Port of Alaska Modernization Project

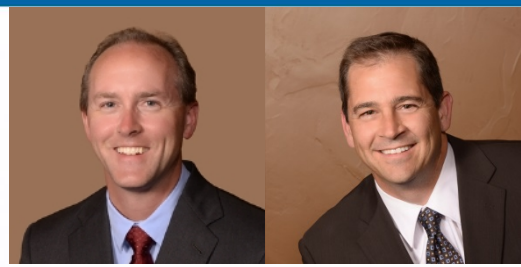
MUNICIPALITY OF ANCHORAGE

ASSEMBLY ENTERPRISE AND UTILITY OVERSIGHT COMMITTEE

Special Meeting
February 20, 2019, 2:30pm – 5:00pm
Assembly Chambers Loussac Library
3600 Denali, Room 108

Port of Alaska Modernization Project: "…how to build the most cost effective port that can meet our needs as swiftly as possible."
(Assembly Member Constant, Committee Co-Chair)

Port of Alaska Modernization Project



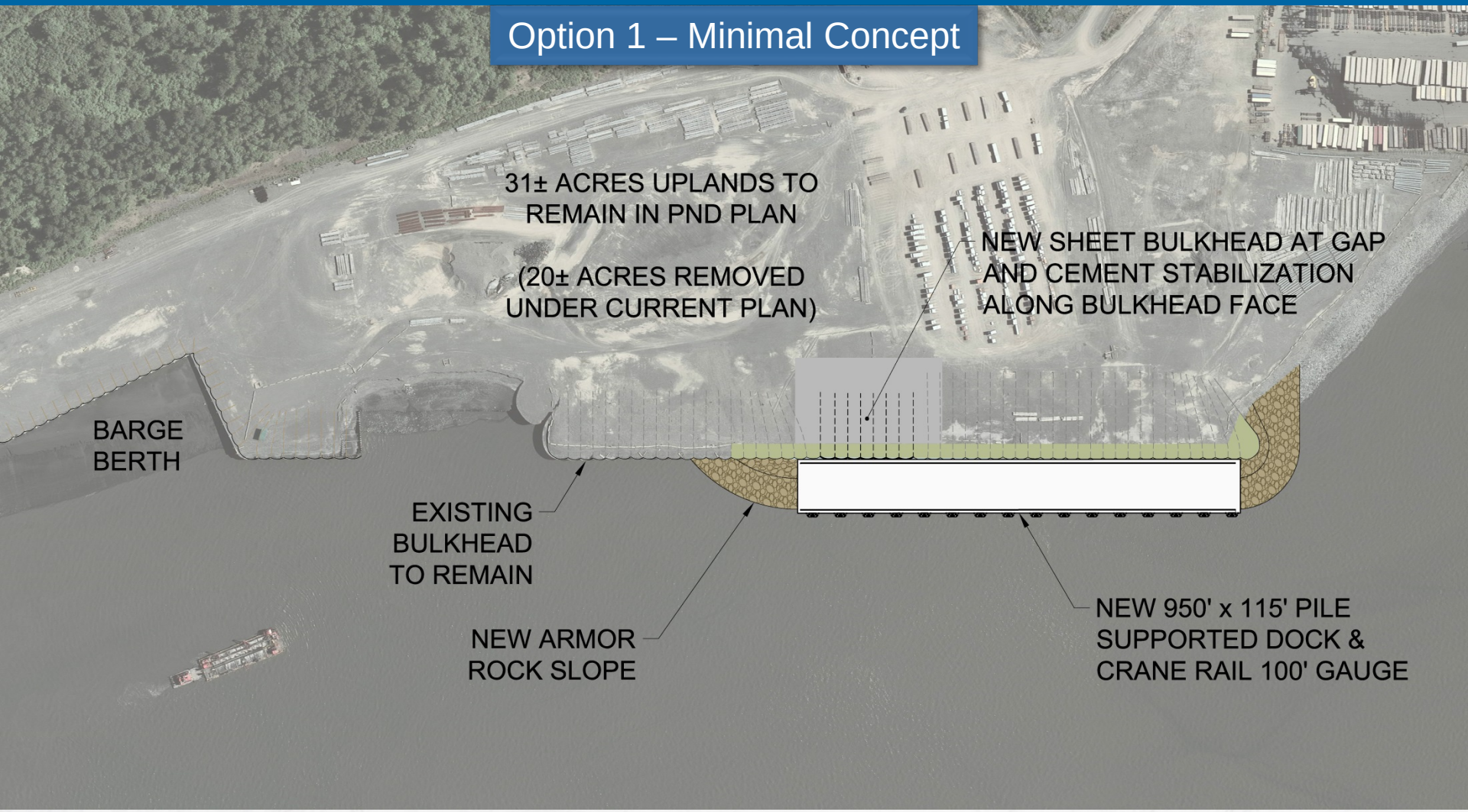
Jim Campbell, PE, President, PND Engineers, Inc.
Dempsey Thieman, PE, SE, Sr. Vice President

- PND is an Alaska engineering company, employing 100 staff.
- PND has provided engineering design for all of Alaska's container ports, in Anchorage, Kodiak, and Dutch Harbor (UMC and APL).
- Designer of the OPEN CELL™ wall system used in the original 2006-2012 Port Intermodal Expansion Project.
- Our 2006 design was sound. Construction failures were the true problem.
- We are knowledgeable about many of the technical concerns at the Port, but have not been part of any discussions or planning since about 2012.

