the snow cannot be shoved into the harbor, so both ARRC and AML have developed tactics to move the snow to locations that allow operations to proceed. Keeping switches and frogs from ice buildup is also a persistent problem, as ice can derail a train if not constantly monitored. Any redevelopment of the yard and terminal facility must take winter operations and snow removal into consideration.

4. Outreach and Engagement

ARRC recognizes that the public and other stakeholders want to be involved in decisions that affect them. ARRC also recognizes that it is responsible for safe and effective operations of its rail and waterfront infrastructure. The goal of the WTMP's public involvement activities is to keep people informed about the WTMP project and provide opportunities for stakeholders to share ideas, concerns, and opportunities related to the master plan. The goals of these efforts are to:

1. Inform the public on why the planning efforts are needed and ARRC's proposed plan of action;
2. Provide opportunities for public input on terminal access, use, and community needs; and
3. Share how public input was used during planning efforts.

4.1. Stakeholders

Our stakeholders are those who are interested in or affected by—directly or indirectly—the WTMP efforts and eventual implementation of projects. They include ARRC internal staff, as well as external stakeholders such as the Alaska DOT&PF, City of Whittier's elected officials, private freight providers, passenger operators, and key business interests. Whittier residents and the public, local businesses, non-governmental community and economic development organizations, and others also have an interest in the project. Each stakeholder group has its own perspective on the planning efforts, with varying interests and concerns.

By consulting and involving stakeholder groups at key phases of project development, the project team was able to identify opportunities and respond to issues of concern as they arose, thereby increasing understanding, building trust, and growing support for the plan's eventual implementation. Project stakeholders had and will continue to have opportunities to participate during the planning process and project implementation based on their anticipated level of interest and ability to participate meaningfully.

4.2. Objectives

Stakeholder engagement is a systematic process designed to provide clear and consistent information and engage stakeholders at appropriate and meaningful levels of project development. This project uses the "Public Participation Pillars" (IAP2 USA - IAP2 Core Values, Ethics, Spectrum) from the International Association for Public Participation (IAP2) as a guide for public engagement.

ARRC proposes an early and continuous process to engage and inform stakeholders, guided by three distinct overlapping objectives (see Table 4-1):

- **Inform** stakeholders about the project, decision-making structure, and development process.
- **Consult** stakeholders to obtain input on plan considerations and project development.
- **Involve** key internal and external stakeholders meaningfully in data collection and project development.

Some stakeholders such as ARRC staff and freight providers have technical backgrounds, while others are interested in the project for quality of life, environmental, or economic reasons. The ability of individuals and/or groups to shape the future of ARRC's Whittier Terminal will vary depending on the subject matter and issues of concern. The project's Public Involvement Plan outlines specific objectives and strategies at each stage of plan development.

4.2.1. Internal Stakeholders

Internal stakeholders have been involved throughout the planning effort. These are primarily ARRC's technical staff representing engineering, operations, facility management, real estate, and finance departments. Internal stakeholders also include ARRC's Board of Directors.

4.2.2. External Stakeholders

External stakeholders are individuals and organizational representatives outside of ARRC. Key external partners include agency representatives, local elected officials, and ARRC customers who have an immediate or detailed connection to the Whittier Terminal and who can provide substantive input into current and long-term operational needs. Other external stakeholders may not be as familiar with day-to-day operations but may also have a stake in the plan's outcome. These may include Whittier residents and visitors, seasonal small business owners, and regional organizations (including Alaska Native Corporations).

Table 4-1. Tools for Engagement

Tools to Inform—Raise Awareness and Educate	Tools to Consult—Obtain Feedback	Tools to Involve—Work Directly with Stakeholders
• Project website • E-newsletters • E-mail/listservs • Existing mechanisms (e.g., organization presentations, newsletters) • Informational materials/infographics	• Comment forms • Electronic surveys • Small group meetings and presentations • Briefings (City Council, Planning Commission) • Public open house	• One-on-one meetings • Interviews (phone or in-person) • Site visits • Subject matter/technical workshops

4.3. Stakeholder Engagement Report

A detailed stakeholder engagement report was prepared at the conclusion of the public engagement process and incorporated as Stakeholder Engagement Report (Appendix E) in the final WTMP. A summary of engagements is included in Table 4-2.

Table 4-2. Summary of Engagements

Date	Audience	Purpose
2023–2025 Engagements		
7/13/2023	Internal Stakeholder Meeting	Brainstorm Vision statement
8/28/2023	Internal Stakeholder Meeting	Discussion: current and future potential strengths, weaknesses, and opportunities
11/21/2023	City Council Presentation	Introduce project and understand community concerns and opportunities
12/7/2023	External Stakeholder Meeting	Understand operational needs from external stakeholders
2/15/2024	Whittier Planning and Zoning Meeting	Understand local conditions and upcoming plans for development
3/18/2024	Internal Stakeholder Meeting	Review Alternative 1 with project management and engineering
9/30/2024	Internal Stakeholder Meeting	Review Alternative 2 with internal operations and engineering
10/15/2024	City Council Presentation	Provide update prior to final draft document for public review and comment
2/25/2025	Internal Stakeholder Meeting	Review Draft Master Plan with internal operations and engineering
3/21/2025	External Stakeholder Meeting(s) – Focus Groups	Review Draft Master Plan AML
3/18/2025	City Council Presentation	Provide update prior to start of public comment period
4/01/2025 to 4/30/2025	Public Comment Period	Draft Master Plan posted on ARRC website for public comment, promoted via newspaper ads, community flyers and post card mailer
4/15/2025	Public Meeting	Public open house with presentation of Draft Master Plan during public comment period

5. Recommendations

A primary goal of this WTMP is to determine recommendations for how to improve the infrastructure at and around the terminal to improve its connectivity and utility to the local region. These recommendations as well as potential project alternatives are discussed here with more detail than what is provided in the Transportation Study (Appendix C) and the Waterfront Reconstruction Study (Appendix D). These recommendations are further refined by either short- or long-term planning horizons as presented in Section 7 of this WTMP.

5.1. Proposed Alternatives for Waterfront Reconstruction

The Whittier Terminal waterfront plays a vital role in Alaska's transportation network, but its aging infrastructure requires careful consideration of reconstruction options. This section outlines alternatives for redevelopment, including a No-Build Alternative, based on a thorough 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, selection of design concepts, and estimation of probable construction costs.

The following sections describe each alternative, beginning with the No-Build Alternative 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.

5.1.1. No-Build Alternative

Under the No-Build Alternative, the facility would be left as-is with no modifications 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 also presents significant risks and challenges. Key concerns include:

- **Structural Deterioration:** The existing marginal wharf is in very poor condition, with its bulkhead failing. The transfer span is in similar poor condition and needs 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 and/or the total shutdown of operations.
- **Operational Disruption:** The deteriorating condition of the transfer span, 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 can pose 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 long-term effects 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 maintenance 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.

5.1.2. 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 railyard 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 reconstruction of a new bulkhead to replace the deteriorating existing bulkhead and new transfer span and barge approach facilities constructed while the existing barge berthing and transfer span remained operational.
- **Phase 2:** This phase would focus on the wharf expansion to the east and removal of the old barge facilities, ensuring operational continuity throughout the construction process.

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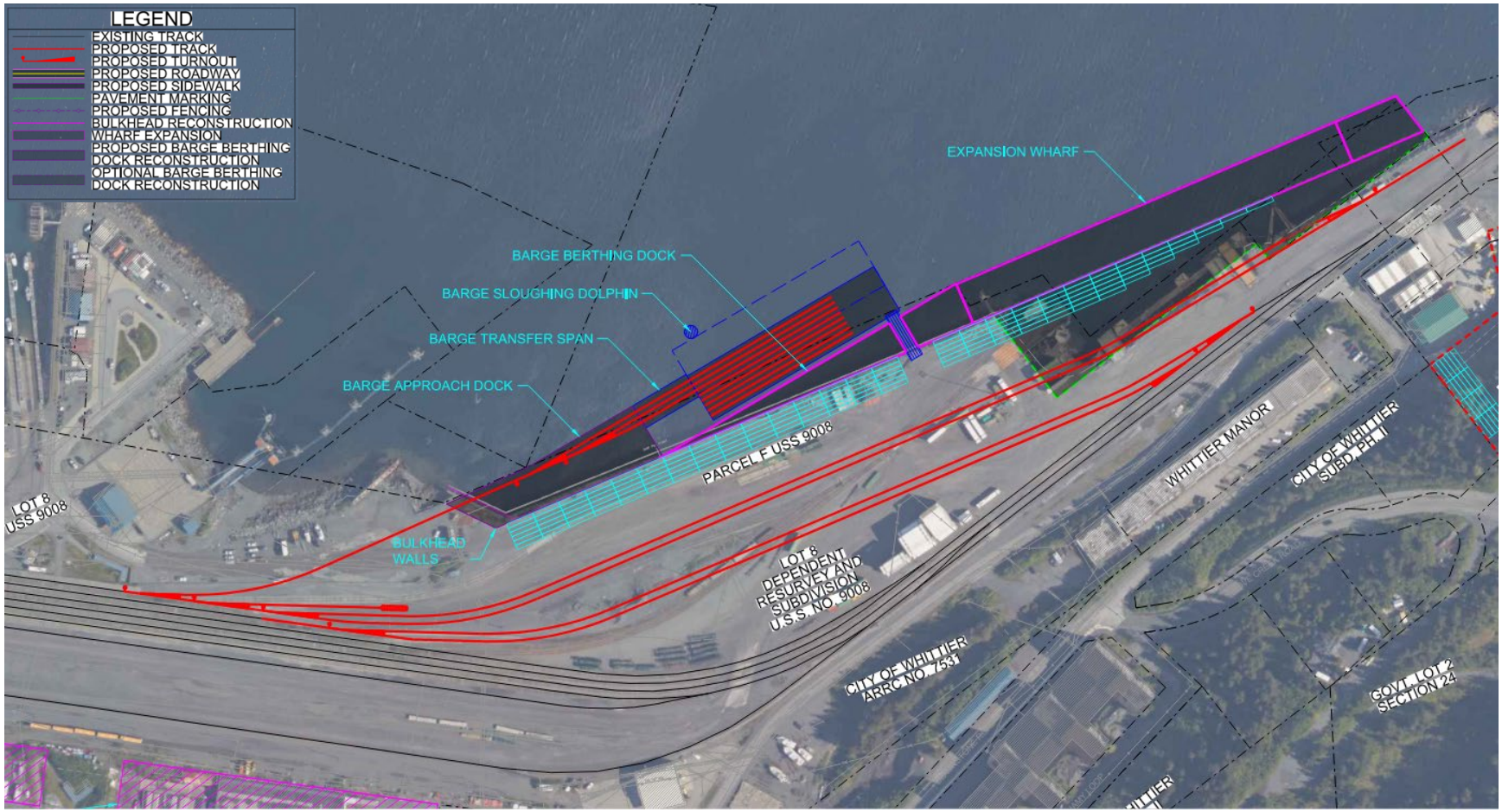
Figure 5-1. Alternative 1 – Westerly Barge Relocation Plan



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As shown on the above figure, 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 existing transfer span's dimensions are well optimized; thus, the new transfer span would maintain the same 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 (nearest $5M) 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 a grade separation between ARRC tracks and Whittier Street is completed prior to relocation of the barge berthing facilities. The community and ARRC have 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.

