Agency: Commerce, Community and Economic Development

Grants to Municipalities (AS 37.05.315)

Grant Recipient: Nome **Federal Tax ID:** 92-6000084

Project Title: **Project Type:** Remodel, Reconstruction and Upgrades

Nome - Port Design and Construction

State Funding Requested: $181,668,000 **House District:** 39 / T

One-Time Need

Brief Project Description:

The City of Nome is requesting $181,668,000 in State funding to repair and expand marine infrastructure to meet the growing needs of industry working in the Port of Nome.

Funding Plan:

Total Project Cost:	$181,668,000
Funding Already Secured:	($0)
FY2013 State Funding Request:	($181,668,000)
Project Deficit:	$0

Detailed Project Description and Justification:

The City of Nome is requesting $181,668,000 in State funding to repair and expand marine infrastructure to meet the growing needs of industry working in the Port of Nome.

Snake River Moorage Expansion-Phase II.....$13,667,000

The City of Nome is in a very unique position within the State of Alaska, relative to offshore lease sales in state waters for suction gold dredging. In 2011 DNR lease sales netted the State of Alaska over $9 million. As the leased waters are located just off shore of Nome, this resulted in another significant increase in the small vessel fleet operating out of the Nome Small Boat Harbor.

Nome, as a historic mining community, eagerly supports the increased local economic opportunity and the development of the State of Alaska's resources. However, this seemingly overnight growth has driven the number of offshore dredging craft from a mere 3 in 1996, to 39 in 2011. Reports indicate this fleet will nearly double in 2012.

Nome's Inner Harbor/Turning Basin met the limits of its expansion potential in 2008, yet desperately needs to increase moorage capacity to accommodate the growth of the dredging and fishing fleets. A suitable location has been located on the west side of the Snake River that will allow for a fixed ice-resistant dolphin anchored float system. The City of Nome purchased several lots adjacent to this area to develop the shore-side infrastructure necessary to support the float system.

The City of Nome is requesting an investment from the State of Alaska to provide this additional space for the offshore dredges to reduce user conflict in an already over-crowded inner harbor. 35% design drawings and cost estimate attached.

Contact Name: Paul LaBolle
Contact Number: 465-3789

For use by Co-chair Staff Only:

$10,000,000
Approved

4:21 PM 5/2/2012

Deep Draft Port Design and Construction.....$150,000,000
The intense planning over the expansion and development of the Arctic has brought many projects to the fore-front to provide a deep draft port for the vessel fleet that will be required to explore, design, create, maintain and service this development. Though several areas have piqued interest among those with vision, Nome serves as the only real option with an existing port facility, adequate fuel storage, expanded medical facilities, air transportation and community structure already in place. In order to accommodate deeper draft vessels, the current depth of the outer harbor, at -22.5 MLLW, we need to extend the causeway to -35 MLLW depth. The City is updating its Port and Harbor Master plan that will determine the most viable option to reach this desired depth, and this project will design the best option and take us the last step in identifying Nome as Alaska's Deep Draft Port for the Arctic. With the historic winter refueling that just happened in Nome the USCG Icebreaker Healy was able to break shore fast ice 460 yards from the end of the causeway to allow the T/V Renda to transfer fuel. The Ice breaker Healy rested 865 yards from the end of the causeway in waters at -40 MLLW. Concept level drawings for four alternative designs and rough order magnitude cost estimates have been compiled by the City's Engineering firm.

Barge (High) Ramp Loading Dock.....$3,012,000
The City's Barge Ramp inside the Small Boat Harbor has been heavily utilized since its construction in 2005, serving as a vessel launch and loading ramp for the distribution of equipment, cargo, and gravel throughout the region. The constant heavy use as a loading ramp, in addition to the erosion of the subsurface foundation, has created a depression in the concrete that needs repair.
In an effort to meet the growing demands of cargo and gravel movement, and eliminate the multi-user conflict of the existing launch ramp, a secondary structure for the cargo vessels has been determined to be the most viable solution. A location for this new open cell loading dock has been identified just north of the existing concrete launch ramp, which will be taken out of service and repaired during this project.
The growing small vessel fleet that drives the need for the additional moorage space on the Snake River, also drives this separation of use to prevent extremely long wait periods for launching. 35% design drawings and cost estimate attached.

Causeway Ramp (Middle) Dock.....$13,489,000
The Port of Nome Causeway has two open cell sheet pile docks; the Westgold Dock -- built in 1989, and the City Dock -- built in 1991. Over the past four years, Nome has seen a significant increase in large vessel traffic that often requires vessels to anchor offshore for 1 to 3 days until dock space becomes available. This growing demand is based on an expanding fleet of cargo, fuel and gravel barges that support movement of these commodities throughout the region and Western Alaska. These village communities rely heavily on Nome's ability to transship the cargo within a short window to meet construction timelines and keep costs low.

For use by Co-chair Staff Only:

Contact Name: Paul LaBolle
Contact Number: 465-3789

4:21 PM 5/2/2012

In addition, a growing number of commercial and private vessels are transiting the Northwest Passage and frequently use Nome as a stopover to resupply or hide during extreme weather. Many of the vessels supporting the research and development of resources in the Chukchi and Beaufort Seas use Nome as a resupply port, crew change location and staging area for arctic equipment.
The Causeway Ramp Middle Dock Project is intended to address this critical space shortage in the outer harbor with an additional 475 feet of sheet pile between the existing docks, and a 100 foot section constructed at a lower elevation to serve as a ramp to transfer rolling stock on and off barges. This additional dock will allow for the necessary space to work a fuel and gravel barge, while still being able to accommodate a research or cruise ship. This will not only reduce vessel wait time, but also assist in keeping shipping costs down in a region that is all too familiar with the costs of marine shipping. 35% design drawings and cost estimates attached.

South & East Dock Fender Repair Construction.....$1,500,000
The USACE completed the Nome Sheet Pile Replacement Project in 2007-08 as a follow up project to the Navigation Improvements Project which successfully relocated the entrance to the Small Boat Harbor and Snake River. While the new sheet pile walls serve well for cargo and fuel transfers, the mooring fenders have suffered repeated damage from the ice forces each winter, indicating the design is too light duty for an arctic climate. The City has obtained drawings for a new "floating camel" fender design. This project is construction ready.

Project Timeline:

The Snake River Moorage Expansion project is underway with design efforts. Design efforts are underway for the Barge Ramp Loading Dock Construction, as well as the Causeway Ramp Dock. The South & East Dock Fender Repair is construction ready.

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

City of Nome

Grant Recipient Contact Information:

Name:	Denise Michels
Title:	Mayor
Address:	P.O. Box 281
	Nome, Alaska 99762
Phone Number:	(907)443-6600
Email:	dmichels@nomealaska.org

Has this project been through a public review process at the local level and is it a community priority? [X] Yes [ ] No

For use by Co-chair Staff Only:

4:21 PM 5/2/2012

Contact Name: Paul LaBolle
Contact Number: 465-3789

Presented by:
Mayor
Action Taken:
Yes 6 No 0
Abstain 0

CITY OF NOME, ALASKA

RESOLUTION NO. R-12-01-04 AMENDED

A RESOLUTION ENDORSING PROJECTS AND POSITION STATEMENTS FOR THE CITY OF NOME 2012 STATE LEGISLATIVE PRIORITIES

WHEREAS, a public hearing and joint work session of the Nome City Council, Nome Joint Utility Board, Nome School District Board, Nome Planning Commission, and Nome Port Commission was held in Nome, Alaska on Monday, November 14, 2011; and,

WHEREAS, it is with unanimity that the following prioritized projects are considered worthy of advocacy to State of Alaska legislative and administrative leaders:

Priority #1 - Water and Sewer Infrastructure Improvements;

Priority #2 - Port of Nome Improvements; and,

Priority #3 - Support for Long Term Care Facility and Assisted Living Facility

Priority #4 - Develop, Locate or Extend Affordable Energy Sources to Nome and Other Rural Alaskan Communities

WHEREAS, it is with unanimity the following Community Infrastructure items are considered worthy of advocacy to State of Alaska legislative and administrative leaders:

Nome City Community Infrastructure:
- Nome Causeway Extension for Deep Draft Arctic Port
- Extension of Steadman Street to the By-pass Road for Future Community Development
- DOT/PF Northwest Alaska Access Study
- Portable Fire Gear to be used by NVFD for the region
- Heavy Equipment Multi-Purpose Loader and Snow Blower
- Public Facility Upgrades
- Covered Multi-Use Recreational Structure

Nome School Capital Improvements:
- District Office Sprinkler/Fire Alarm Upgrade
- Nome Elementary School Gym Floor Replacement
- Nome Beltz High School HVAC Direct Digital Control Phase II

Utility Issues:
- Support for Changes to the PCE Program
- Expand Eligibility and Maximum Loan Limits for Participation in State Revolving Bulk Fuel Loan Fund;

WHEREAS, it is with unanimity that the following legislative position statements are supported by the City of Nome and considered worthy of advocacy to State legislative and administrative leaders:

Alaska Army National Guard Readiness Center;

State Office Building;

Pioneer/Veterans Home in Northwest Alaska; and,

Detoxification Center

WHEREAS, it is with unanimity that the following legislative position statements are supported by the City of Nome and considered worthy of advocacy to State of Alaska legislative and administrative leaders:

State Fiscal Issues:

- Support for the Municipal Revenue Sharing Program
- Support of Transportation Infrastructure Funding to include Rural Alaska
- Support of the Development of the State of Alaska's Renewable Energy Resources and the Continuance and Expansion of Programs that Increase End-Use Conservation and Energy Efficiency
- Support of the Arctic Marine Shipping Assessment 2009 Report Recommendation

NOW, THEREFORE, BE IT RESOLVED that the Nome City Council endorses the aforementioned items for inclusion in the City of Nome 2012 State of Alaska Legislative Priorities Package.

APPROVED the 27th day of January, 2012 and **SIGNED** this 30th day of January, 2012.

DENISE MICHELS, Mayor

ATTEST:

VANESSA MUSICH, City Clerk

NOME INNER HARBOR HIGH RAMP
35% DESIGN COST ESTIMATE

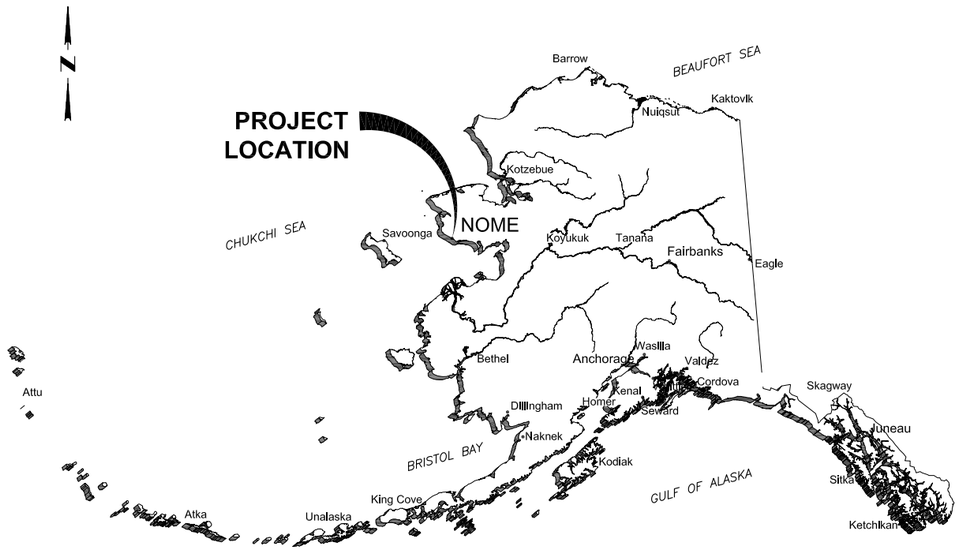
A	Mob/Demob/Site Prep/Cleanup/Bonds/Insurance	$	750,000
B	Dredge	$	300,000
C	OPEN CELL with ramp and access fill	$	866,000
D	Dolphins	$	649,000

Materials and Labor Subtotal	$	2,565,000
Engineering	$	100,000
Fill mitigation and permitting expense	$	30,000
CA—Bidding Assistance, Submittal Review, Fabrication Inspection, Field Inspection	$	52,000
Final Inspection & As-Built Drawings	$	8,000
10% Construction Contingency		257,000
Construction Total with Contingency	**$**	**3,012,000**

1. Cost estimate based on 35% Inner Harbor High Ramp drawings dated 3/06/2012 and similar projects.
2. Construction Administration costs are approximate and will depend on construction duration.