Original (2006) Design Objectives

- Reduce dredging by moving the face out 400 feet - “self cleaning”
- Create valuable new uplands
- Avoids or eliminates conflicts with existing terminals during construction of new facilities
- Improved operations with full access and back reach to/from wharf
- Deep draft for new larger ships
- Reduce corrosion problems
- Mitigate sedimentation problem in tidal zones and seismic instability

Cost Effective Alternative for the Port



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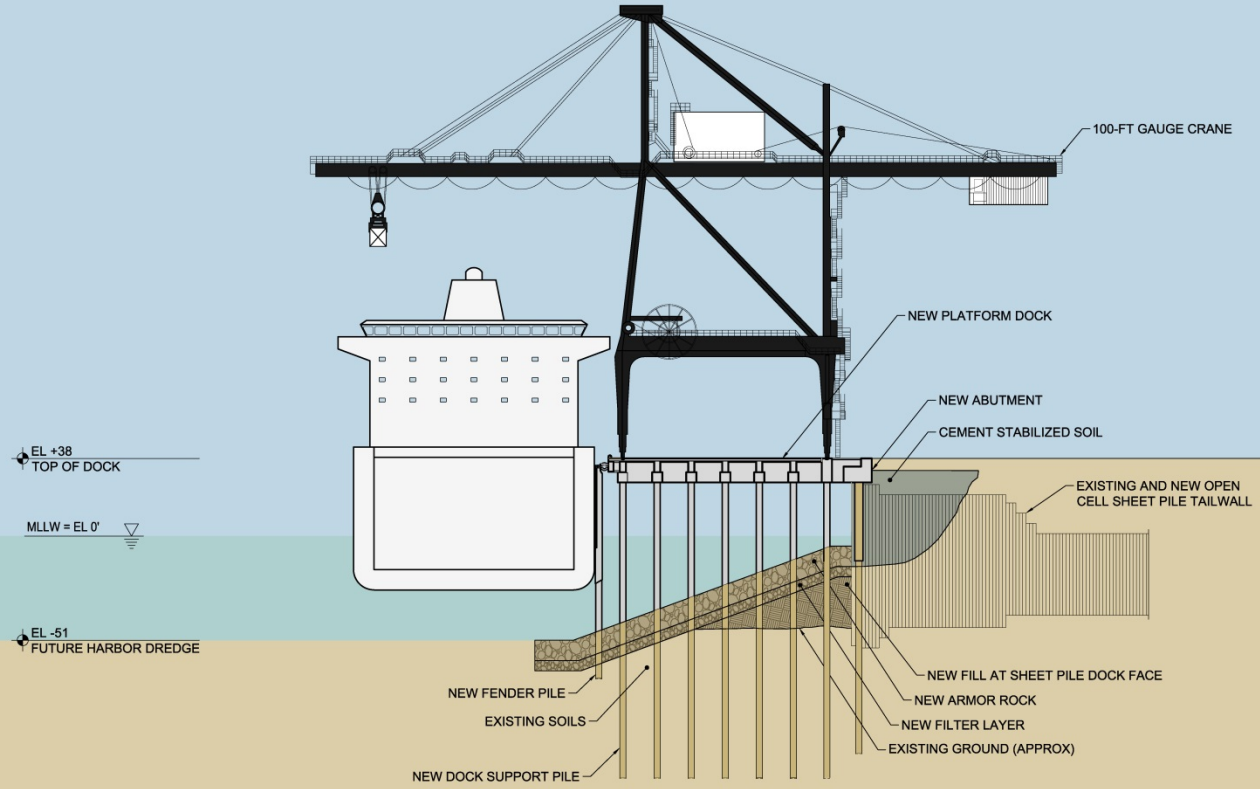
Cost Effective Alternative for the Port