5.1.3. Alternative 2A – Reconstruct Existing Berthing Facilities in Place (Recommended Alternative)

Alternative 2A, the recommended alternative, proposes reconstructing the existing barge berth facility in its current location. To accomplish this, construction phasing would 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 confidence in the project's location.

The second key piece of waterfront infrastructure which requires reconstruction is the existing marginal wharf bulkhead. The current bulkhead is a sheet pile wall with tiebacks and deadman anchors. The exposed face of the wall is in a state of deterioration and requires replacement or stabilization repairs to maintain its usefulness. A separate alternatives analysis was completed to determine if stabilization repairs or replacement was recommended for the bulkhead and the results of that study are included in Bulkhead Alternatives Analysis (Appendix H). The recommended alternative from that study is to construct a new bulkhead immediately outboard of the existing bulkhead with new tiebacks and deadman anchors designed for modern marine terminal facility loading. This solution maintains the usable space behind the existing wall and allows for future pile supported or filled wharf expansion (see Alternative 2B) while maintaining reasonable costs.

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 railyard 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 (nearest $5M) for this alternative includes:

- $20 million to reconstruct the marginal wharf bulkhead,
- $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 a retained fill dock with 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. The cost for the marginal wharf bulkhead includes construction of sheet pile walls with tiebacks. All costs are in 2024 dollars.

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

5.1.4. Alternative 2B – In-Place Reconstruction with Wharf Expansion

Alternative 2B builds upon Alternative 2A by reconstructing the existing barge berth facility in place and expanding the marginal wharf to provide additional space for waterfront storage, optional additional cargo ship berthing, and rail loading/unloading capabilities. 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 conditions. Like 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 ($105 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 opinion of probable construction cost (nearest $5M) 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 a retained fill dock with 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. The cost for the marginal wharf bulkhead includes construction of sheet pile walls with tiebacks in two phases. Phase 1 is to reconstruct the existing bulkhead to stabilize existing supported ground. Phase 2 is to construct the wharf expansion using earthen or rock fill and a second sheet pile bulkhead with tiebacks. All costs are in 2024 dollars.

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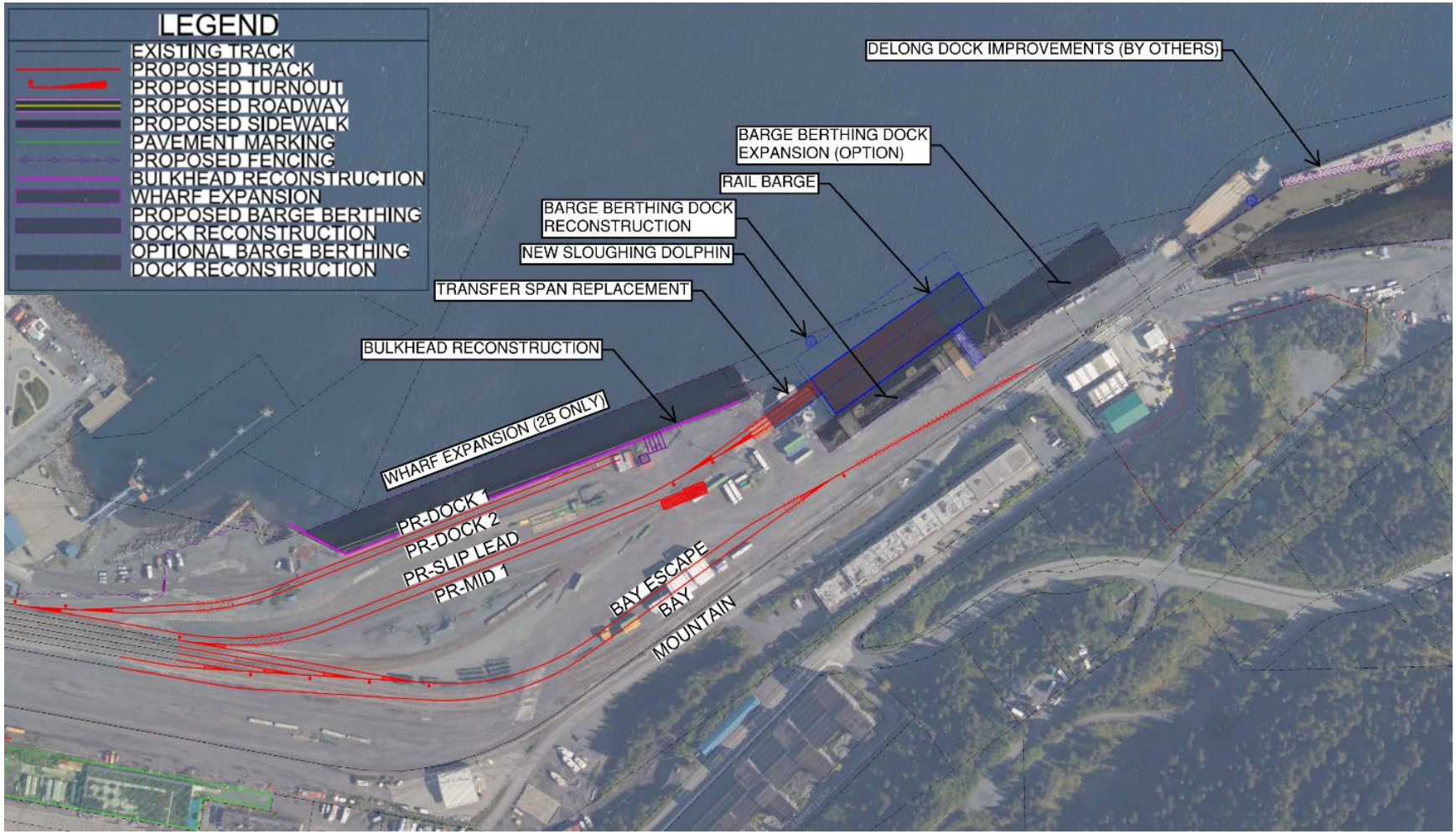
Figure 5-2. Alternatives 2A and 2B – Reconstruction of Barge Berthing Facilities in Place plus Wharf Expansion



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5.1.5. Other Reconstruction Considerations

Other reconstruction alternatives were reviewed and ultimately discarded, including:

- **Moving barge berth to Delong Dock area:** This alternative was rejected due to the costs, disruption, and relocations that would be required to ongoing operations on the far east side of the waterfront.
- **Moving barge berth to mid-point of marginal wharf:** This alternative was considered and rejected. It had all the costs of Alternative 1 but was rejected due to shorter working railyard tracks.
- **Pile-supported concrete dock alternative:** This alternative was part of initial concepts for a new marginal wharf. It was compared to a sheet pile bulkhead fill dock and rejected for cost and constructability reasons. Proximity to competent rock material and short borrow distances made the fill alternative superior.

5.1.6. Summary and Recommendations

The Whittier Terminal Waterfront Reconstruction Study (Appendix D) 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. The study explores several reconstruction alternatives to modernize the terminal, improve its operational efficiencies, and ensure its long-term sustainability. Each alternative was evaluated based on its ability to address current deficiencies, optimize constructability and costs, minimize operational disruptions, and support the future growth of the terminal, which plays a vital role in Alaska's intermodal transportation network:

- **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 and passenger 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 recommended 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 efficiencies 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 the retention of key operational features make Alternative 2A the preferred 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.

Based on the analysis conducted in the Waterfront Reconstruction Study (Appendix D), 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 would allow the ARRC and AML to continue efficiently supporting Alaska's freight and passenger 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 (PIDP), ensuring that the Whittier Terminal remains a key component of Alaska's transportation network. A funding and action plan will be written upon completion of the Master Plan to lay out the process and potential funding sources for Alternative 2A.

5.2. Proposed Alternatives for Landside Terminal

Building on the waterfront reconstruction alternatives, the proposed landside terminal improvements address multiple conflict points and opportunities to improve efficiency of rail, vehicular, and pedestrian movements within the terminal.

The aim of the alternatives is to improve the overall functionality, safety, and longevity of the terminal's infrastructure while maintaining efficient operations. Each alternative presents distinct approaches for critical landside transportation elements. The following sections present benefits

and challenges for several landside terminal alternatives, focusing on operational efficiency, construction feasibility, and cost considerations based on the preferred waterfront reconstruction Alternative 2A, reconstructing existing facilities in place. Each improvement first identifies the need or challenge as presented by current conditions and is followed by a proposed solution. Some solutions have multiple options or alternatives to address the needs.

5.2.1. South Terminal Track Realignments

Need/Challenge: Existing track alignments within the terminal are not optimized for increases in container handling volumes, resulting in insufficient and unusable track length for loading and unloading trains and storing cargo. Provide for truck and lift equipment routes within the terminal to allow side handling of containers.

Proposed Solution: Realignment and installation of additional working tracks within the terminal to maximize track lengths available for freight and intermodal operations.