NOME HARBOR IMPROVEMENTS
PORT OF NOME
INNER HARBOR HIGH RAMP

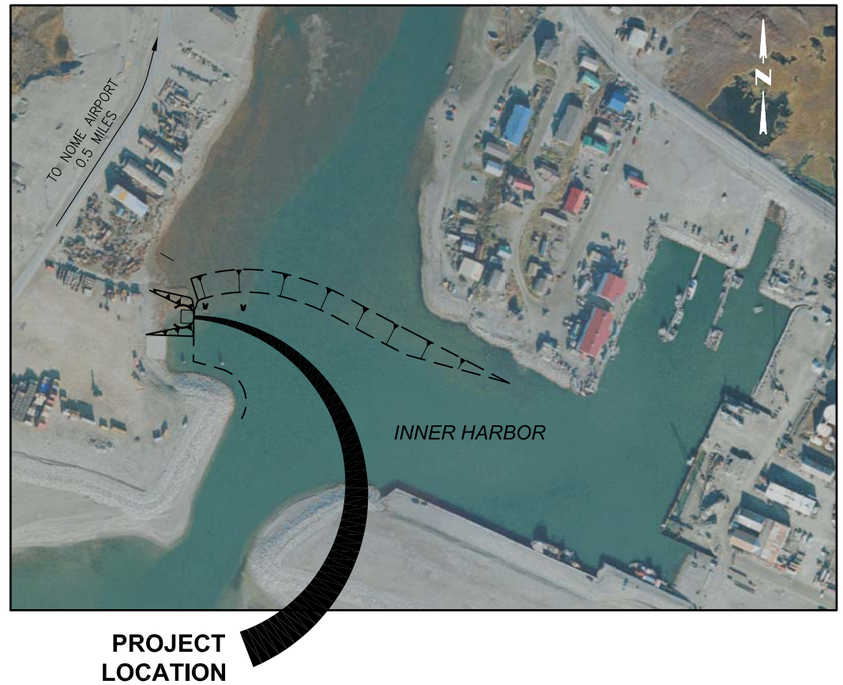
FEBRUARY 2012, NOME, ALASKA



STATE OF ALASKA

SHEET INDEX

* NOT INCLUDED THIS SET



NOME INNER HARBOR VICINITY

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

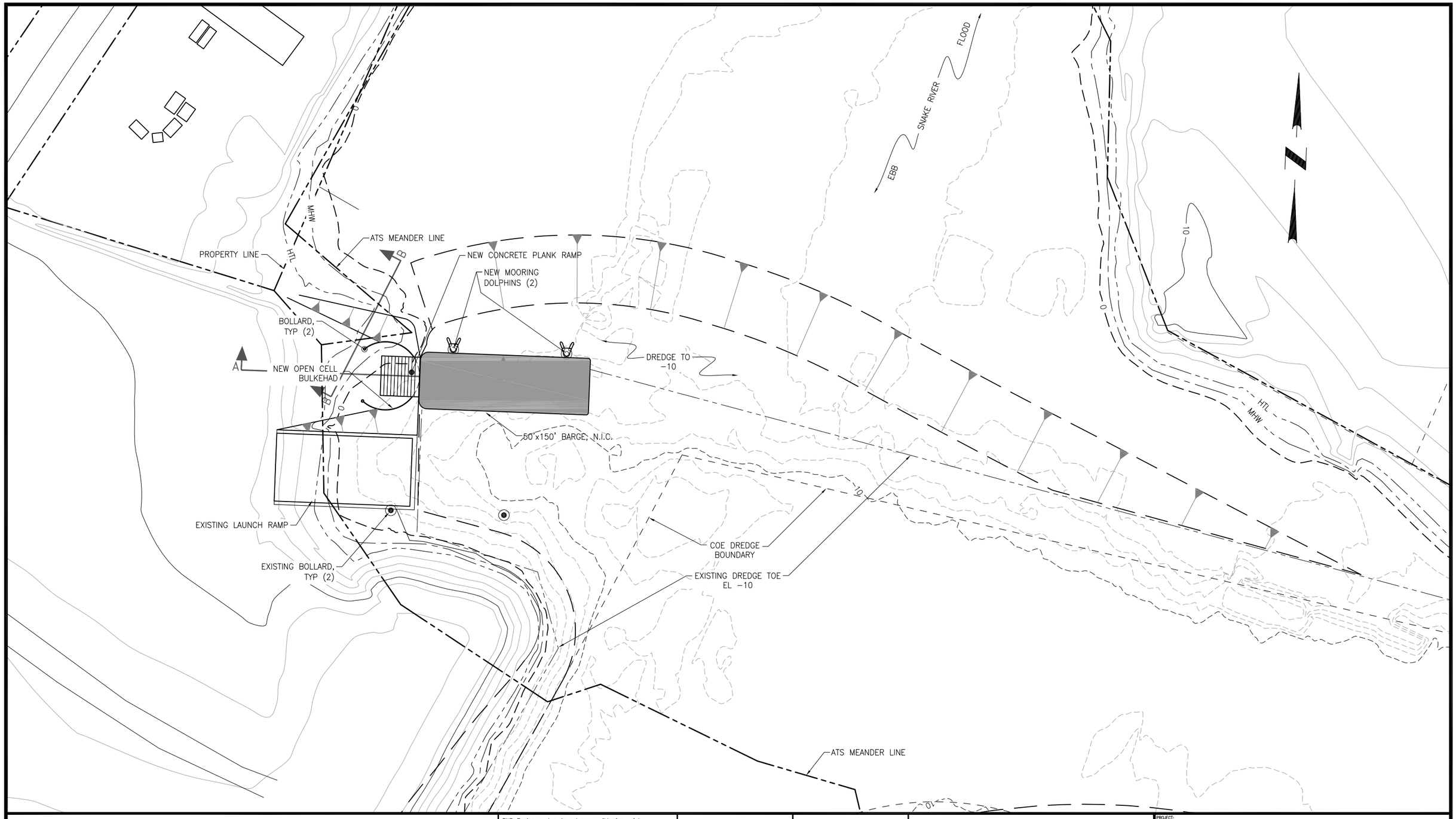
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
COVER

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

SHEET NO: 1 OF X



OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

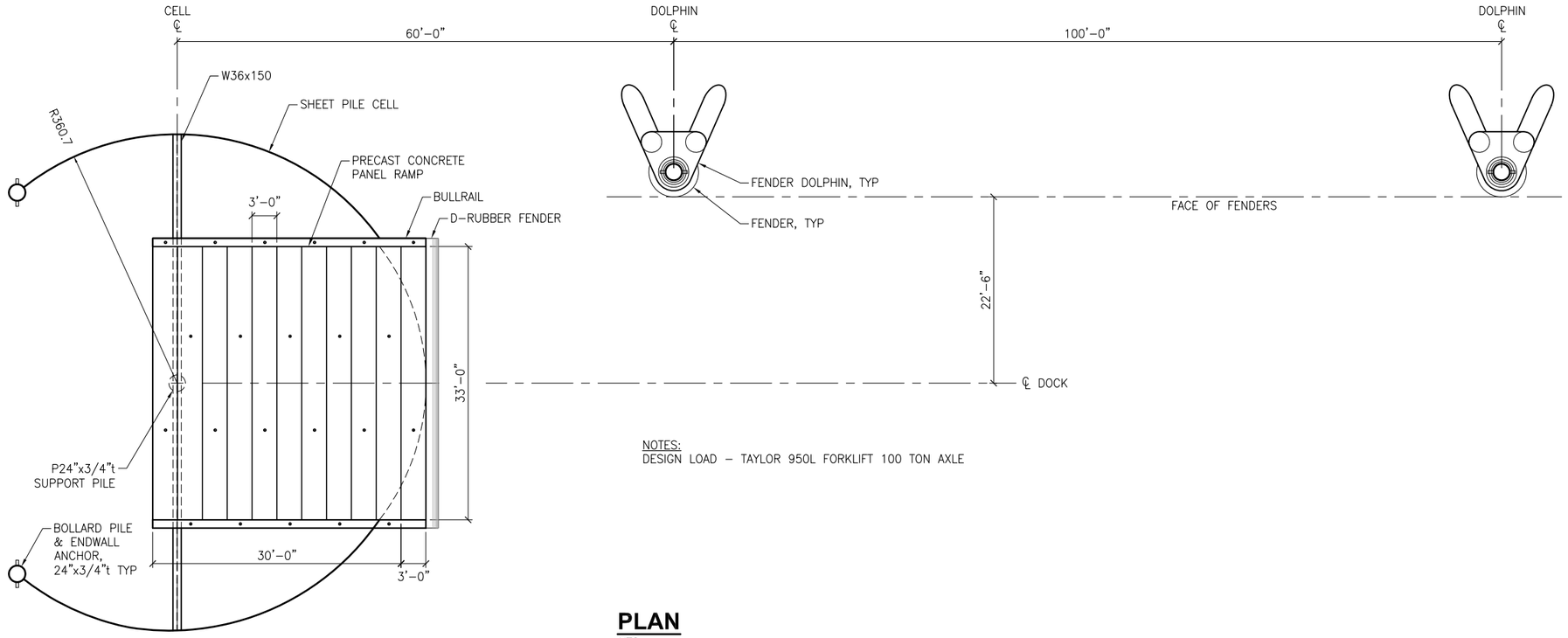
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
SITE PLAN

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

SHEET NO: 2 OF X



NOTES:
DESIGN LOAD – TAYLOR 950L FORKLIFT 100 TON AXLE

PLAN
NTS

QUANTITIES		
ITEM	LENGTH	#ITEMS
PS31 SHEET PILE	25'	30
PS31 SHEET PILE	20'	6
PS31 SHEET PILE	15'	48
30"x 1" DOLPHIN PILE	65'	6
24"x3/4" ANCHOR PILE	30'	2
24"x3/4" SUPPORT PILE	40'	1

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

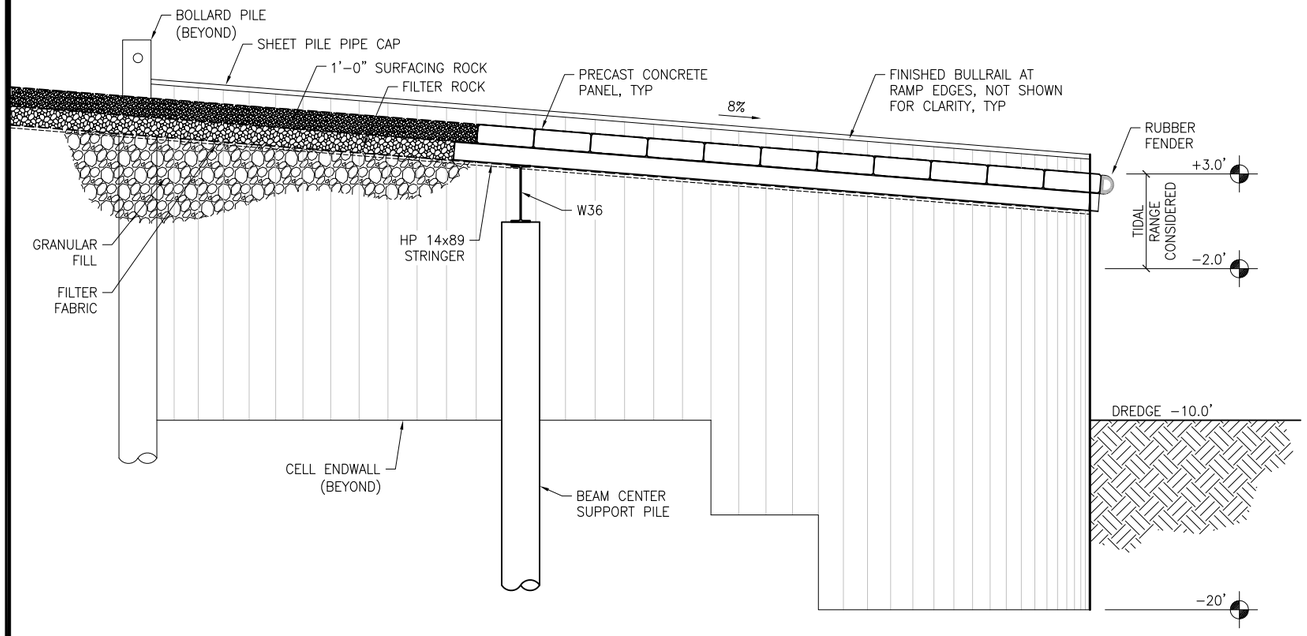
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
OPEN CELL LAYOUT

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

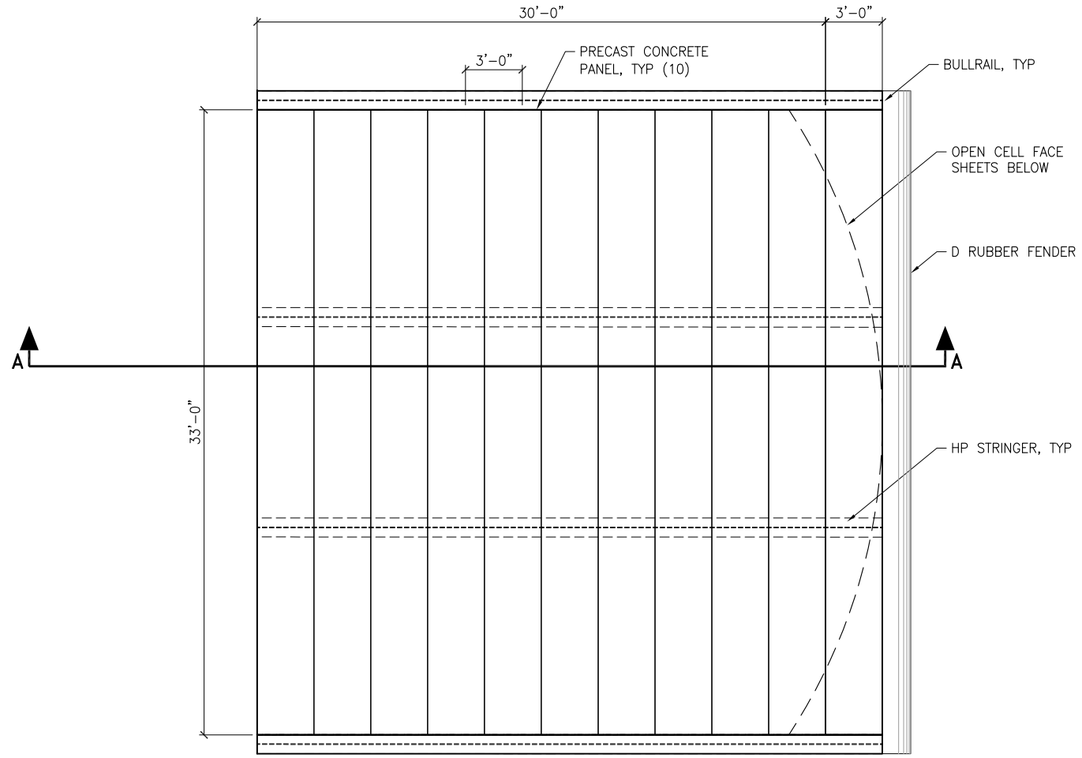
SHEET NO: 3 OF X



SECTION A-A

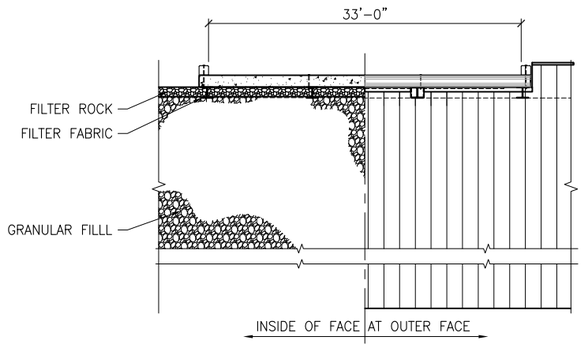
NTS

NOTE: TIDES IN NOME ARE HIGHER THAN +3 FT APPROXIMATELY 3% OF THE TIME, AND LOWER THAN –2 FT LESS THAN 1% OF THE TIME DURING MAY TO NOVEMBER.