TERMINAL 1 DOCK AND CRANE SECTION

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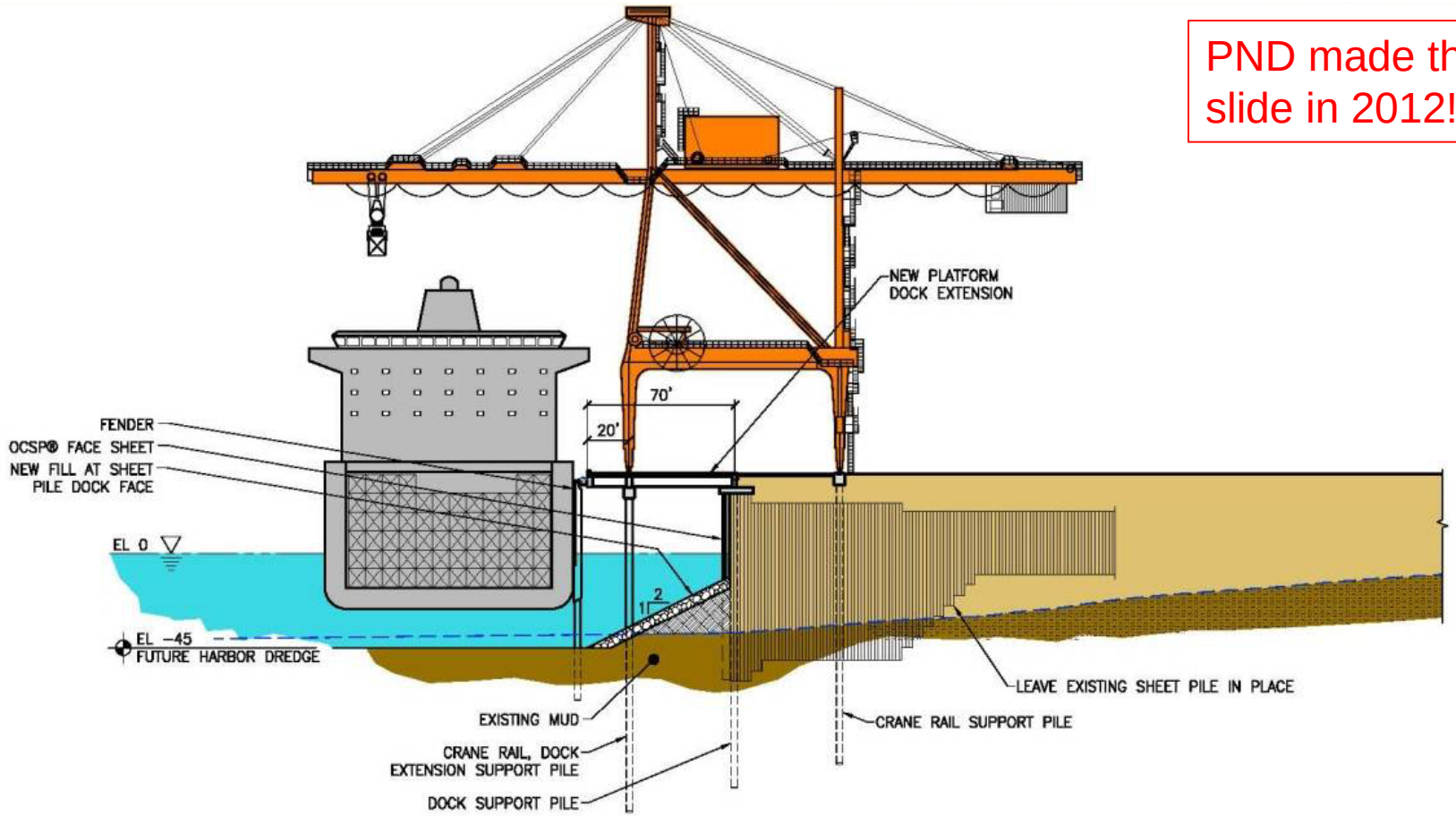
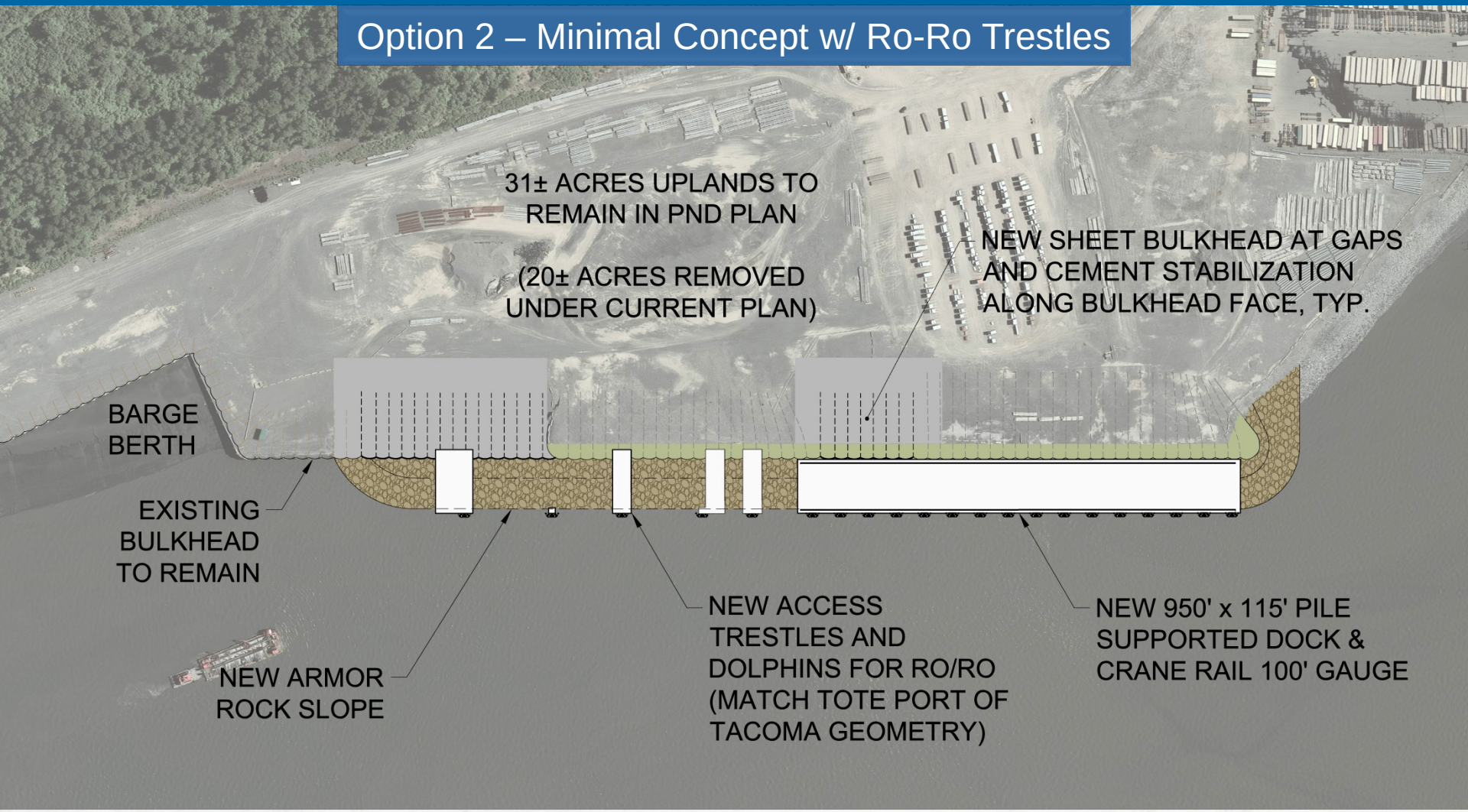
Repair Options
Marginal Wharf in Front