There are five options (A, B, C, D and E; Figure 5-3 through Figure 5-7) presented to realign terminal tracks. Any of the five options presented can be combined with Alternative 2A or 2B as recommended in the Waterfront Reconstruction Study and Section 5.1 of this plan.

The five options were created by increasing the available track lengths accessible by side handling equipment for the handling of containerized cargo. For container loading and unloading, the tracks must provide a minimum of 55 feet of clear width to the side of the tracks to allow for the movement of 53-foot containers within the side handling equipment as it moves along the track (with containers perpendicular to the center line of track). With the use of hostlers and chassis to shuttle containers to and from the barge, it is necessary to occasionally move the containers by the top-lift equipment over both short and long distances. Where possible, additional track length was provided to reduce the requirement of switching railcars during the arrival or departure of trains within the terminal.

Creation of additional space within the terminal to stack containers awaiting forwarding by barge or rail was also prioritized. At present, loaded containers that arrive in the Whittier Terminal by integrated tug barge service are stacked and provided electrical power (as required for frozen seafood) for later transfer onto southbound barges to the mainland. Additionally, surplus empty containers are occasionally stacked within the terminal when an interim imbalance in container volumes require doing so.

Provision of tracks nearer the barge was favored where possible to limit the travel distance of the side handling equipment when containers are moved directly to/from railcars. The placement of tracks adjacent to the proposed wharf also provides for additional utility when the movement of non-containerized cargo is considered following the construction of a marginal wharf. The track in proximity allows for the discharge of dimensional break bulk cargo like steel or pipe into railcars.

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Option A

- Add a pair of dock tracks to the railroad east (geographic north) of the barge slip.
- Realign the slip lead and add working tracks on either side.
- Relocate the ramp track to provide for circus loading of vehicles to flat cars.
- Add a full length of additional Lower 3 track (1,680 feet).
- Extend the Oil Track an additional 500 feet (not shown on Figure 5-3, but shown in Appendix B, Exhibit Figures).
- Net gain of 3,720 feet in intermodal working track length.
- **Estimated Cost: $15 million**

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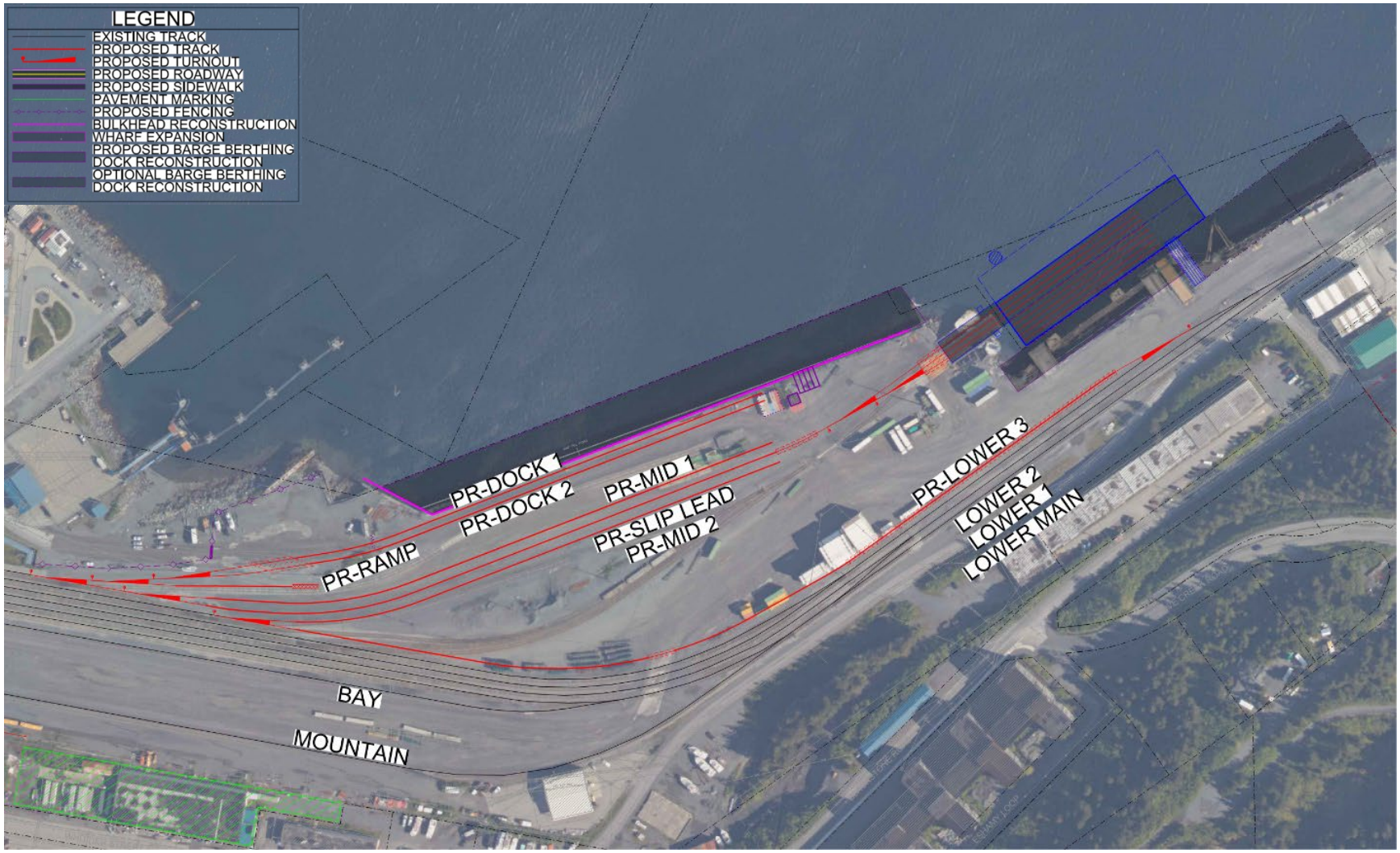
Figure 5-3. Option A – Conceptual Track Layout



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Option B

- Add a pair of dock tracks to the railroad east (geographic north) of the barge slip. Same as Option A.
- Add a pair of mid-tracks to the railroad east (geographic north) between the existing slip lead and proposed dock tracks.
- Relocate the ramp track between the slip lead and lower tracks. Add side ramp loading capability.
- Add a partial length of additional Lower 3 track (685 feet).
- Extend the Oil Track an additional 500 feet. Same as Option A.
- Net gain of 2,670 feet in intermodal working track length.
- **Estimated Cost: $11 million**

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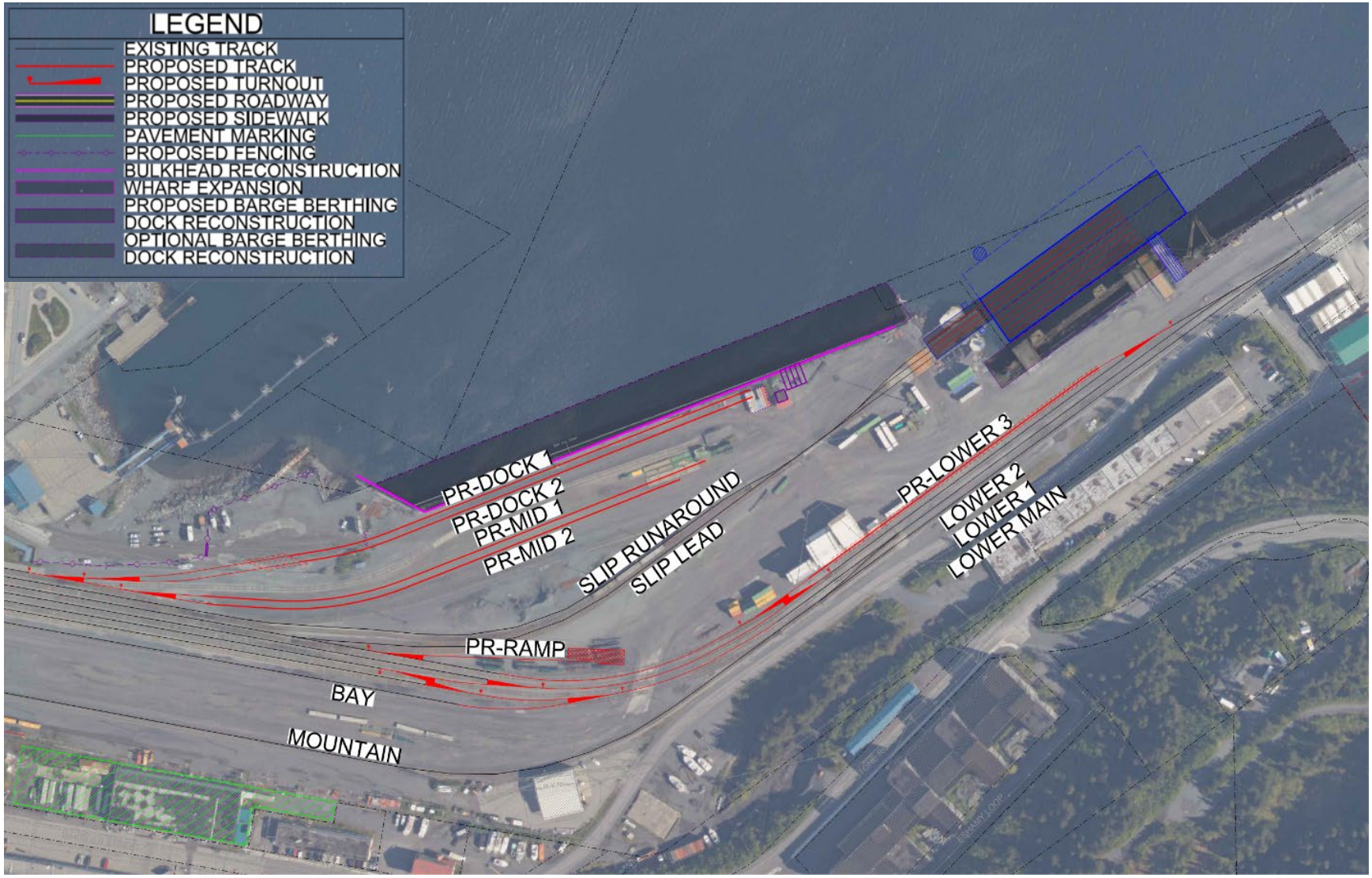
Figure 5-4. Option B – Conceptual Track Layout