PANEL PLAN

NTS



RAMP ELEVATION

NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

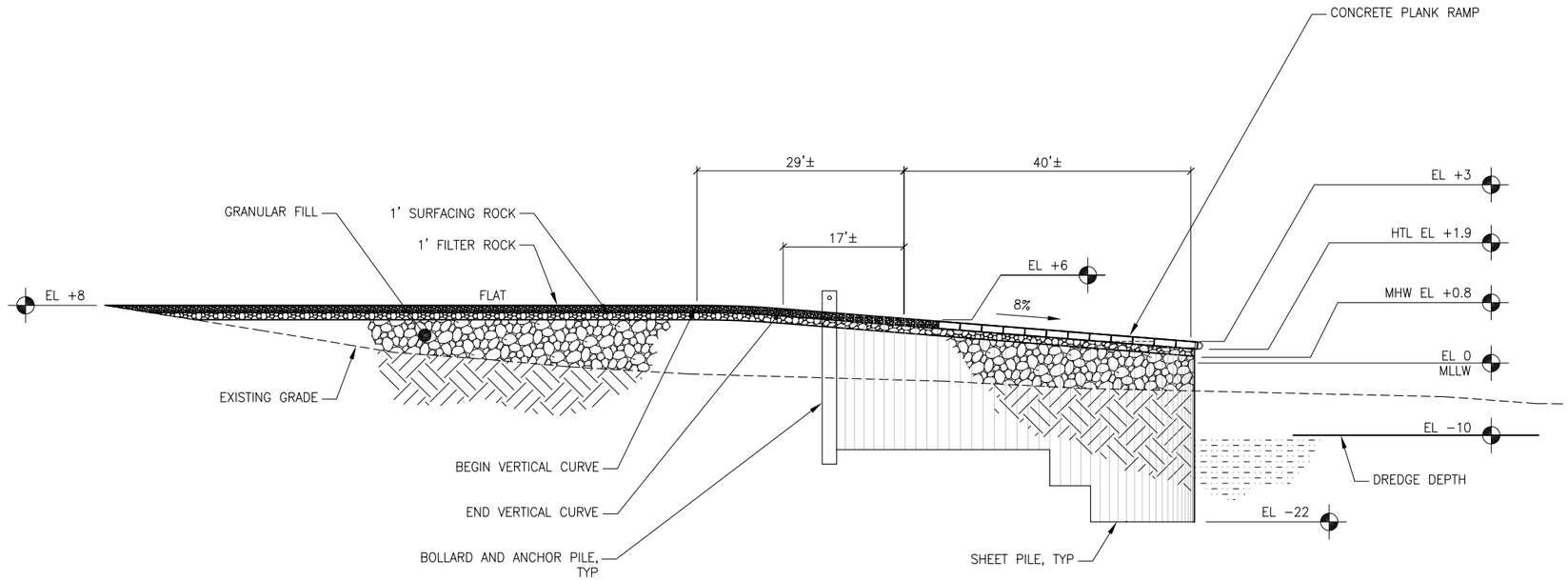
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
RAMP PLAN & SECTIONS

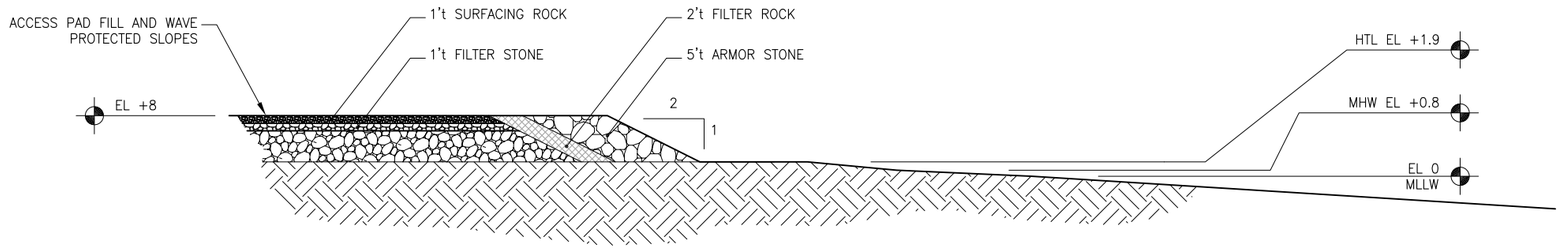
DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

SHEET NO: 5 OF X



ACCESS AND RAMP SECTION A-A

NTS



ACCESS SECTION B-B

NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

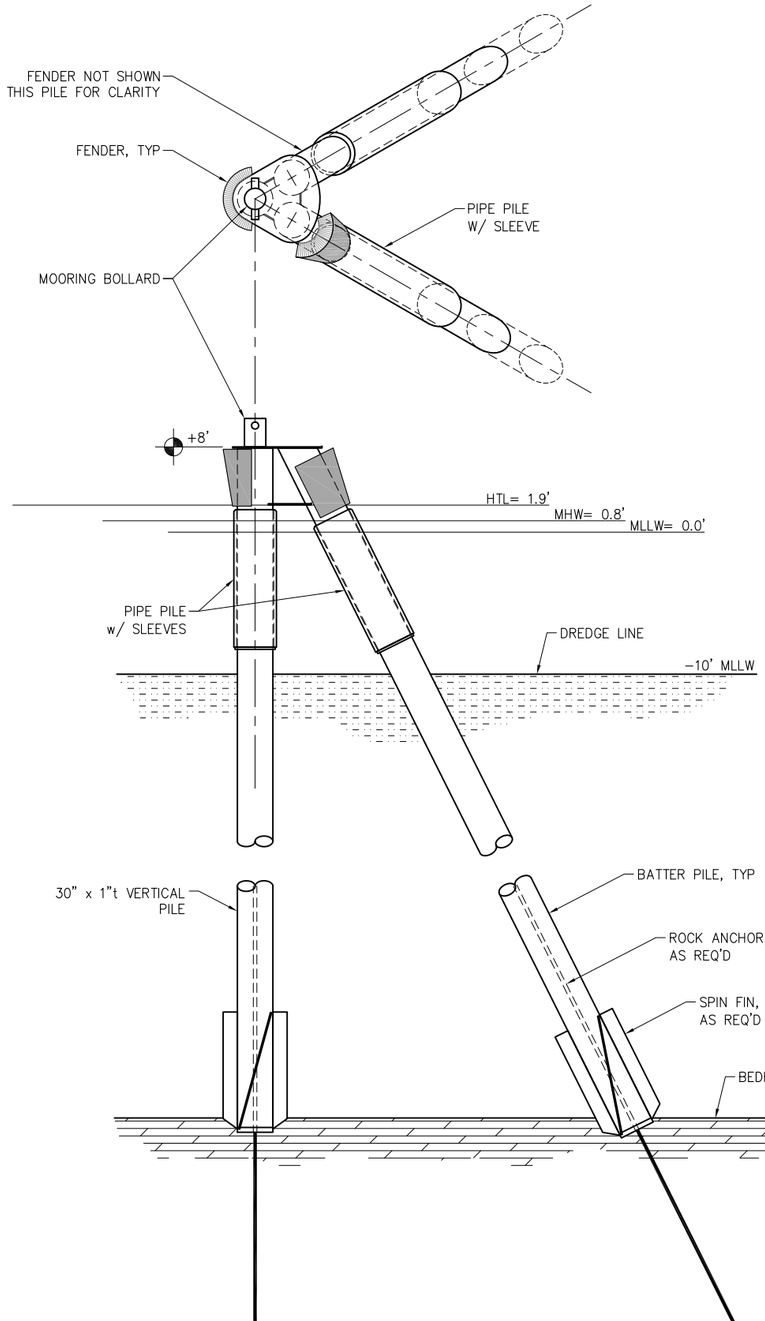
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
FILL SECTIONS

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

SHEET NO: 7 OF X



OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35% DRAWINGS
3/06/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
INNER HARBOR HIGH RAMP

TITLE:
DOLPHIN DETAILS

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	101053

SHEET NO: **8** OF X

NOME HARBOR MID DOCK

35% DESIGN COST ESTIMATE

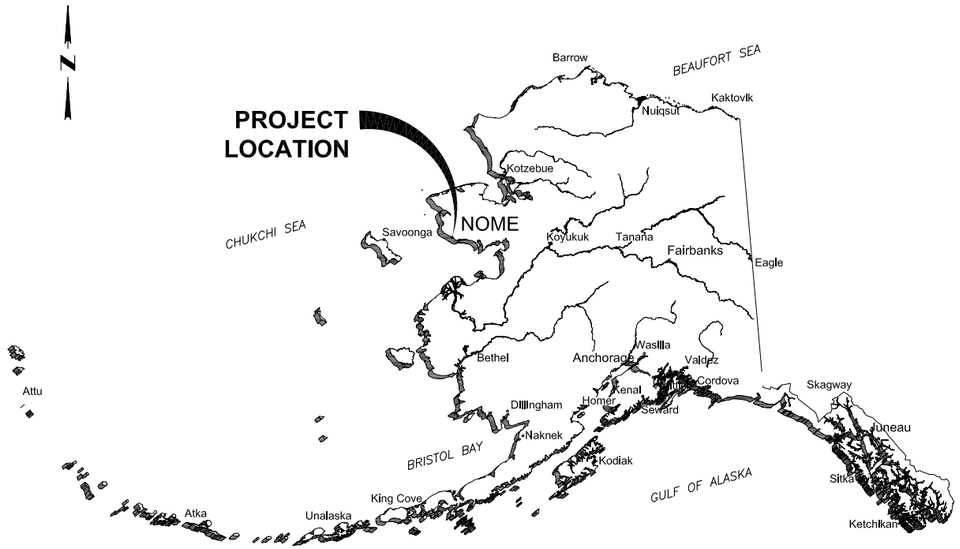
Item	Unit	Quantity	Unit Price		Amount
1 *MOB / DEMOB, DEMO AND CLEANUP*				**$**	**2,199,000**
2 *OPEN CELL SHEET PILE® DOCK*				**$**	**8,959,680**
3 *DOCK AMENITIES - HIGH MAST LIGHT*				**$**	**250,000**
4 *RO-RO RAMP*				**$**	**493,000**
FILL MITIGATION ESTIMATE=				**$**	**25,000**
BIDDING ASSISTANCE, SUBMITTAL REVIEW, FABRICATION INSPECTION =				**$**	**155,000**
ENGINEERING =				**$**	**180,000**
CONSTRUCTION TOTAL =				**$**	**12,262,000**
Construction Contingency				$	1,227,000
CONSTRUCTION TOTAL w/ CONTINGENCY =				**$**	**13,489,000**

Notes:

1. Estimated costs and quantities are based on 35% Design drawings and typical construction costs for similar structures.
2. Construction administration costs are approximate and will depend on construction duration.