PND made this slide in 2012!

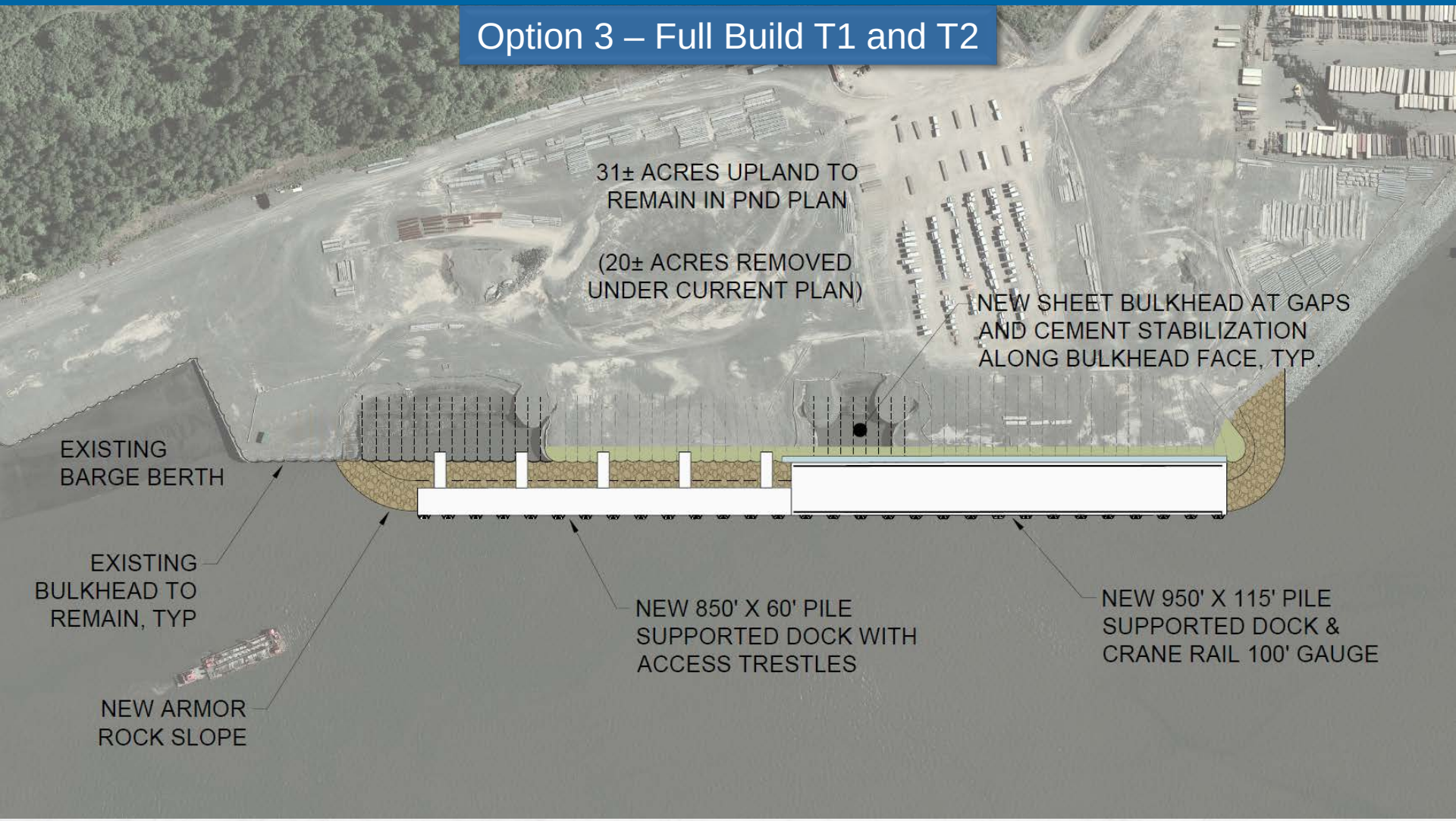


Cost Effective Alternative for the Port

Option 2 – Minimal Concept w/ Ro-Ro Trestles



Cost Effective Alternative for the Port



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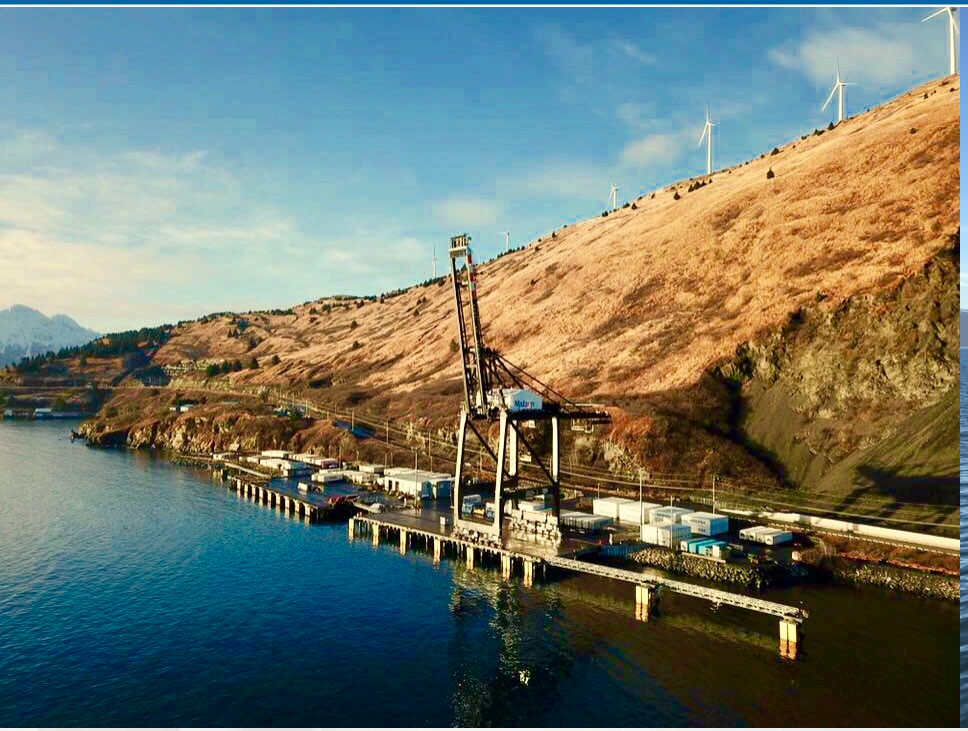

Kodiak Pier 3

- ❑ Completed in 2016 for $35 million
- ❑ 420 feet of new pier face, OPEN CELL backwall, 100-ft crane gauge
- ❑ High seismic, deep draft, same Matson ships that call on Anchorage