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Option C

- Add a pair of dock tracks to the railroad east (geographic north) of the barge slip. Same as Options A and B.
- Realign the slip lead and add working track along south side.
- Relocate the ramp track to the end of the work track, near the stern ramp of the barge. Add side ramp loading capability.
- Extend the Bay track (1,020 feet) for intermodal transfer.
- Extend the working length of Mountain track (1,325 feet) for intermodal transfer.
- Reconfigure the railroad west end of freight tracks and provide a Bay escape track.
- Extend the Oil Track an additional 500 feet. Same as Options A and B.
- Net gain of 1,815 feet in intermodal working track length.
- **Estimated Cost: $18 million**

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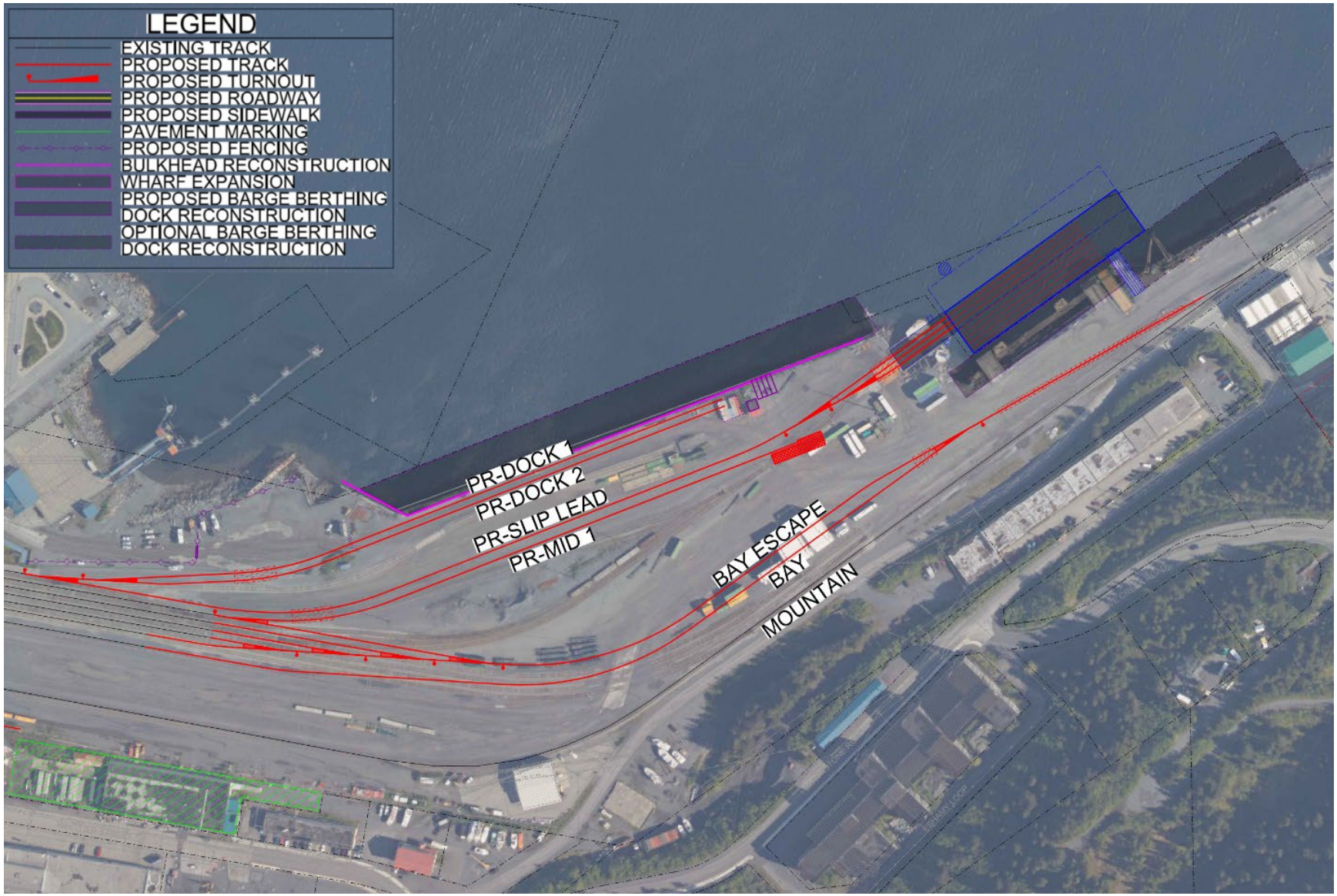
Figure 5-5. Option C – Conceptual Track Layout



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Option D

- Remove Dock 5 track, utilize area for container storage (removed tracks are not shown on Figure 5-6).
- Relocate the ramp track to the end of a realigned Dock 4 track, near the stern ramp of the barge. Add side ramp loading capability.
- Create a second Mountain track north of the present Mountain track (2,795 feet), connect to existing Lower 1 track, provide crossing materials along the length of the track to facilitate lift operations on both Mountain tracks.
- Extend the crossing materials along the east end of Bay track (620 feet) to connect to existing Lower 2 track for intermodal transfer along adjacent tracks.
- Remove Lower 3 track and reconfigure the railroad west end of freight tracks to reduce conflict with intermodal transfer along Bay and Mountain tracks.
- Extend the Oil Track an additional 500 feet. Same as Options A, B, and C.
- Net gain of 2,820 feet in intermodal working track length.
- **Estimated Cost: $17 million**

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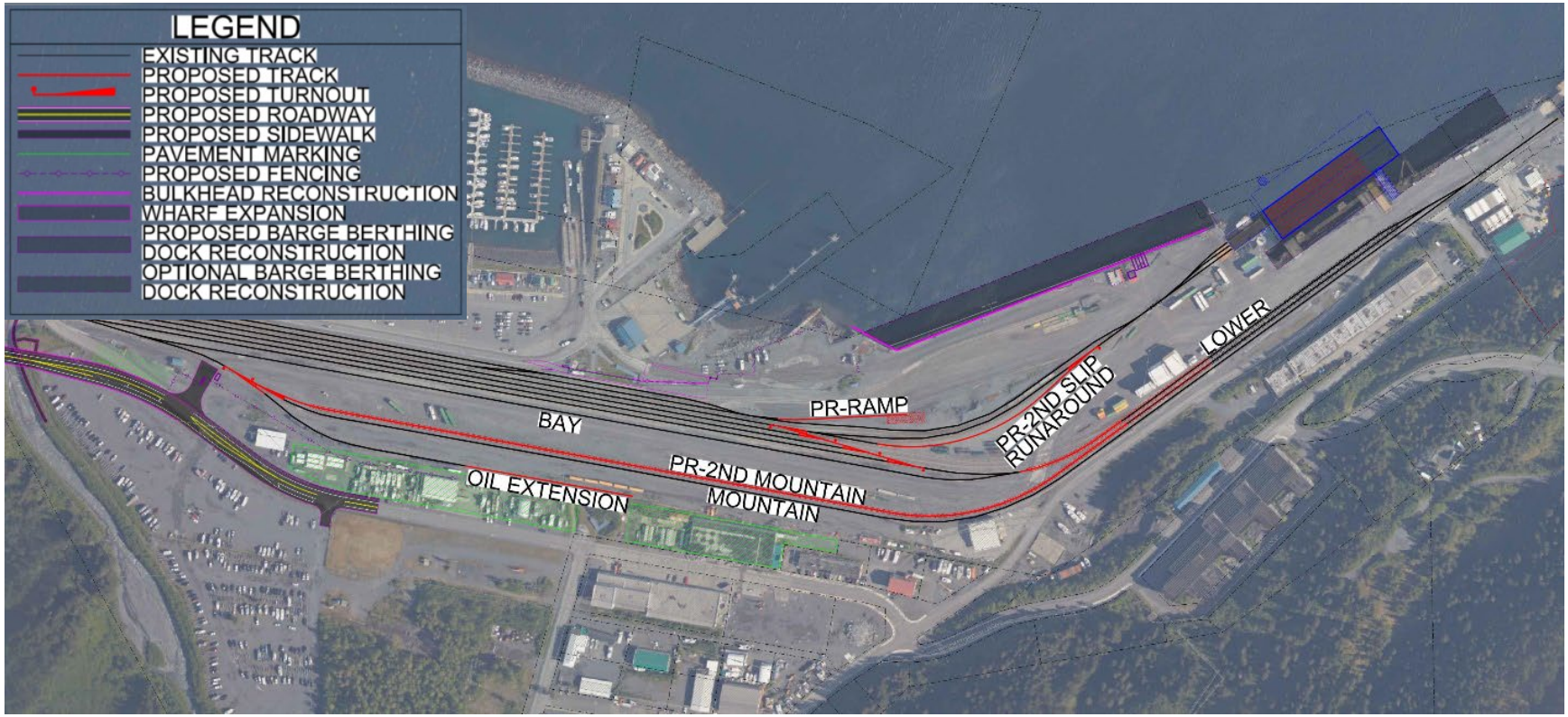
Figure 5-6. Option D – Conceptual Track Layout



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Option E (recommended)

- Remove Dock 5 track, utilize area for container storage. Same as Option D.
- Relocate the ramp track to the end of a realigned Dock 4 track, near the stern ramp of the barge. Add side ramp loading capability. Same as Option D.
- Create a second Mountain track north of the present Mountain track (2,795 feet), connect to existing Lower 1 track, provide crossing materials along the length of the track to facilitate lift operations on both Mountain tracks. Same as Option D.
- Extend the Bay track (1,020 feet) for intermodal transfer.
- Reconfigure the railroad west end of freight tracks and provide a Bay escape track.
- Extend the Oil Track an additional 500 feet. Same as Options A, B, C, and D.
- Net gain of 3,835 feet in intermodal working track length.
- **Estimated Cost: $18 million**