NOME HARBOR IMPROVEMENTS
PORT OF NOME
MID DOCK

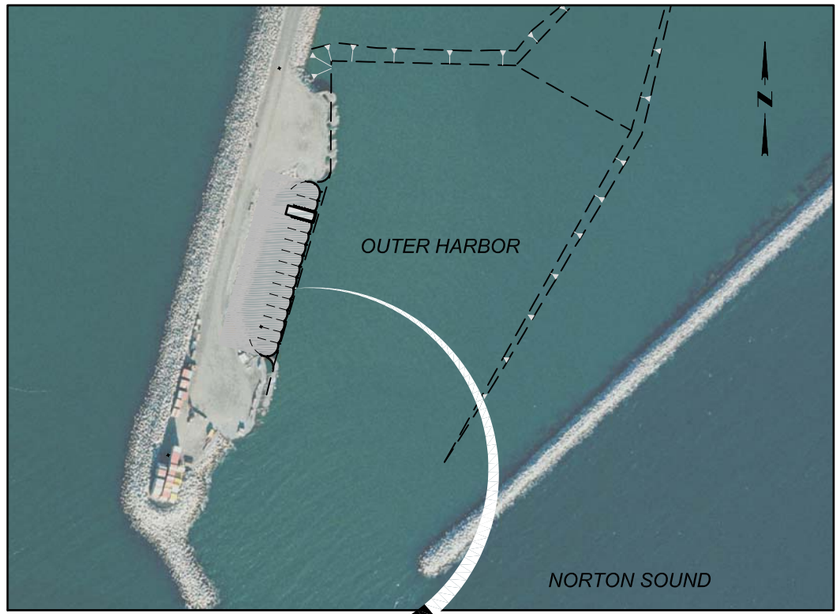
JANUARY 2012, NOME, ALASKA



STATE OF ALASKA

SHEET INDEX

*NOT INCLUDED THIS SET



NOME OUTER HARBOR VICINITY

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

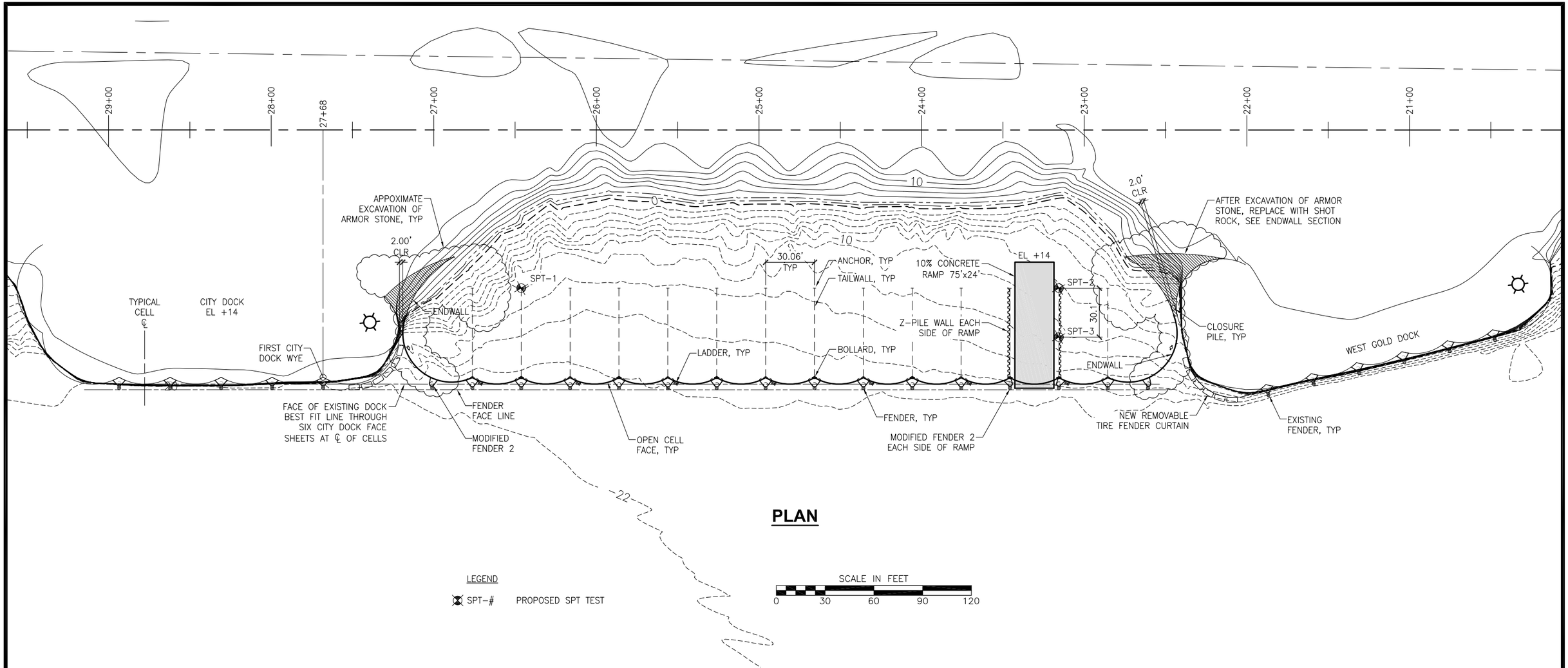
PND ENGINEERS, INC.

PROJECT: CITY OF NOME HARBOR IMPROVEMENTS MID DOCK

TITLE: COVER

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 1 OF X



PLAN

LEGEND

SPT-# PROPOSED SPT TEST

SCALE IN FEET

0 30 60 90 120

OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

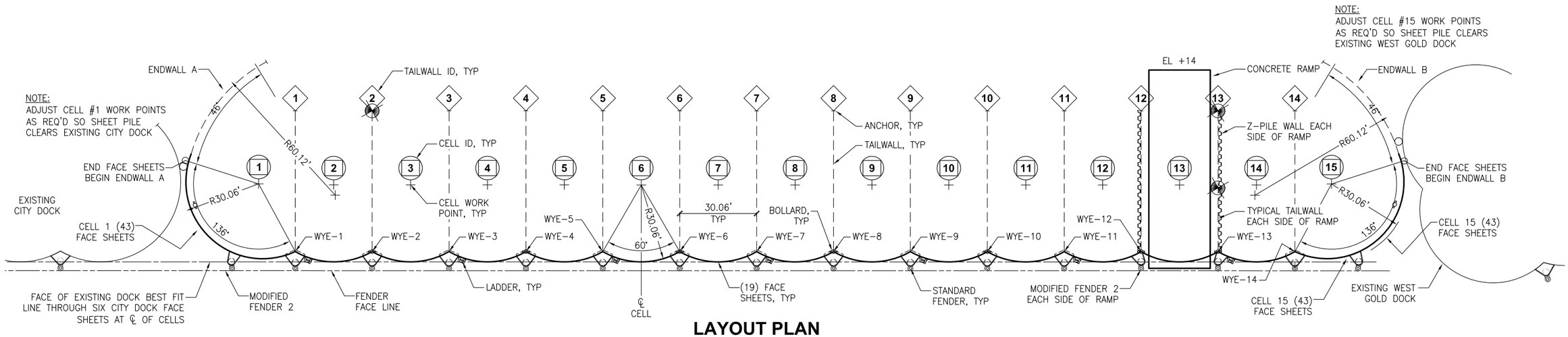
P N D ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS MID DOCK

TITLE:
SITE PLAN

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 2 OF X



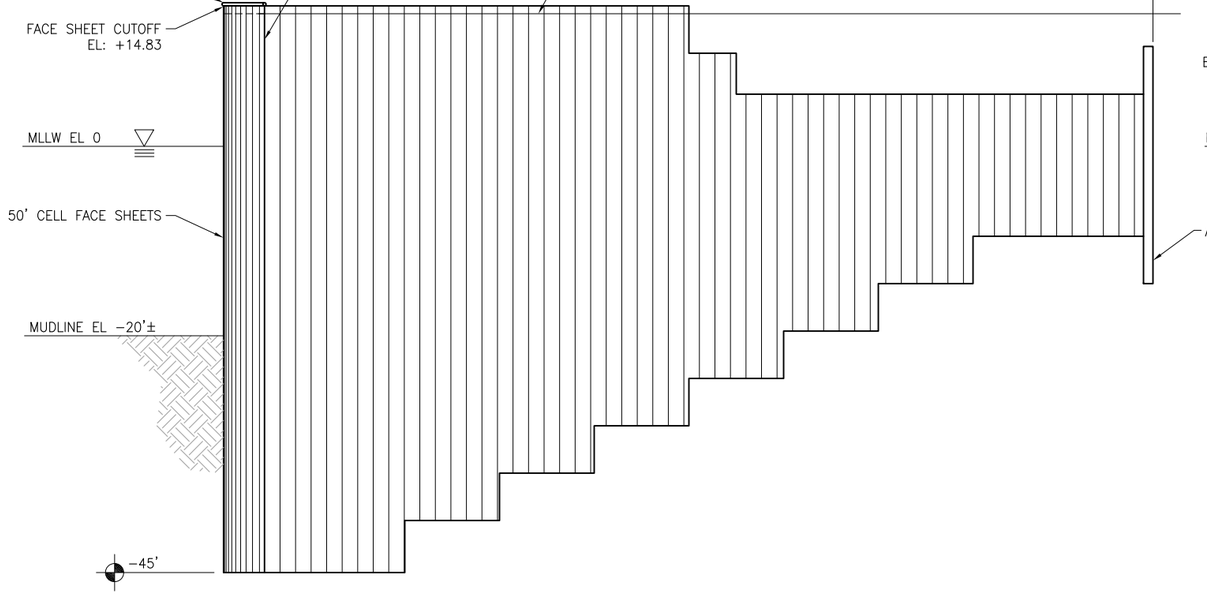
LAYOUT PLAN

SCALE IN FEET

0 20 40 60 80

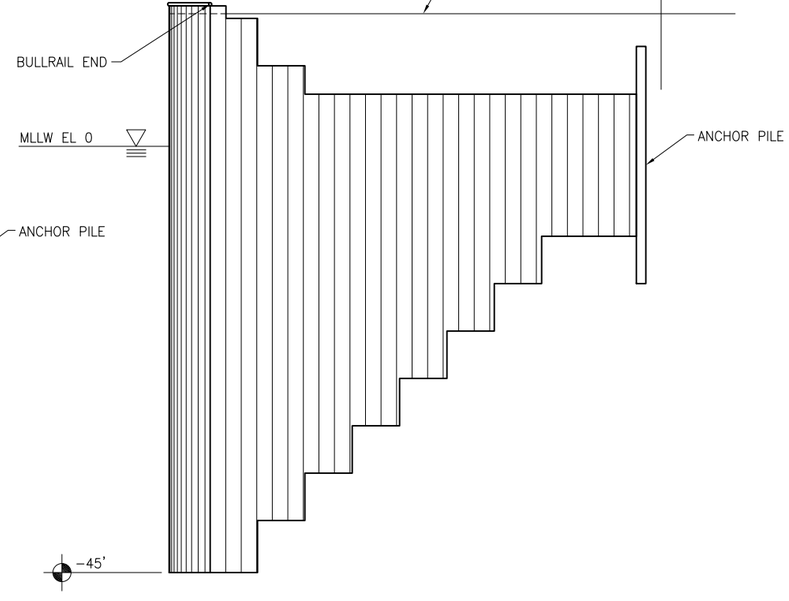
WYE LAYOUT TABLE		
POINT*	STATION	OFFSET
WYE-1		
WYE-2		
WYE-3		
WYE-4		
WYE-5		
WYE-6		
WYE-7		
WYE-8		
WYE-9		
WYE-10		
WYE-11		
WYE-12		
WYE-13		
WYE-14		