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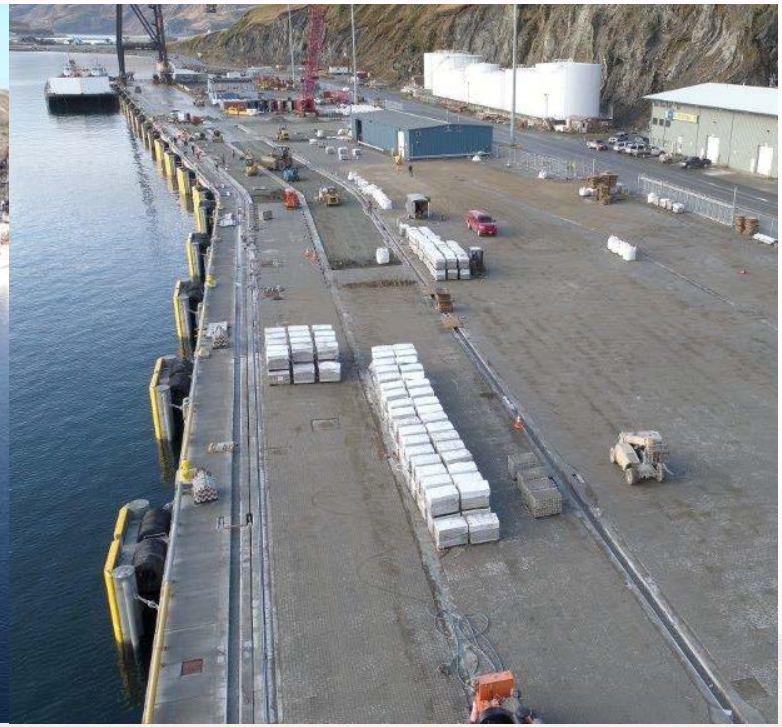

Unalaska Marine Center – Dock Position 3 and 4 Replacement

- ❑ Completed in 2019 for $35 million
- ❑ 714 feet of new dock face, OPEN CELL bulkhead, 50-ft crane gauge
- ❑ High seismic, deep draft, same Matson ships that call on Anchorage

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	Project Component	Current PAMP Plan	PND Option 1 Minimal Concept	PND Option 2 Minimal Concept w/RO-RO Trestles	PND Option 3 Full Build T1 and T2
1	Petroleum & Cement Terminal (PCT) & South Backlands Stabilization (SBS)	$240,000,000	$0	$0	$0
2	Landside Buildings (LSB)	$15,000,000	$0	$0	$0
3	North Extension Stabilization (NES Step 1 and Step 2)	$253,000,000	$0	$0	$0
4	Terminal 1 (Matson)	$747,000,000	$0	$0	$0
5	Terminal 2 (Tote)	$448,000,000	$0	$0	$0
6	Petroleum Terminal (PT)	$177,000,000	$0	$0	$0
7	Terminal 3 Demolition	$48,000,000	$0	$0	$0
8	North Terminal 1 (N1)	$0	$186,000,000	$186,000,000	$186,000,000
9	North Terminal 2 (N2)	$0	$0	$64,000,000	$115,000,000
	Total	$1,928,000,000	$186,000,000	$250,000,000	$301,000,000

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WHY DOES THE CURRENT PLAN COST SO MUCH?

- ❑ Inefficient sequencing required to avoid conflicts and keep operations going during construction
- ❑ Unnecessary demolition
- ❑ Excessive design criteria (seismic, loads, life expectancy)
- ❑ Long approach trestles to proposed Terminals 1 and 2
- ❑ Significant dredging quantities