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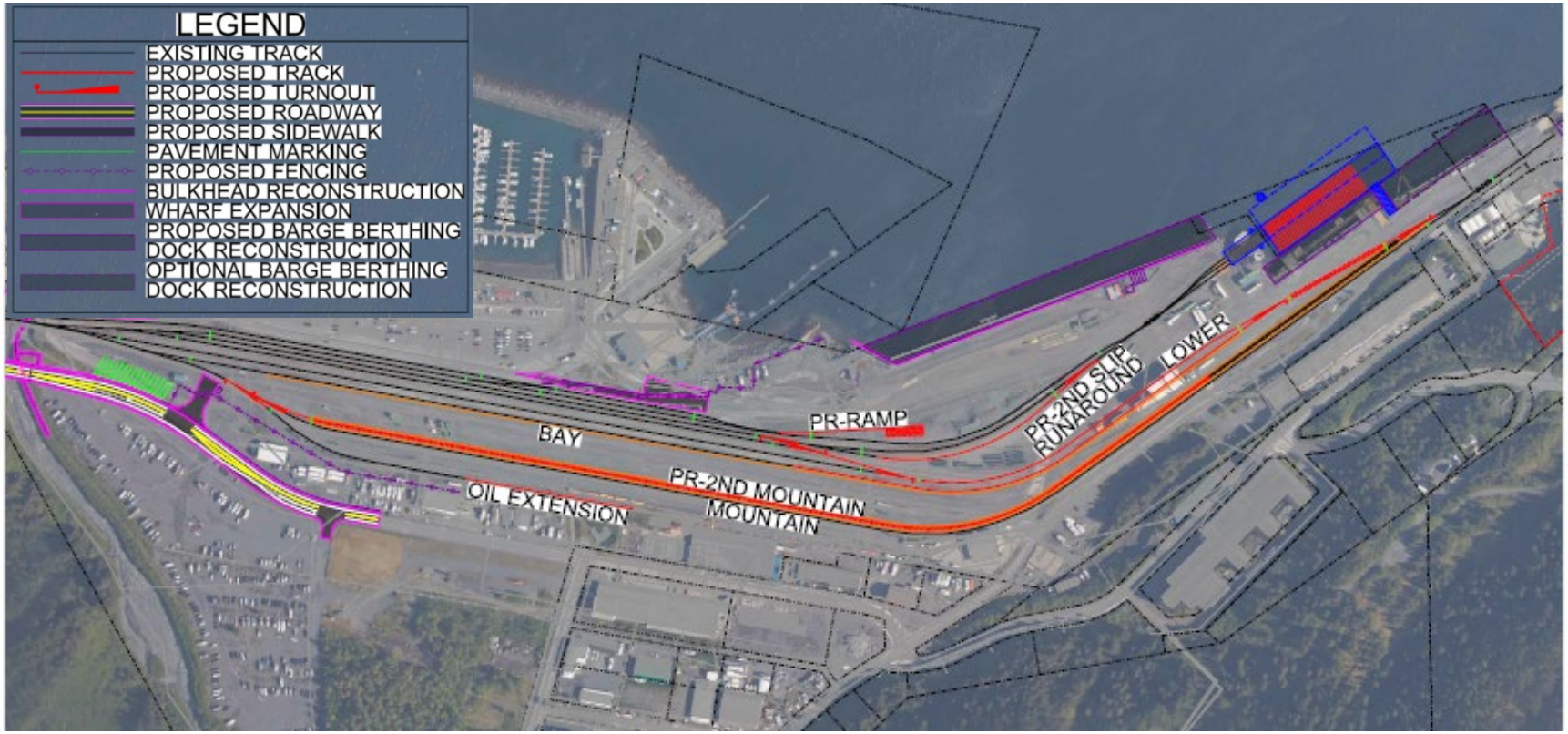
Figure 5-7. Option E – Conceptual Track Layout (Recommended)



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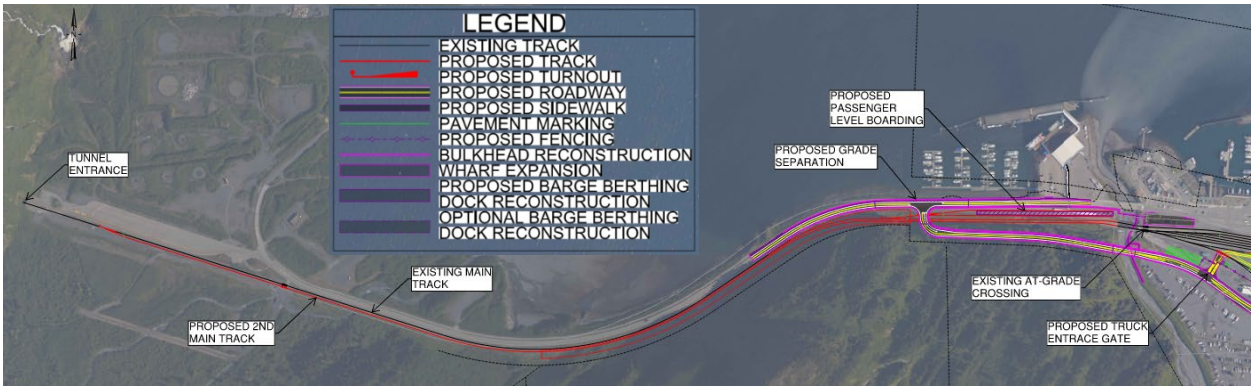
5.2.2. Second Main Track from Whittier Creek to Tunnel Entrance

Need/Challenge: Switching operations within the terminal are limited by the single main track from the Whittier Creek crossing to the Anton Anderson Memorial Tunnel entrance. This creates a bottleneck where freight operations are hindered during days of heavy passenger traffic and vice versa. Increasing track capacity by double tracking from the tunnel entrance to the north end of the terminal would improve capacity and provide for more flexibility in freight and passenger operations within Whittier. Further, the installation of a second track would provide an opportunity to build a level passenger boarding platform to allow for a safer and more convenient rail passenger boarding experience. The addition of a second main track also allows for the building and staging of complete trains outside of the railyard itself, streamlining the departure of freight trains from Whittier and reducing the time that the grade crossing is blocked due to trains being assembled or awaiting scheduled passage through the tunnel.

Proposed Solution: Construct a second main track from Whittier Creek to the tunnel entrance. The proposed location of the second main track would be on the railroad west (geographic south) side of the existing main track. It is anticipated that some blasting of the rock hillside may be required to provide adequate clearance along portions of the alignment. To save on other improvements costs, rock produced from blasting activities may be used as fill for new Whittier Terminal facilities. Additionally, realignment of the main track is necessary to the railroad north (geographic west) of the Whittier Creek bridges to allow for modifications to the passenger boarding area (see Section 5.2.3) and to facilitate future grade separation of Camp Road and Whitter Street (see Section 5.2.4)

Estimated Cost: $23 million

Figure 5-8. Proposed Second Main Track from Tunnel Entrance to Whittier Creek with Additional Improvements



5.2.3. Passenger-Level Boarding Platform

Need/Challenge: The existing passenger facilities in the Whittier Terminal are basic and focused on the processing of a single passenger train at a time. The station consists of a single spur track with asphalt pavement at top of rail, and a temporary fabric structure is erected on the pavement north of the spur track during the operational season to provide basic shelter. The

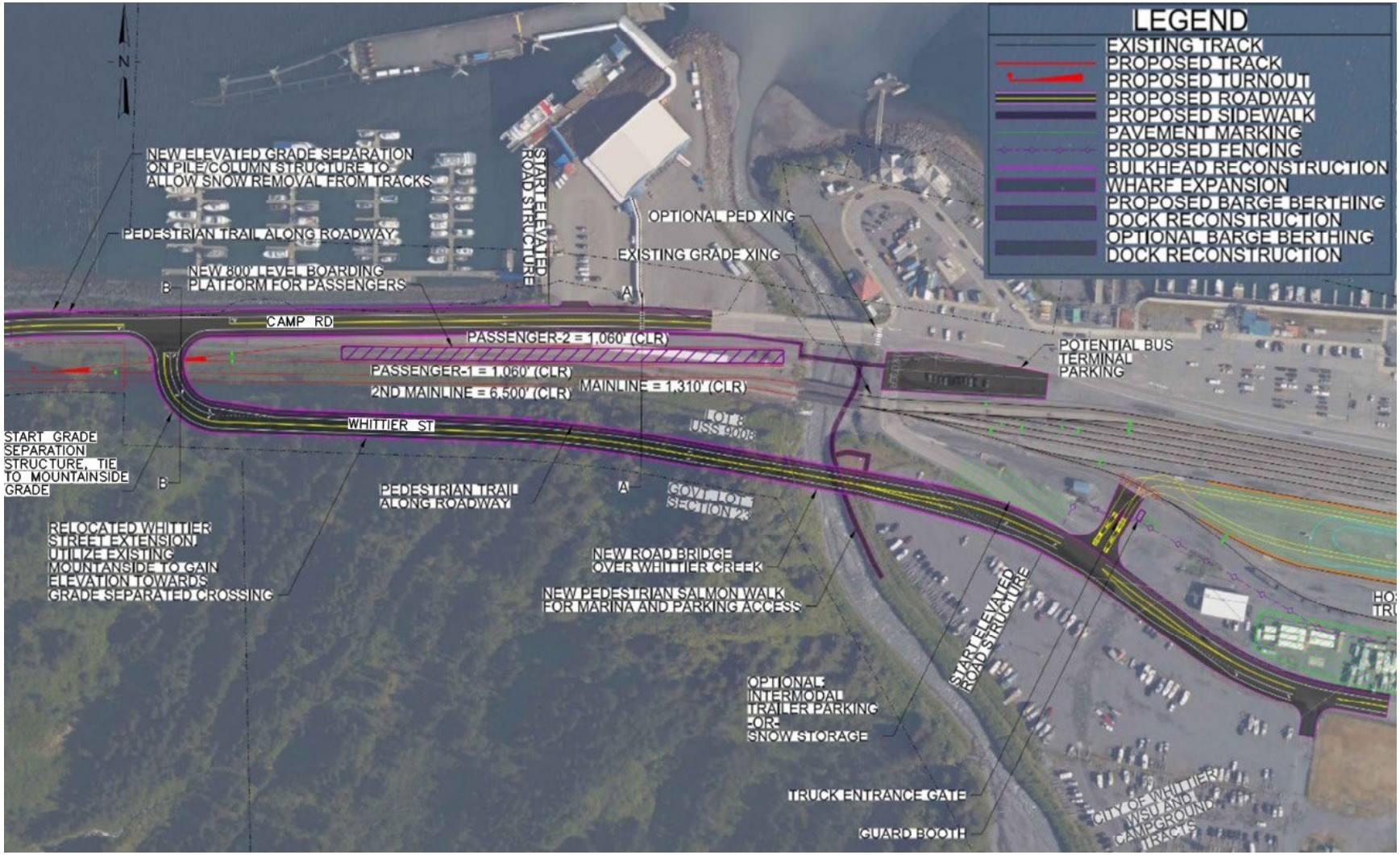
track-level pavement requires passengers to use stairs to board and disembark the high-level passenger railcars, which increases processing time and complicates the accommodation of disabled individuals. While it is possible to park a second passenger train upon the main track for loading/unloading, with pavement up to the main track to allow for passenger boarding, doing so blocks mainline access to and from the railyard. The increasing volume of cruise traffic through Whittier creates opportunities for additional passenger rail services, necessitating improvements in station capacity and efficiency of passenger operations.