* REFERENCE POINT FIRST CITY DOCK WYE



TYPICAL ENDWALL

NTS



TYPICAL TAILWALL

NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS MID DOCK

TITLE:
OPEN CELL LAYOUT

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

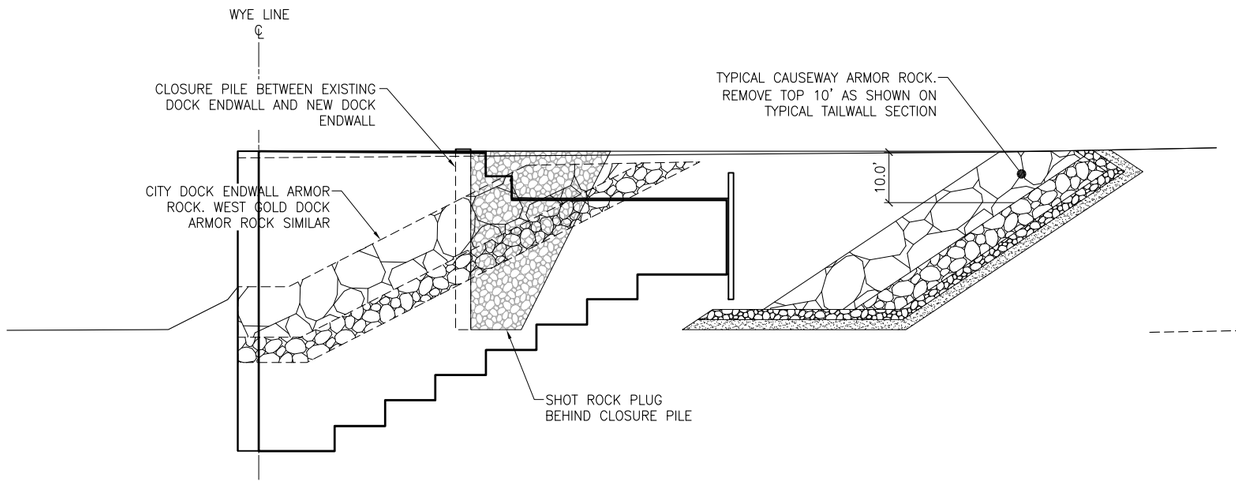
SHEET NO: 3 OF X

CITY DOCK

CITY DOCK CLOSE-UP

WEST GOLD DOCK

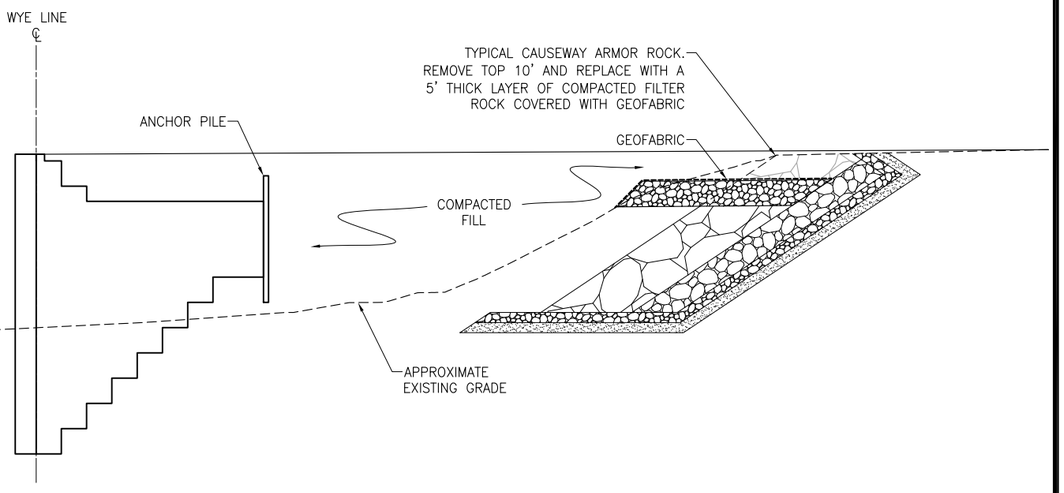
WEST GOLD DOCK CLOSE-UP



NOTE:
EXCAVATE ROCK MATERIAL AS REQUIRED FOR SHEET PILE INSTALLATION

ENDWALL SECTION

NTS SHOWN AT CITY DOCK



TYPICAL TAILWALL SECTION

NTS

OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS MID DOCK

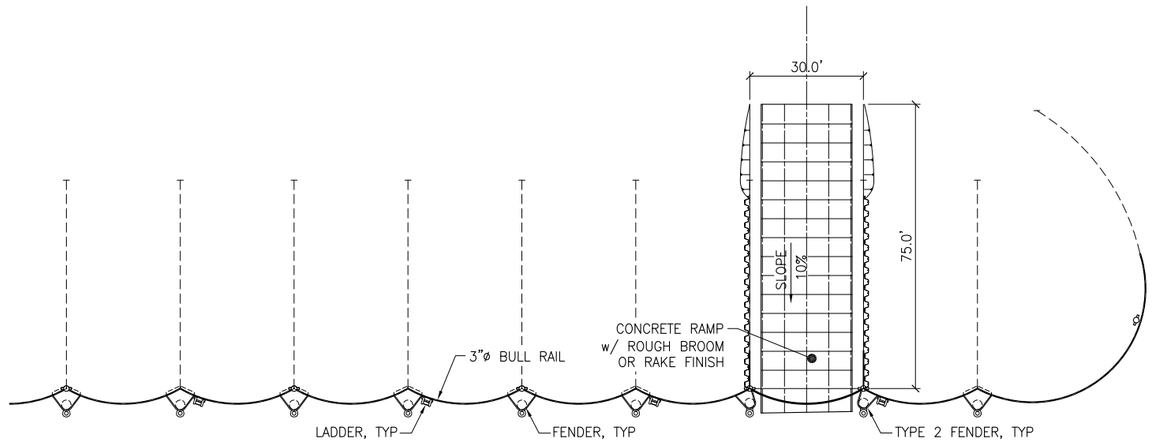
TITLE:
SECTION & PHOTOS

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

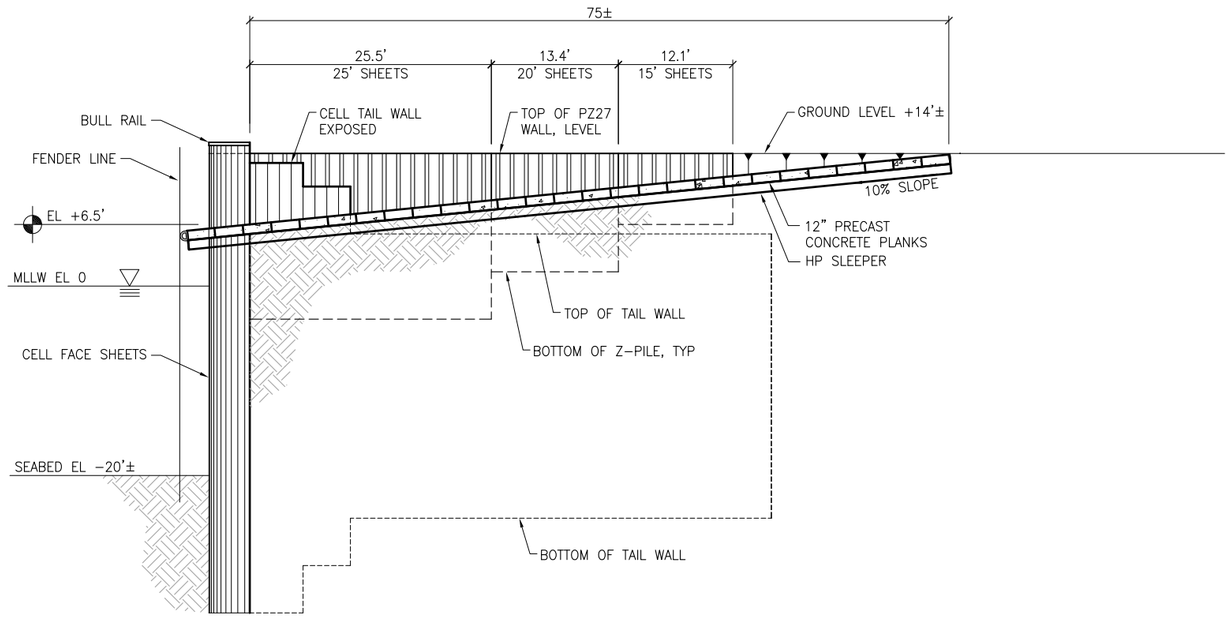
SHEET NO: 5 OF X

SCALE IN FEET

20 0 20 40 60

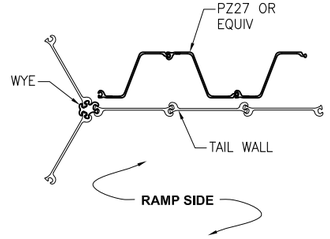


DOCK RAMP PLAN



RAMP SECTION

NTS



PZ SHEET PLAN AT WYE

NTS

OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

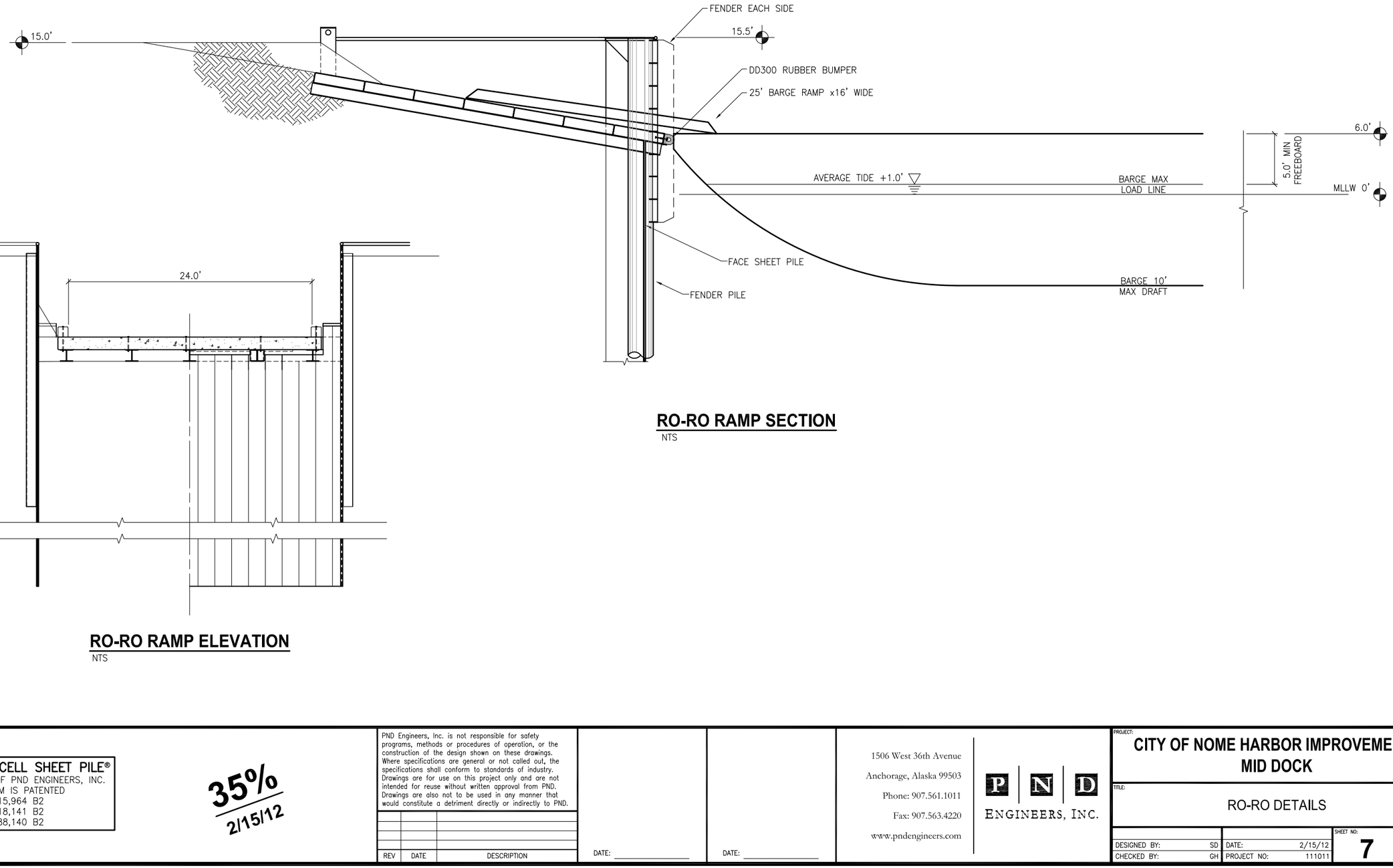
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
MID DOCK

TITLE:
RAMP PLAN & SECTION

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 6 OF X



RO-RO RAMP SECTION
NTS

RO-RO RAMP ELEVATION
NTS

OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

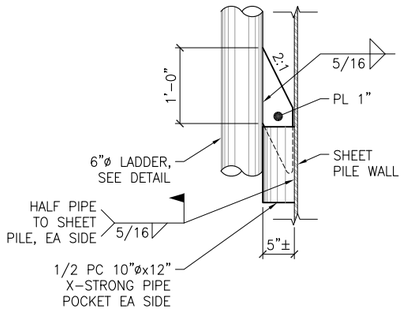
1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com
PND ENGINEERS, INC.

PROJECT:
CITY OF NOME HARBOR IMPROVEMENTS
MID DOCK

TITLE:
RO-RO DETAILS

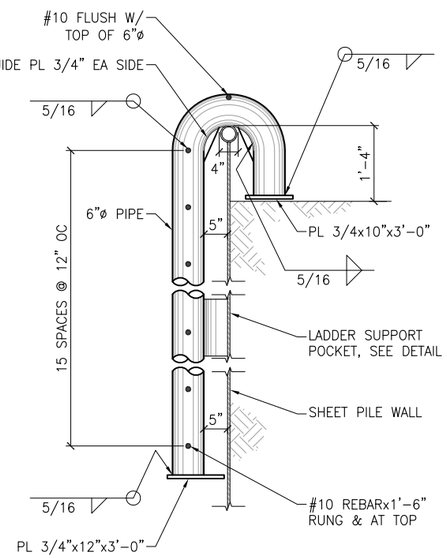
DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 7 OF X