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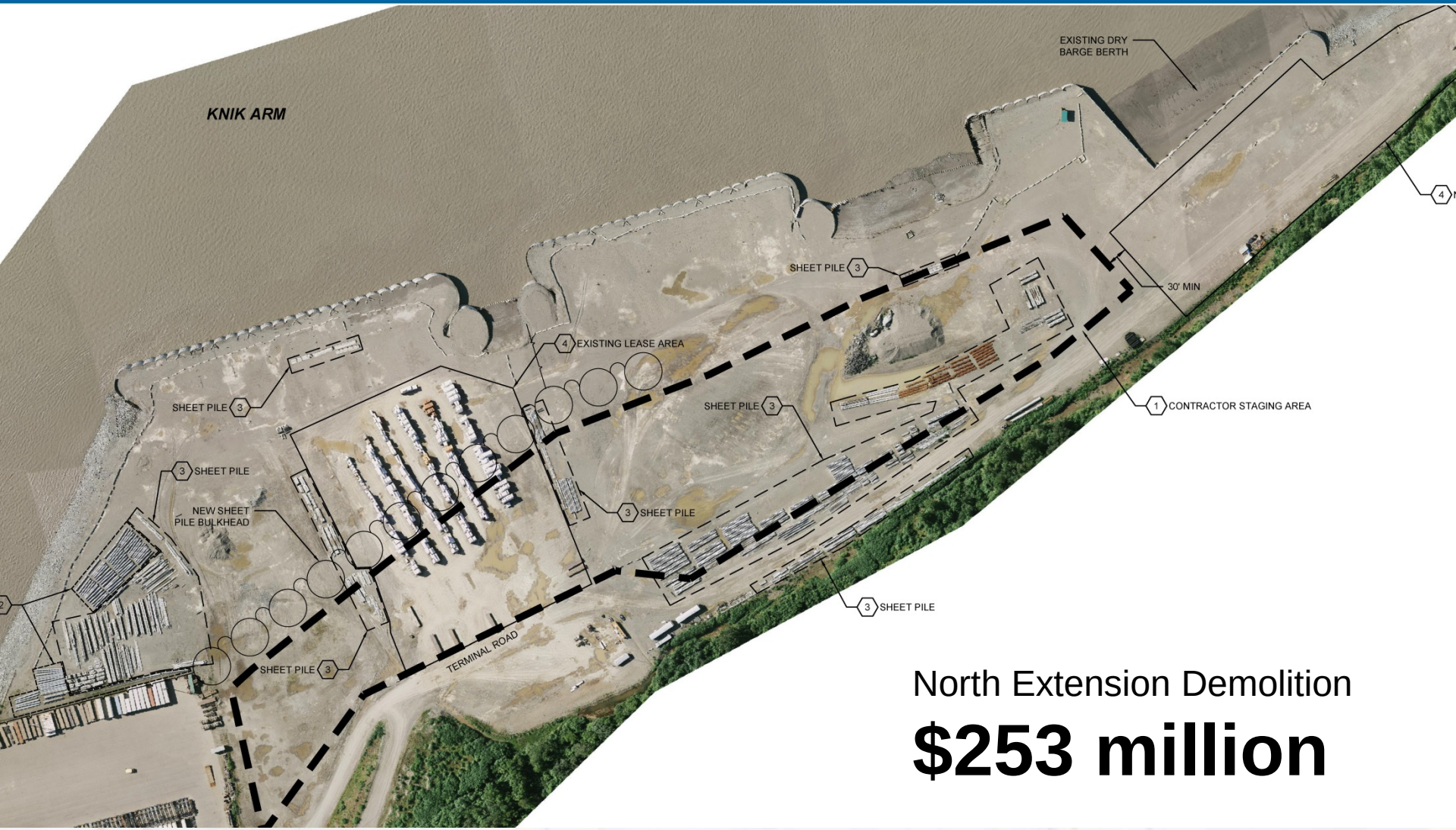
Why does it cost so much?



North Extension Demolition

$253 million

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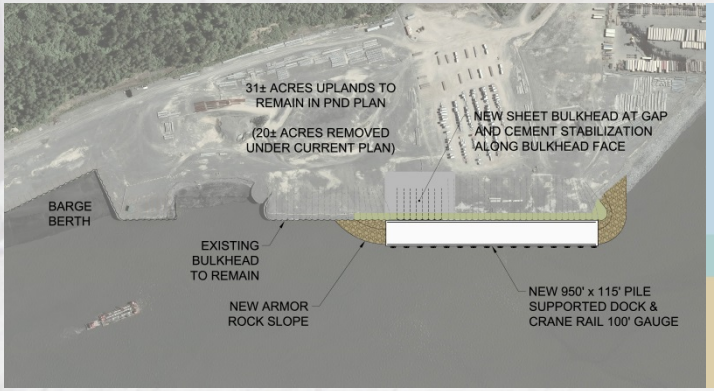
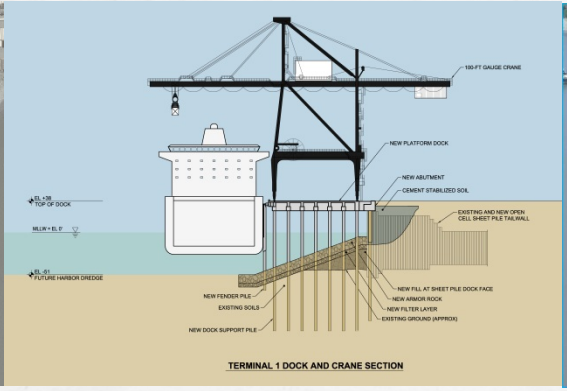
WHY ARE PND COSTS SO MUCH LESS?

- ❑ No dredging required
- ❑ Almost no demolition required
- ❑ Can construct PCT and repair/replace POL later, when funds become available
- ❑ Maximizes use of existing facilities (reuse existing infrastructure)
- ❑ Can use existing T1-T3 for cruise and light duty vessels