Proposed Solution: Construct a double-sided high-level station platform and dedicated passenger loading tracks to remove freight-passenger train conflicts:

- Expand the existing passenger area to the south, providing for two passenger tracks off the mainline.
- Provide cross-over at the east end of Passenger 1 track to allow for train departure into terminal.
- Construct new canopy coverage of the boarding platform.
- Provide for floor-level boarding of passenger railcars, improving accessibility for all passengers.
- Relocate pedestrian crossing access to the platform to the east, in proximity to the existing intersection.

Estimated Cost: $15 million

Figure 5-9. Proposed Passenger Boarding Relocation, Grade Separation, and Security Gate Relocation



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5.2.4. Grade Separation of Camp Road and Whittier Street

Need/Challenge: The existing at-grade crossing at Whittier Street is a safety concern and operations choke point for rail operations within the terminal. During barge loading and unloading, the crossing is frequently blocked, cutting off Whittier proper (including boat harbor trailer parking) from the waterfront and tunnel access. The crossing also limits the ability of residents to leave the City of Whittier and for emergency vehicles to access the waterfront facilities.

Proposed Solution: Remove the current at-grade crossing at the intersection of Camp Road and Whittier Street and construct a new grade-separated crossing west of the passenger loading zone. The proposed solution must allow for snow maintenance, provide access for vehicular traffic at all times, and not block tsunami evacuation routes from the waterfront:

- Utilize the existing hillside above the current passenger loading area to the west of Whittier Creek for a new roadway (Whittier Street).
- Move the crossing to the west end of the passenger loading area and raise the grade of Camp Road to provide a grade-separated crossing.
- Construct the elevated portions of Camp Road on piers to allow for snow removal on the railroad tracks under and through the elevated structure. The elevated structure will also serve as an additional tsunami evacuation refuge point as high ground near the waterfront area, limiting the need to cross the tracks and reducing the evacuation distance.
- Construct a new pedestrian “salmon walk” to allow foot traffic from the parking area to the boat harbor/waterfront. The pedestrian path would also allow for quicker tsunami evacuation routes for pedestrians in addition to the elevated road structure.
- Construct an alternative bus parking area on the waterfront side of Camp Road with pedestrian access directly from buses to the train passenger loading area to increase accessibility and safety.

Estimated Cost: $75 million

5.2.5. New Gates and Security Fencing

Need/Challenge: ARRC is required to maintain a secure perimeter around the terminal. Changes to the proposed track alignments and truck routing would require moving some gates and installing new fencing in certain areas. Current access to the Whittier Terminal is on the geographic north side of the terminal near the Ferry Terminal. During busy ferry loading, parking can overflow past the gate entrance, which inhibits truck movement in and out of the terminal.

Proposed Solution: Install new gates and fencing in strategic locations that reduce conflicts between the busy waterfront traffic areas and incoming and outgoing terminal truck traffic:

- Relocate the existing security gate and fencing geographic west to allow for the new track alignments. This gate would become a split entry gate utilizing separate inbound and outbound gates to reduce congestion and improve truck traffic flow.

    - The primary inbound truck entrance (with card access gate) on the north side of yard would move to a location parallel to tracks and west of the ferry terminal to better separate inbound truck traffic from conflicting ferry traffic.
    - The primary outbound truck entrance would move west to avoid conflicts with proposed track improvements and remain on the existing gate and road alignment.
- In conjunction with the grade separation, construct a new secondary truck entrance to the terminal off Whittier Street to improve secondary truck traffic flow and circulation of both terminal and non-terminal traffic.
- Add new fencing as needed throughout different phases of terminal construction to maintain a secure perimeter at all times.

Estimated Cost: $2 million

5.2.6. Other Reconstruction Considerations

Snow removal and storage is a known issue in Whittier. The proposed grade separation would be column-supported to allow snow removal from tracks underneath the raised road. Future removal of the fish-packing facilities (no longer in service) on the geographic south side of the terminal along Whittier Street would provide for additional snow removal area within ARRC ROW/Reserve. Any improvements impacting snow removal on adjacent Alaska DOT&PF and City of Whittier facilities would require ongoing coordination with affected parties for future snow relocation and maintenance operations.

The addition of automated signal crossing arms at the existing at-grade crossing was explored following the public comment period. After review of the crossing area, the addition of these arms proves problematic due to a number of factors including snow removal, available maintenance facilities, and poor roadway geometry to name a few. Therefore, crossing arms are not included as recommended features of the master plan.

5.2.7. Portage Tunnel Clearance Improvements

Improvements to the Portage Tunnel clearance to allow for double stacking operations within the Whittier Terminal is outside the scope of this study since the tunnel is physically outside the limits of the study area. However, improvements to the tunnel clearance to allow double stacking operations would impact the proposed improvements to the Whittier Terminal outlined in this study such as reduced railyard track improvements or modified track alignments to optimize the railyard for double stack operations.

5.2.8. Summary and Recommendations

The proposed landside terminal improvements build upon Alternative 2A – Reconstruct Existing Berthing Facilities in Place and provide multiple improvement opportunities that can be implemented as funding becomes available. Due to the variety of projects, it is preferable that the funding plan takes a holistic approach based on applicable funding sources. All options in Alternative 2A include a version of the south terminal track realignments, second main track

extension, grade separation, and reconfiguration of security gates and fencing. Of the three options presented for the south terminal track realignments, Option E is the recommended option, as it provides for the best truck traffic flow while also providing the longest lengths of working track for the Mountain and Bay tracks.

These recommendations and findings were presented to the public and the terminal and rail partners for their input. Their input is incorporated into the WTMP, and any recommended changes were analyzed for potential incorporation into the final plan. A funding and action plan will be written to lay out the process and potential funding sources for the recommended alternative. Table 5-1 summarizes the various combinations of waterfront and landside alternatives discussed to provide a total cost.

Table 5-1. Summary of Improvements Costs by Alternative and Option

Common Improvements	Cost	Waterfront Alternative	Cost	Track Realignment Option	Cost	Total Cost
Second Main Track **Passenger Level Boarding** **Grade Separation** **Security Gate Relocation and Fencing**	**$115 million**	Alternative 1	$215 million	N/A	$10 million	$340 million
		Alternative 2A (recommended)	**$52 million**	Option A	$15 million	$182 million
				Option B	$11 million	$178 million
				Option C	$18 million	$185 million
				Option D	$17 million	$184 million
				Option E (recommended)	**$18 million**	**$185 million**
		Alternative 2B	$104 million	Option A	$15 million	$234 million
				Option B	$11 million	$230 million
				Option C	$18 million	$237 million
				Option D	$17 million	$236 million
				Option E	$18 million	$237 million

6. Master Plan

6.1. Prioritization of Improvements

The master plan focuses on optimizing terminal rail and vehicular operations and replacing existing infrastructure that is nearing the end of its useful life (short term) as well as providing capacity improvements for the future (long term). The overall horizon of the master plan is a 20-year period beginning in 2025 and continuing through 2045. The proposed improvements will be implemented as separate projects based on available funding through a variety of funding mechanisms (see Section 7 of this report). The identified improvements have been prioritized into seven projects in order from most critical to least critical to assist with identifying appropriate grant opportunities that align with the proposed improvements:

1. Reconstruction of the transfer span and barge berthing facilities.
2. Reconstruction of the marginal wharf bulkhead.
3. Reconfiguration of the existing yard tracks, truck routes, and primary access gate.
4. Construction of a second main line from the tunnel entrance to Whittier Creek.
5. Construction of a new passenger-level boarding platform and associated tracks.
6. Construction of a grade separation and associated facilities to remove the Whittier Street at-grade crossing.
7. Expansion of the marginal wharf to previous limits.

The list of projects above was identified considering single-stack rail car operations only. If double-stack rail car operations were feasible with clearance improvements to the Portage Tunnel, then railyard improvements may be reduced or modified from what is described in this Master Plan to better accommodate double-stack operations.

As noted in the Transportation Study (Appendix C) and the Waterfront Reconstruction Study (Appendix D), the transfer span and barge berthing facilities are reaching the end of their useful life, and the proposed improvements would renew the service life of these facilities. Loss of functionality of the barge berthing operation is a statewide supply chain concern that has far-reaching economic effects for the state of Alaska and is a critical piece of the terminal infrastructure. Under Alternative 2A with reconstruction in place, the transfer span replacement and associated barge berthing facility improvements may be completed before any other proposed improvements if necessary. It is recommended that both the transfer span replacement and berthing facility upgrades be completed together. This will allow concurrent and beneficial replacement of other berthing facilities such as the existing mooring dolphins and A-frame ramp utilized by the forklifts for non-railcar container cargo. It is recommended to complete this high priority project within 2–4 years.