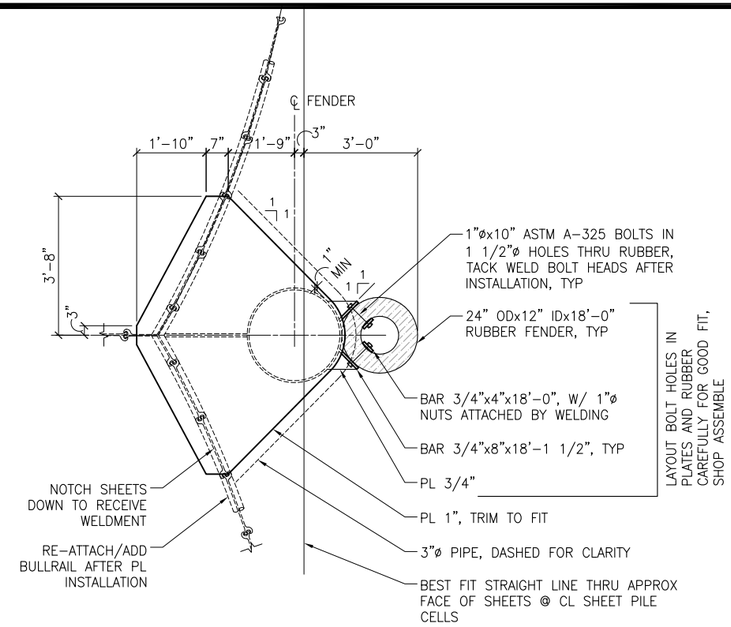
LADDER SUPPORT POCKET

LOCATE 10'± FROM TOP OF LADDER



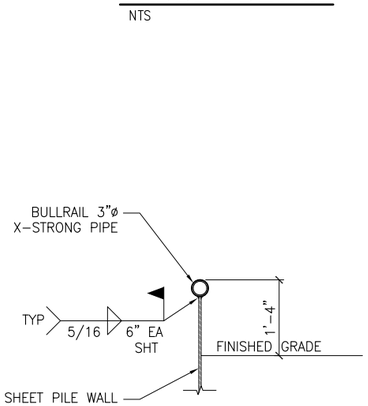
LADDER DETAIL

NTS



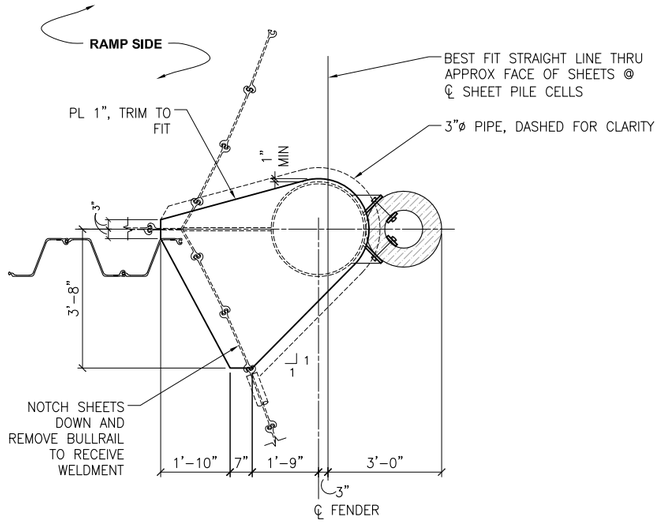
STANDARD FENDER PLAN

NTS (12) REQUIRED



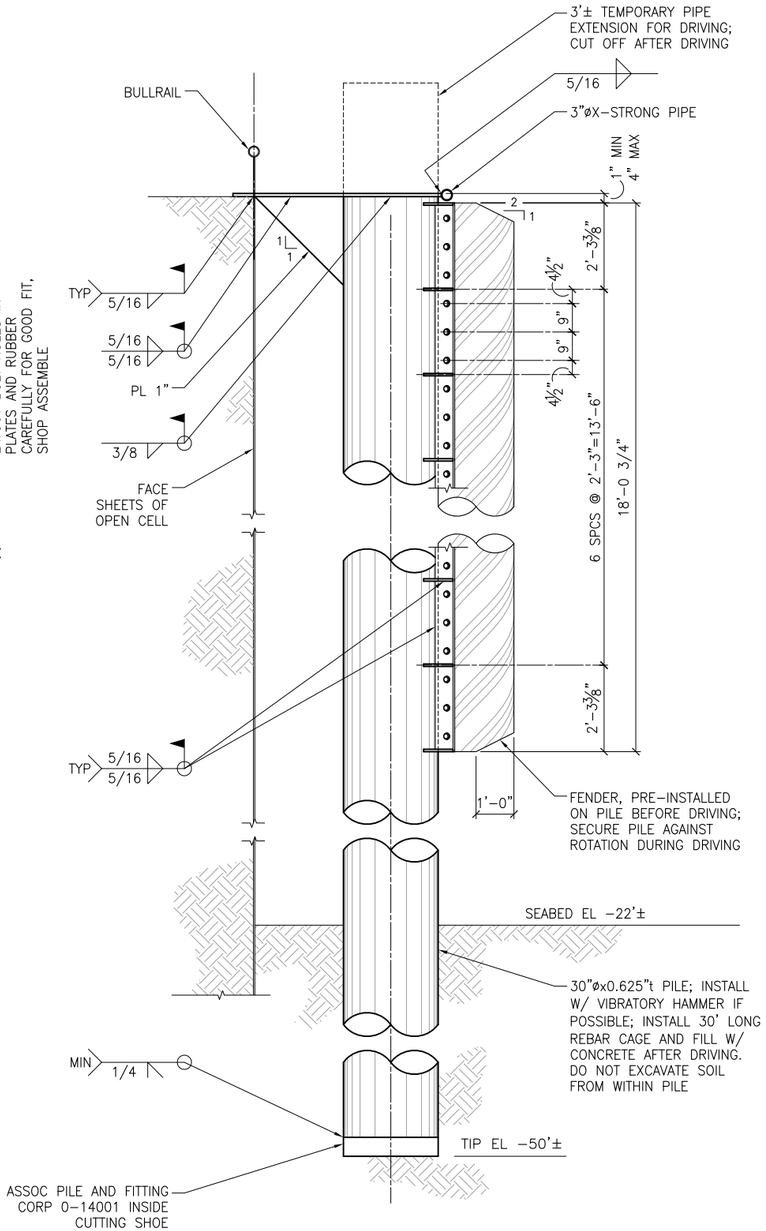
BULLRAIL SECTION

NTS



FENDER 2

NTS (4) REQUIRED



FENDER ELEVATION

NTS

OPEN CELL® AND OPEN CELL SHEET PILE® ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

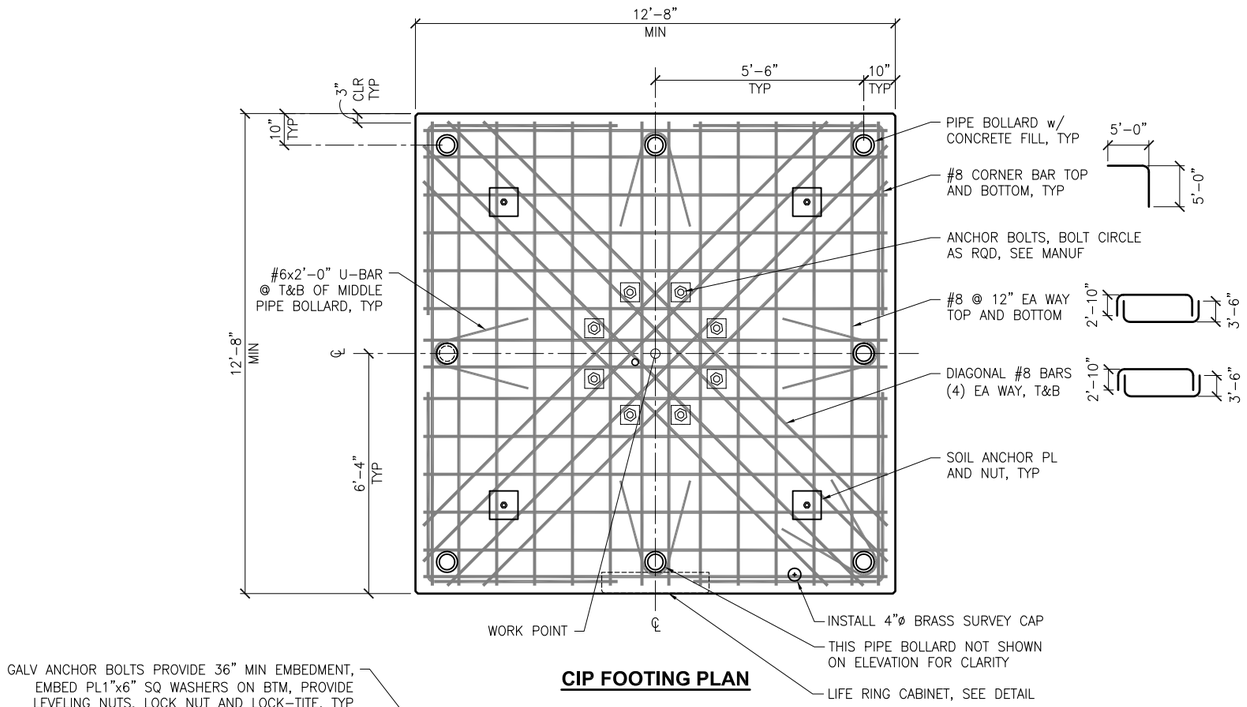
PND ENGINEERS, INC.

PROJECT: CITY OF NOME HARBOR IMPROVEMENTS MID DOCK

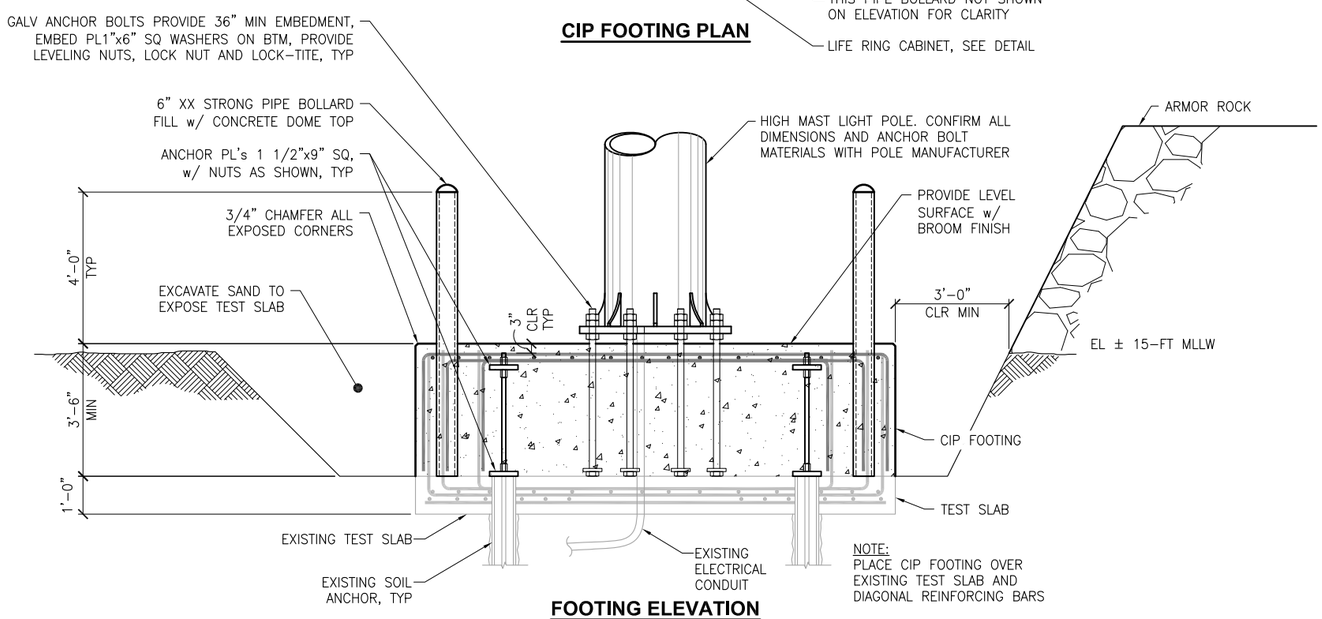
TITLE: FENDER DETAILS

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 8 OF X



CIP FOOTING PLAN



FOOTING ELEVATION

SOIL ANCHOR HIGH MAST LIGHT FOUNDATION

NTS

OPEN CELL® AND **OPEN CELL SHEET PILE®**
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

35%
2/15/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

PROJECT: **CITY OF NOME HARBOR IMPROVEMENTS MID DOCK**

TITLE: **HIGH MAST LIGHT FOUNDATION**

DESIGNED BY:	SD	DATE:	2/15/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 9 OF X

NOME SNAKE RIVER FLOATS

35% DESIGN COST ESTIMATE

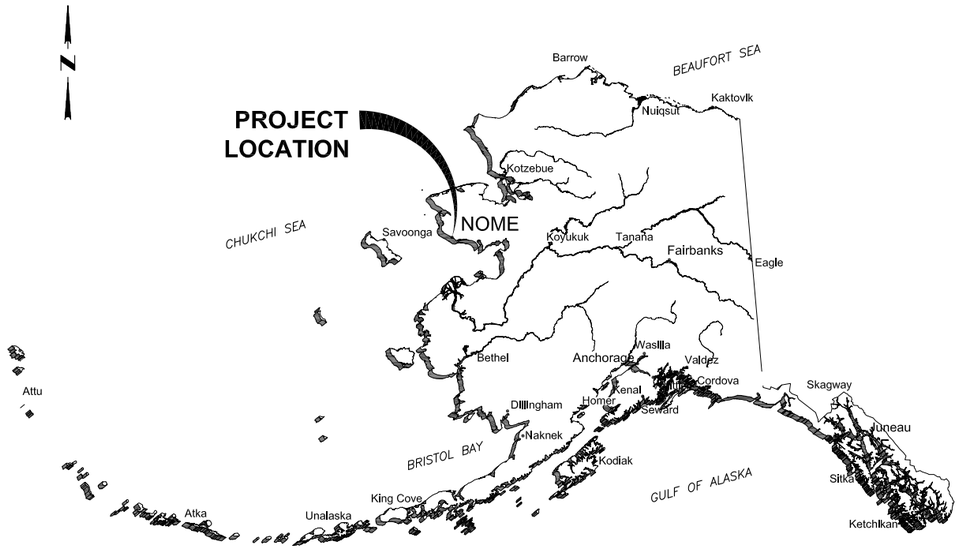
		Total cost
1. Mob/Demob/Cleanup/Bonds/Insurance	$	1,200,000
2. Fill	$	1,080,500
3. Dredge	$	3,600,000
4. Trestle, gangway and floats	$	4,436,000
5. Dolphins	$	1,669,000
Labor and Materials Total	**$**	**11,985,500**
Compensatory fill mitigation and permitting expenses	**$**	**42,500**
Preconstruction and As-built survey	**$**	**50,000**
CA—Bidding Assistance, Submittal Review, Fabrication and Field Inspection	**$**	**155,000**
Engineering	**$**	**235,000**
Construction Contingency	**$**	**1,199,000**
Construction total with Contingency	**$**	**13,667,000**

Notes:

1. Estimated costs based on "35% Drawings" dated 2/30/2012 City of Nome Snake River Floats and typical construction costs for similar structures.
2. Construction administration costs are approximate and will depend on construction duration.