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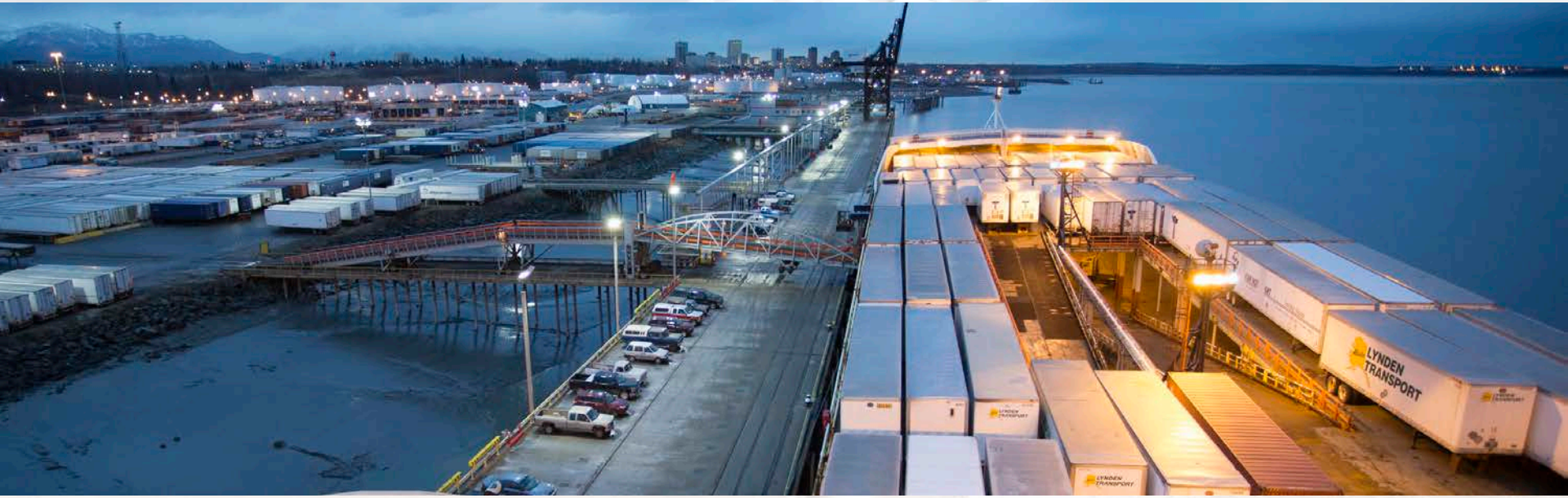
TECHNICAL CONCERNS WITH CURRENT DESIGN

- ❑ Inefficient sequencing required
- ❑ Corrosion issues and the cost to address them
- ❑ Dredging issues (maintenance)
- ❑ Less efficient design for operations (no back reach)
- ❑ Siltation (liquefiable, seismically unstable)



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CORROSION

- Iron oxidizing microbes - typically occurs between MLLW and -8' MLLW
- The rate of this corrosion is much greater than that of "general" corrosion

"One of the beneficial aspects of the retained fill concept for the Port Expansion Project is that there is no impact from this sedimentation or deposition." (R&M 2009)

R&M CONSULTANTS, INC.
9101 Vanguard Drive, Anchorage, Alaska 99507
(907) 522-1707, FAX (907) 522-3403, www.rmconsult.com

Memorandum

To:	Todd Cowles, P.E.
From:	Duane Anderson, P.E.
Subject:	Port of Anchorage – Seismic Vulnerability
Date:	7/30/09 (Updated and revised 9/6/12)
Project #:	1771.02.05

Background

The Port berthing facilities suffer from severe corrosion. Although no specific testing has been performed, the form of corrosion prevalent at the Port is thought to be "Accelerated Low Water Corrosion (ALWC)" or "Lowest Astronomic Tide (LAT)" corrosion. This form of corrosion is the result of iron oxidizing microbes and it typically occurs between MLLW and up to 1 meter below the extreme low tide, or at the Port between MLLW and -8' MLLW. Most of the literature and research on this type of corrosion has been in Europe, where it is more common. The rate of corrosion is much greater than that of "general" corrosion which is generally considered most severe at the mud line or in the tidal zone.

Neither R&M Consultants, nor any other Port Consultants, have prepared a quantitative analysis of the susceptibility of the Port's berthing infrastructure. Prior inspection reports have noted that, due to corrosion, many of the piles are at the limit of support for vertical loads. This statement infers that additional lateral loading from an earthquake could result in significant damage.

Although R&M described this condition in detail in the 2000 Annual Inspection report. We had earlier expressed concerns of problems associated with the build-up of sediments shoreward and within the footprint of the wharf. Our concern was that the sediments would liquefy in a seismic event and impose significant lateral pressure on the piles. This situation was never considered as "design criteria" for port facilities. The impact of possible liquefaction of the upland soil is magnified by two factors:

1. The extreme corrosion zone falls close to the mid-height of the pile, which is the critical section for resistance of lateral pile pressure,
2. The piles on POL No. 1, Terminal No. 1, and portions of Terminal no. 2 were installed with a shallow embedment and will behave more like simply supported columns as opposed to deeply embedded pile behavior with "fixity", ie. they are somewhat inherently more susceptible to damage.

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West Construction Letter Regarding Constructability of PND Design

"I believe that the failures at the Port of Anchorage were the result of inexperienced contractors and project managers, and were not related to the design of the facility."

"I also firmly believe that the facility can be constructed as originally designed if it is constructed by an experienced contractor and overseen by a competent project manager…"

- Brad West, West Construction, letter to Mayor Sullivan dated Feb 6, 2013 and bid protest letter dated Feb 27, 2008.

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Thank You

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