The marginal wharf bulkhead provides critical support to the landside operations of the existing terminal, but the supported land is currently unusable due to the condition of the existing bulkhead wall. At a minimum, the wall should be stabilized or replaced to allow renewed use of the supported land. The Bulkhead Alternatives Analysis (Appendix H) reviewed multiple options for improvements of this infrastructure including a recommended alternative for constructing a new bulkhead immediately outboard of the existing bulkhead utilizing a sheet pile shoring system with tieback anchors and removing a portion of the existing bulkhead. Due to the condition of the existing bulkhead, the new bulkhead is a high-priority improvement as it has the potential to limit terminal operations should it be allowed to continue to degrade. It is recommended to complete this high-priority project within 3–6 years.

Reconfiguration of the yard tracks within the terminal to optimize train loading and unloading operations during barge arrivals and departures provides immediate benefits to terminal operations and efficiency. Due to the relatively short, expected track outage durations needed to complete the track realignments compared with the transfer span replacement and berthing facility improvements, this project could feasibly be completed simultaneously with the transfer span and berthing facility reconstruction within the same 2–4-year timeline. However, the terminal track improvements are not required to be completed simultaneously with the transfer

span and berthing facility reconstruction. To fully utilize the reconfigured tracks and vehicular traffic patterns, the primary security entrance gate, which is currently located on the north side of the rail yard, would be revised to the split access method with separate inbound and outbound gates. This would reduce conflicts with traffic from the ferry terminal and small boat harbor and allow trucks to access the yard through the new gate. Other minor relocations of equipment and control buildings and security fencing would be completed at this time to accommodate the changes in track configuration. Because these improvements are not based on deterioration of existing facilities but provide a high return on operational efficiency, a medium priority level has been assigned to this project with a recommended completion within 5–10 years.

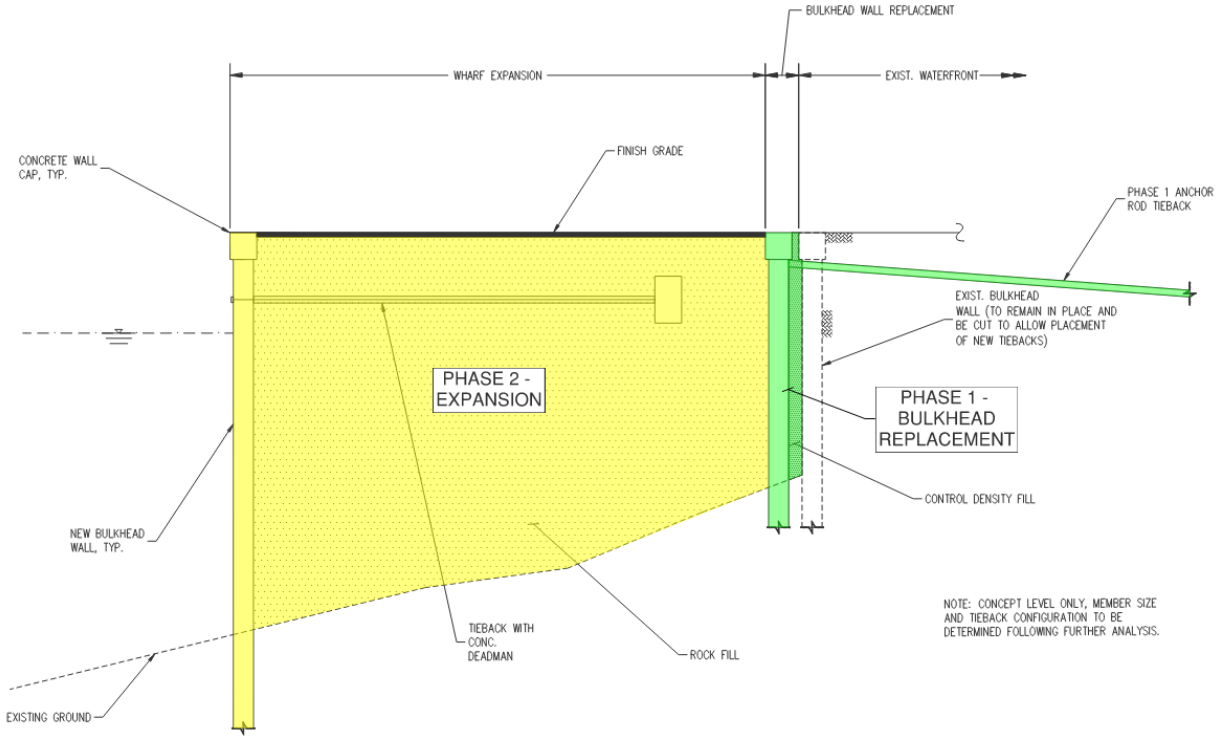
The construction of a second mainline track from the tunnel entrance to the Whittier Creek bridge crossing and construction of the passenger-level boarding area with dedicated passenger loading tracks also provides immediate relief to train operations between the tunnel entrance and the main railyard. The existing bridge over Whittier Creek already has capacity for a second track. The addition of the second track adds approximately 6,500 feet of storage track on the tunnel side of the terminal, which would provide increased capacity for railcar storage west of the tunnel. This would help reduce the amount of movement required through the tunnel and across the at-grade crossing at Whittier Street, which are both sources of conflict for rail and vehicular operations between the public and terminal freight traffic. The construction of a new passenger-level boarding platform with dedicated passenger loading tracks will remove conflicts between passenger and freight train movements within the terminal. Similar projects are currently underway in Seward and Denali National Park. With tourism through Whittier expected to continue to grow, the new level boarding platform will allow for increased passenger train capacity in the future should additional passenger carriages be acquired by ARRC. Constructing the passenger level boarding platform and loading tracks concurrently with the second mainline track expansion is recommended to ensure that proper space for the new facilities is provided with the necessary main track realignments and to minimize the number of contractor mobilizations required to complete the construction work. Because these improvements are not based on deterioration of existing facilities but provide a high return on operational efficiency, a medium priority level has been assigned to this project with a recommended completion within 5–10 years.

The largest of the proposed improvements from a cost perspective is the proposed grade separation from Camp Road to Whittier Street, which removes the current at-grade rail crossing at Whittier Street. The master plan has been developed with this component as a key aspect, providing the largest benefit to the community while not preventing other operations or projects within the terminal from advancing if it is not completed. This project requires the collaboration of ARRC, Alaska DOT&PF, and the City of Whittier to develop a project that can be constructed and maintained in the future. The proposed location of the grade separation takes advantage of natural grade features surrounding the area to limit the amount of roadway on structure required to complete a project of this type. Other alternatives to the proposed grade separation may be explored if agencies agree to pursue this project. This project has been assigned a low priority level as there will be extensive agency coordination required to complete the project and the functionality of the terminal is not adversely affected if not completed. There is widespread

public support for this project from community members, but cost may be a barrier without significant state or federal funding to complete. Based on planning and coordination efforts, a realistic timeline for completion of a proposed grade separation and low priority level when compared with other critical or high priority improvements is 10–15 years. This could be expedited via funding from collaborating agencies.

The final project identified includes the expansion of the marginal wharf discussed in Alternative 2B to a location close to the historical limits of the wharf. This would expand the working area capacity of the terminal and provide opportunities for additional non-rail barge calls along the deeper face of an extended wharf. As discussed in Section 5.1, the cost of expanding the wharf is a significant barrier to completing the project due to the amount of fill required as well as the larger structural system in deeper water. This expansion could be completed as phase two of the wharf reconstruction or incorporated in the initial phase to reconstruct the bulkhead (see Figure 6-1). Constructing the expanded wharf in two phases allows for immediate replacement of the failing bulkhead to maintain infrastructure integrity while deferring costs for expansion to the future. However, the overall cost could be reduced by constructing the expansion at the same time as the bulkhead replacement since the interior bulkhead would not need to be as robust (or possibly not needed at all) and a single contractor mobilization could be utilized. Section 6.2 illustrates the result of deferring the expansion wharf cost by maintaining relatively uniform capital costs year over year throughout the 20-year master plan timeframe. Since this optional expansion is not a part of the recommended Alternative 2A, it has been assigned the lowest priority level. Completion within the 20-year master plan timeframe is feasible, but not required, depending on the amount and type of funding available and should be driven by economic opportunities identified in the future, if possible, to provide sufficient return on the investment.