NOME HARBOR IMPROVEMENTS
PORT OF NOME
SNAKE RIVER FLOATS

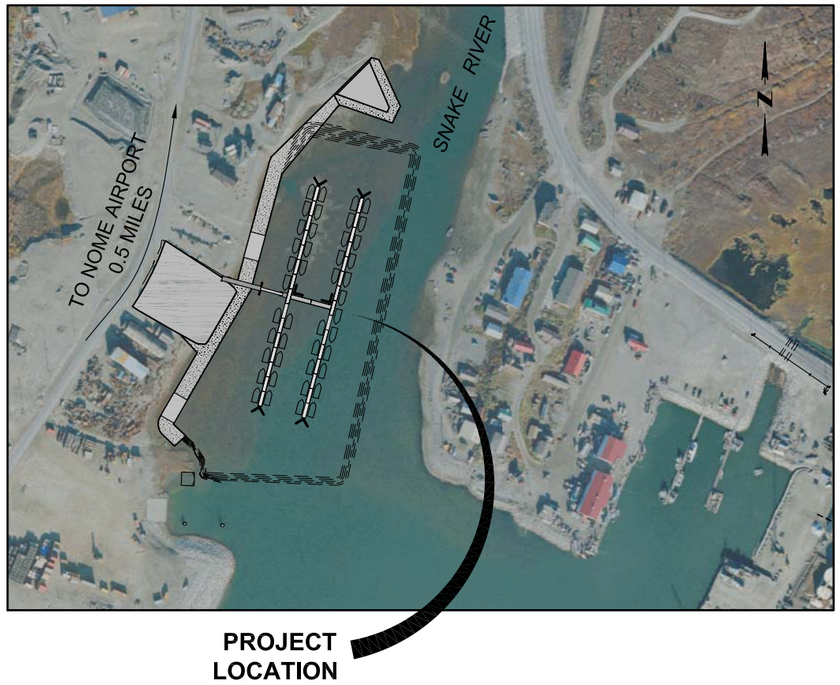
JANUARY 2012, NOME, ALASKA



STATE OF ALASKA

SHEET INDEX

*NOT INCLUDED THIS SET



NOME SNAKE RIVER VICINITY

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

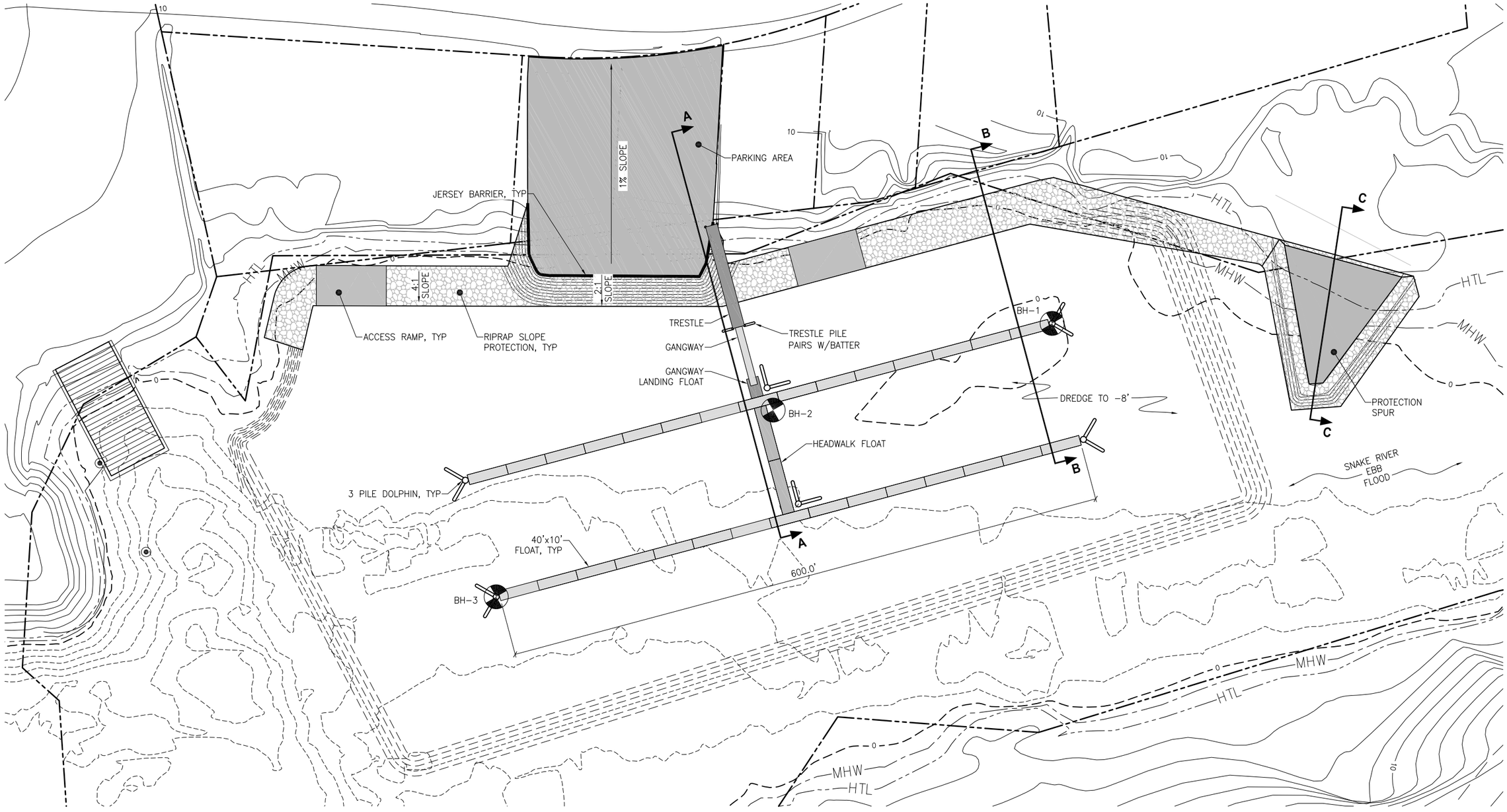
PND ENGINEERS, INC.

PROJECT: CITY OF NOME SNAKE RIVER FLOATS

TITLE: COVER

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 1 OF X



35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

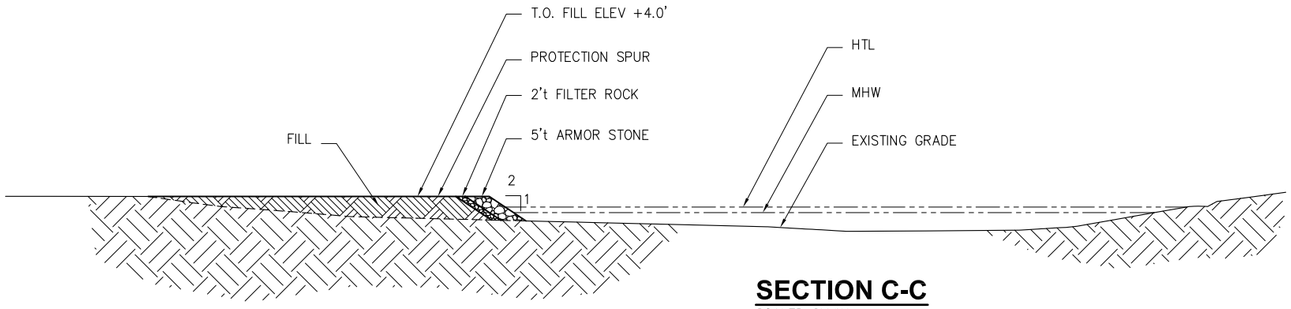
PND ENGINEERS, INC.

PROJECT: **CITY OF NOME SNAKE RIVER FLOATS**

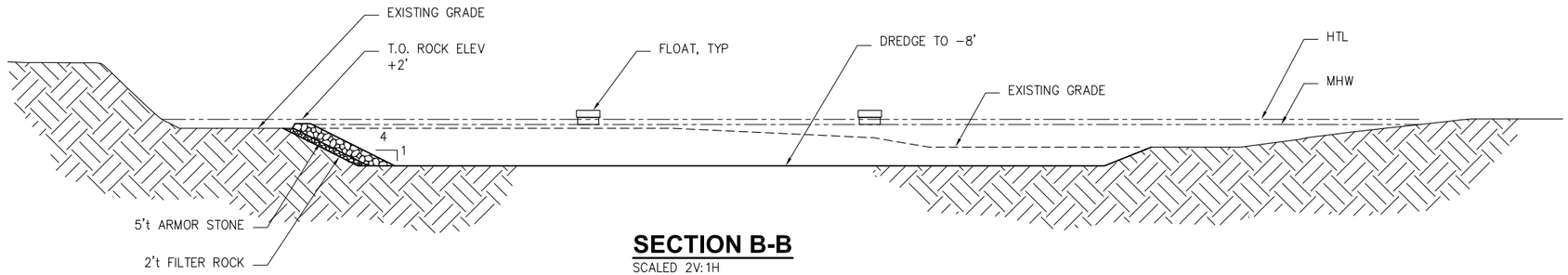
TITLE: SITE PLAN

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

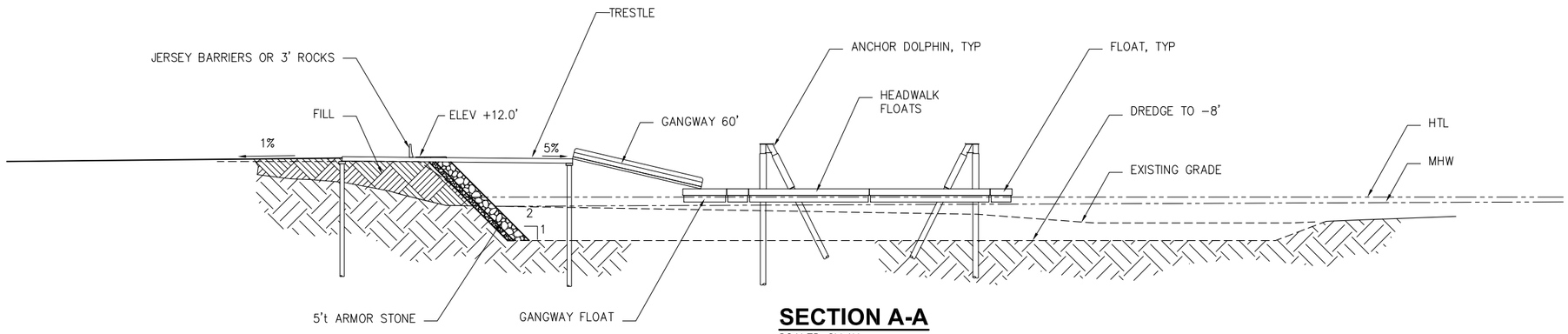
SHEET NO: 2 OF X



SECTION C-C
SCALED 2V:1H



SECTION B-B
SCALED 2V:1H



SECTION A-A
SCALED 2V:1H

PILE AND FLOAT QUANTITIES	
TRESTLE PILE	6
TRESTLE	1
DOLPHIN PILE	18
FLOAT SECTION	30
HEADWALK FLOAT	2
GANGWAY	1
GANGWAY FLOAT	1
FLOAT AREA (SQ FT)	14,000
GANGWAY AND TRESTLE AREA (SQ FT)	1,200

QUANTITIES IN CUBIC YARDS

FLOAT ACCESS AND BASIN		
	HTL (1.9')	MHW (0.8')
FILL BELOW	–	–
ARMOR ROCK BELOW	1,700	1,500
DREDGE	80,000	80,000
FILTER ROCK	–	–
PROTECTION SPUR		
FILL BELOW	660	250
ARMOR ROCK BELOW	660	330

AREA IN SQUARE FEET

FLOAT ACCESS AND BASIN		
	HTL (1.9')	MHW (0.8')
FILL BELOW	–	–
ARMOR ROCK BELOW	10,000	9,000
DREDGE	380,000	380,000
FILTER ROCK		
PROTECTION SPUR		
FILL BELOW	10,000	8,000
ARMOR ROCK BELOW	12,000	10,000
FILTER ROCK	–	–

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

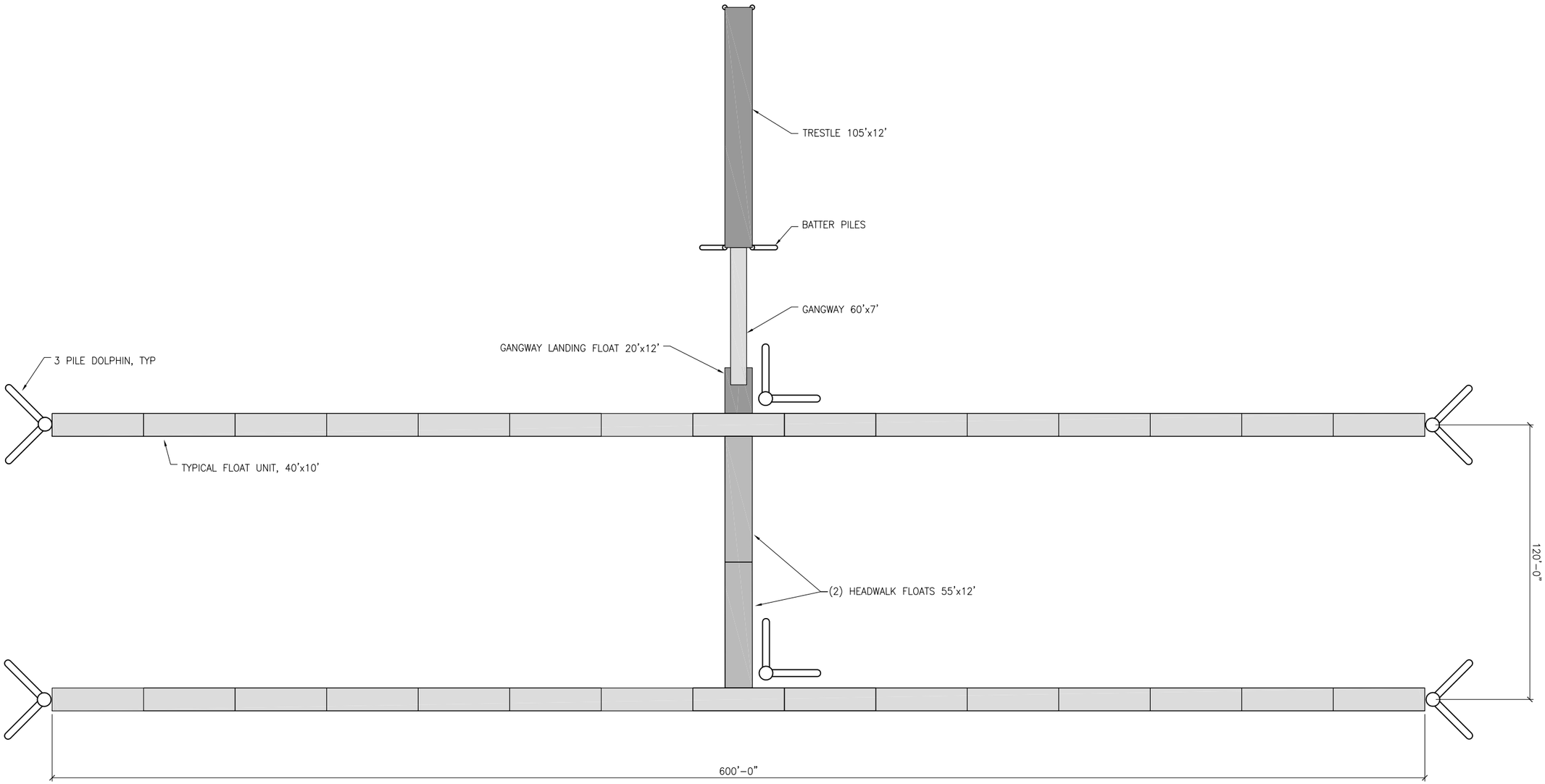
PND ENGINEERS, INC.