Figure 6-1. Marginal Wharf Expansion Phasing



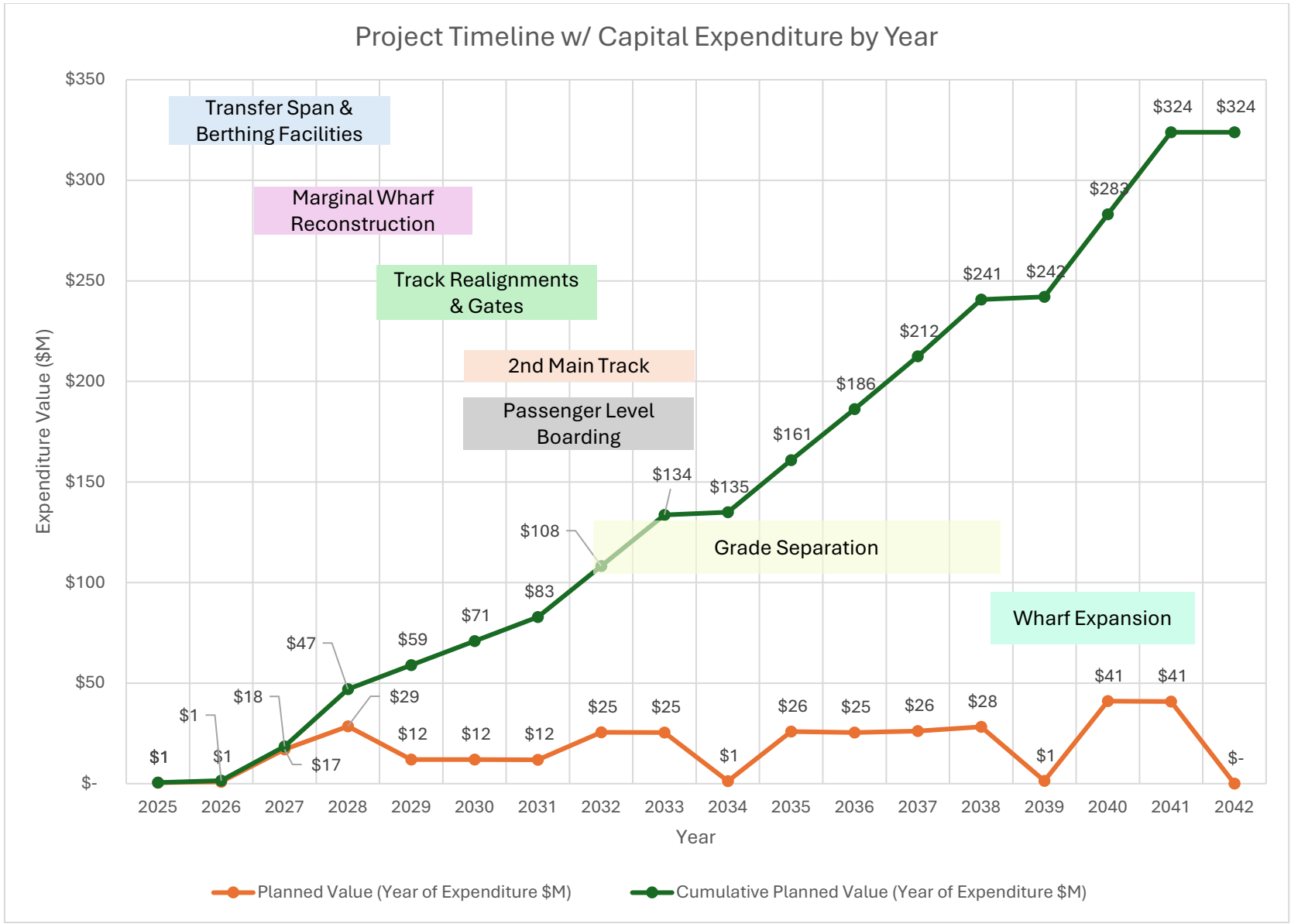
6.2. Projects and Capital Expenditure Timeline

To evaluate the costs of the proposed improvements over time, the project durations were estimated and overlaid with anticipated capital expenditures for the given durations. The results are shown in Figure 6-2. The initial years 2025 through 2027 would have lower spending, as project funding is secured through a combination of internal capital program funds from ARRC, programmatic federal funding support, and discrete grant funding obtained through a variety of federal grant programs for transportation and port infrastructure, depending on the project (see Section 7 for additional information on grant funding). Once grant funding is secured, preliminary engineering, NEPA review, final design, and environmental permitting would be completed. Procurement for construction then would commence, at which point capital expenditures would increase significantly. The timeline for the expenditures is based on the anticipated high-level project schedules, which can be found in Figure 27 of Appendix A.

To complete the evaluation, each project schedule was estimated based on complexity of project and recommended priority level noted in the previous section to maintain critical infrastructure. Funding was split between project planning/engineering and construction. Project planning and engineering is estimated at 5 percent of the total cost of construction. The goal of the analysis is to maintain a relatively even capital expenditure rate year over year and minimize spikes in expenditures. As noted in the graph, once projects are in construction, the expenses per year are consistently in the $12–$29 million range for the Alternative 2A projects. A spike to approximately $41 million per year is noted for the wharf expansion in 2040 as part of Alternative 2B if pursued in future years and is included in Figure 6-2 for illustration purposes.

Project costs are based on concept level opinions of probable construction costs noted in Appendix A for each project completed in 2024 dollars and escalated by 3 percent each year for expenditures into the future. The total expense for Alternative 2A with Track Option E, assuming all projects are complete by the end of 2038, is estimated at nearly $241 million in investments to the Whittier Terminal ($185 million in 2024 dollars without escalation). This represents a major investment in Whittier and will need to be weighed with other priority infrastructure improvements throughout the ARRC Railbelt. Comparatively, if only the high and medium priority improvements are completed, the estimated cumulative cost in 2033 is approximately $133 million ($110 million in 2024 dollars without escalation).

Figure 6-2. Project Timeline with Capital Expenditure by Year (Alternatives 2A and 2B)



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7. Grant Funding and BCA

Grant funding is a key component of ARRC's capital improvements program. ARRC utilizes a combination of revenue generated from freight and passenger rail business, federal formula funds, and discrete grant funding through recent programs such as the PIDP, Consolidated Rail Infrastructure and Safety Improvements (CRISI), and Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants. Grants are administered through a variety of federal agencies such as the Maritime Administration (MARAD), Federal Railroad Administration (FRA), and Federal Transit Administration (FTA), depending on the type of program and project being completed. Recent grant programs such as the FRA Rail Crossing Elimination Grant program present great fits for the proposed improvements. The grade separation project in particular would require coordination with the City of Whittier and Alaska DOT&PF, which could unlock further grant opportunities through the Federal Highway Administration (FHWA) and other local, state, or federal funds for cities and municipalities.

The state of federal grant funding in the near future is uncertain, and therefore specific recommendations cannot be made at this time. As projects progress, grant opportunities will be continually re-evaluated for fit with project goals and grant goals to determine the appropriate funding opportunities to pursue. To support the priority needs of the WTMP, a BCA has been completed for the proposed transfer span replacement and barge berth facility improvements, which are necessary to ensure the continued operation of the rail barge service in Whittier. BCAs for other lower-priority projects should be completed closer to the time of the proposed projects after grant funding opportunities have been identified. Refer to MARAD PIDP Grant Requirements (Appendix F) for the Whittier Terminal Master Plan Project.

7.1. Benefit-Cost Analysis for Priority Projects

This section presents the sketch-level BCA conducted for the priority projects identified in the WTMP (i.e., the Transfer Span and Berthing Facility Reconstruction). In particular, this section summarizes the BCA and the findings. A detailed description of the project's BCA, including the methodology and assumptions can be found in the BCA Technical Report (Appendix I).

The BCA was developed to align with the latest U.S. Department of Transportation's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs* (May 2025) and highlights the potential supply chain implications if the priority projects do not proceed as planned.

Due to the age and condition of the infrastructure required to maintain the rail barge operations in Whittier, there is an increasing probability that Whittier will lose the ability to accommodate rail barges as the infrastructure approaches the end of its useful life. The loss of this capacity at the Whittier Terminal would result in operational and supply chain disruptions for freight movements between the contiguous United States and Alaska. Given the lack of rail barge services at alternate Alaskan ports and the infrastructure capacity required to accommodate certain commodities, the only alternative freight transportation mode is to truck the commodities from the contiguous United States. For instance, the Port of Alaska in Anchorage is a major

alternative Alaskan port that could accommodate select commodities. However, it lacks the necessary capacity to receive and store the potentially impacted bulk liquid commodities, which are currently transported through the Whittier Terminal in railcars. As such, if Whittier were to lose its rail barge services, the majority of the bulk liquids would have no alternatives to transportation via truck.

The Transfer Span and Berthing Facility Replacement Project will look to ensure reliable ongoing rail barge services in Whittier, avoiding the scenario in which supply chains are impacted due to a loss of service. The Project will replace the existing transfer span and reconstruct the berthing facility for barges transporting railcars and containers to Whittier.

Table 7-1 highlights the assumptions related to the project cost and schedule.

Table 7-1. Project Cost and Schedule (2023 Dollars)

Project Cost	2025	2026	2027	2028	Total
Planning and Engineering	$0.5 M	$0.5 M	$0.5 M	$0.0 M	$1.5 M
Construction	$0.0 M	$0.0 M	$14.4 M	$14.4 M	$28.8 M
Total Cost	**$0.5 M**	**$0.5 M**	**$14.9 M**	**$14.4 M**	**$30.3 M**

Note: M = million.

Table 7-2 and Table 7-3 summarize the BCA findings. Annual costs and benefits are computed over the lifecycle of the Project (24 years), with 4 years of project development and 20 years of benefits. Specifically, the Project is expected to be completed in 2028, and benefits accrue during the following completion of the Project, starting in 2029 and lasting through 2048.

Table 7-2. Summary of Benefits (2023 Dollars)

Benefit	Undiscounted	Discounted
Avoided Transportation Safety Costs	$450.3 M	$158.5 M
Avoided Freight Transportation Costs	$687.7 M	$242.0 M
Reduced Emissions	$241.3 M	$84.9 M
Avoided Pavement Damage	$60.3 M	$21.2 M
Total	**$1,439.7 M**	**$506.7 M**

Table 7-3. Benefit-Cost Analysis Results (2023 Dollars)

Key Financial Metrics	Undiscounted	Discounted
Total Benefits	$1,439.7 M	$506.7 M
Total Costs	$30.3 M	$22.5 M
Net Present Value (NPV)	$1,409.4 M	$484.2 M
Benefit-Cost Ratio (BCR)	47.6	22.6
Internal Rate of Return (IRR)	86.5%	

Considering all monetized benefits and costs, the estimated internal rate of return of the Project is 86.5 percent. With a 7.0 percent real discount rate for all impacts, the $22.5 million investment would result in $506.7 million in total benefits, which translates to an NPV of $484.2 million and a BCR of approximately 22.6.[2] Additionally, Table 7-4 presents the key quantified impacts of the priority projects.

The strong positive results reflect the importance of the rail barge services in bringing freight to Alaska. In particular, select commodities, such as bulk liquids, are primarily transported to Alaska through the rail barge services, with the only alternative option being trucking given the volume destined for Alaska and the limited available capacity at alternative Alaskan ports to receive and store bulk liquids.

Table 7-4. Key Quantified Impacts

Impact Category	Total	Average Annual
Safety		
Avoided Fatalities	23.6	1.0
Avoided Injuries	603.5	25.1
Emissions		
Avoided NO_x Emissions (metric tons)	3,676	153
Avoided $PM_{2.5}$ Emissions (metric tons)	164	7

[2] All monetized values are presented in 2023 dollars, in line with U.S. Department of Transportation's *Benefit-Cost Analysis Guidance for Discretionary Grant Programs* (May 2025).

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