PROJECT: **CITY OF NOME SNAKE RIVER FLOATS**

TITLE: SECTIONS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 3 OF X



35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

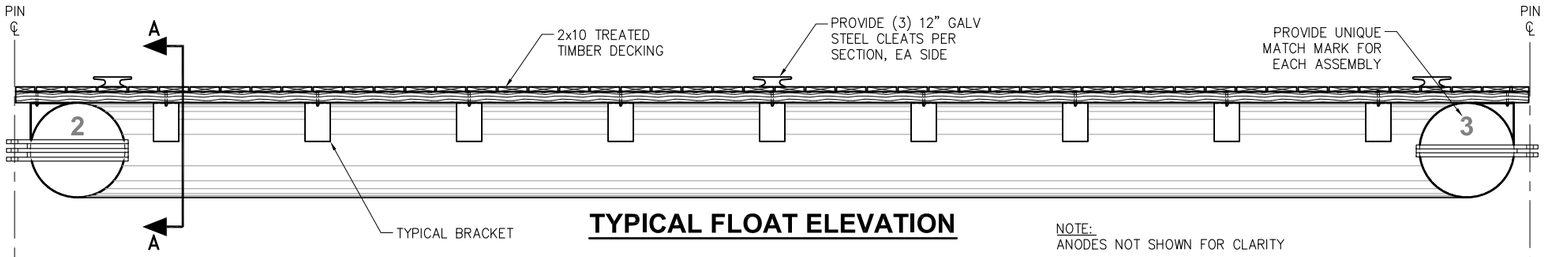
PND ENGINEERS, INC.

PROJECT: **CITY OF NOME SNAKE RIVER FLOATS**

TITLE: FLOAT LAYOUT

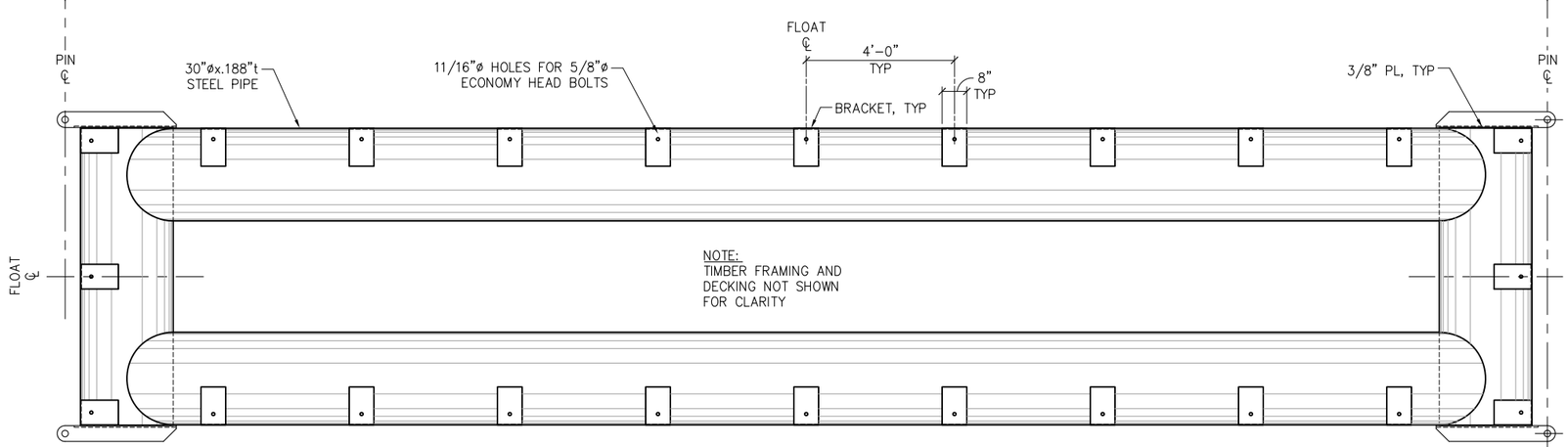
DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 4 OF X

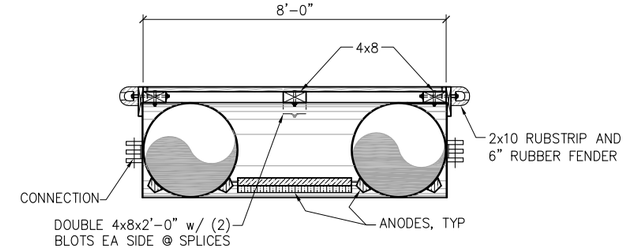


TYPICAL FLOAT ELEVATION

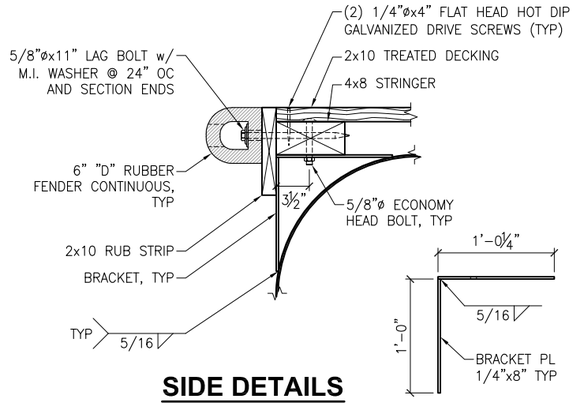
NOTE:
ANODES NOT SHOWN FOR CLARITY



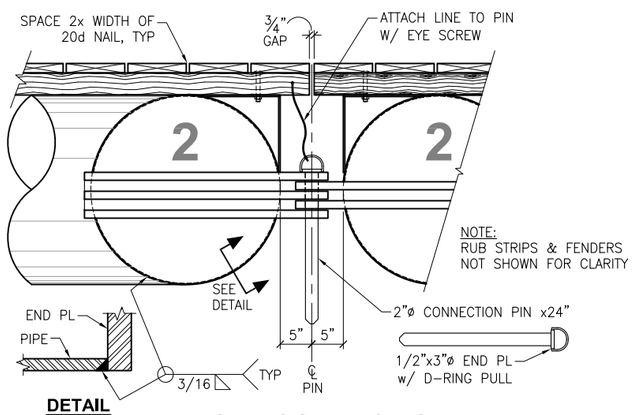
TYPICAL FLOAT PLAN



FLOAT SECTION A-A

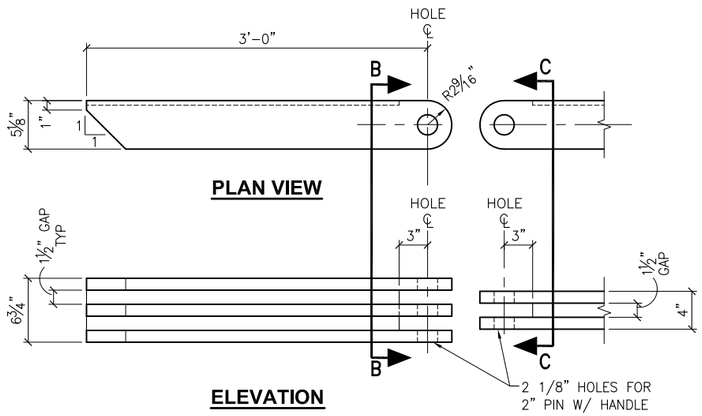


SIDE DETAILS



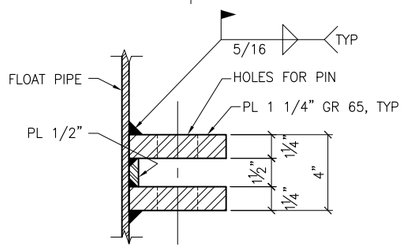
DETAIL

FLOAT CONNECTION

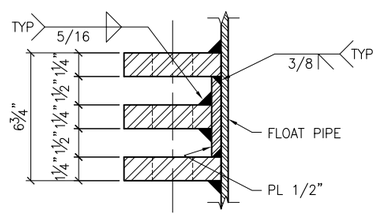


FLOAT CONNECTION DETAILS

(HOT DIP GALVANIZE)



DETAIL C-C



DETAIL B-B

NOTES:

PIPE AND STEEL –	ASTM A36 OR EQUIVALENT
STEEL FB –	ASTM A572 GR. 65
BOLTS –	A307 GALVANIZED (TIMBER)
WELDING –	AWS D1.1 SPECIFICATION
PAINT –	16 MIL EPOXY ALL PIPE AND STEEL
TIMBER –	NO. 1 DOUGLAS FIR OR HEM FIR TREATED WITH ACZA TO 0.6#/CU FT PER AWPA RECOMMENDATIONS
ANODES –	ALUMINUM
FLOAT CONN –	PRE ASSEMBLE AND MATCH MARK

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

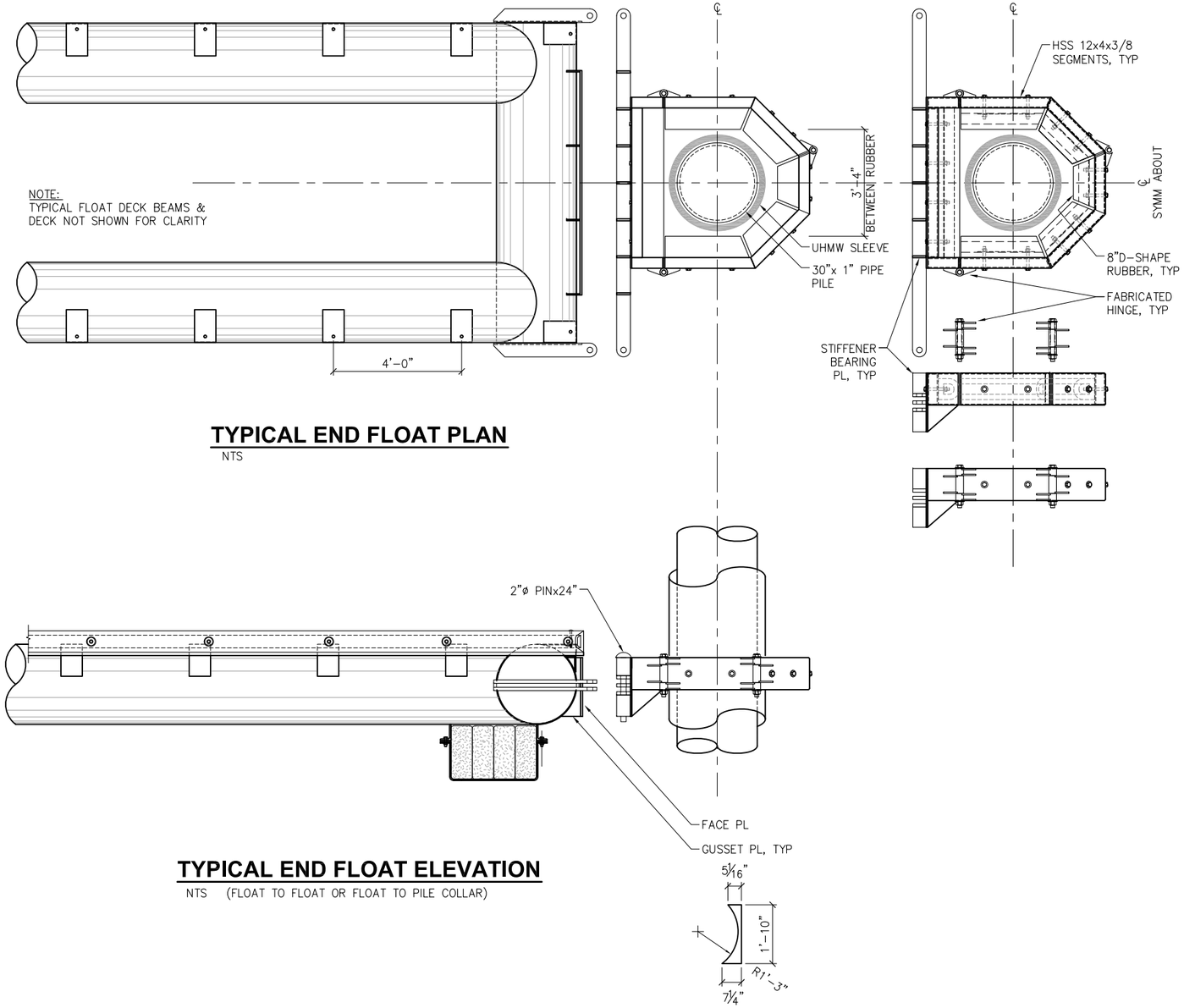
PND ENGINEERS, INC.

PROJECT: CITY OF NOME SNAKE RIVER FLOATS

TITLE: MAIN FLOAT DETAILS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 5 OF X

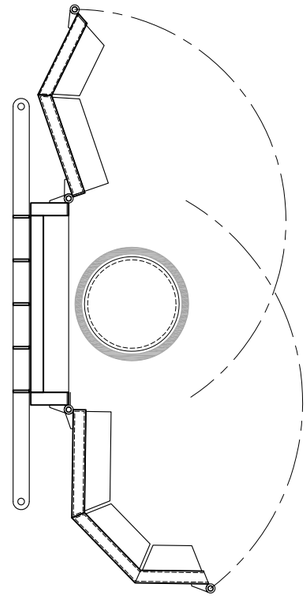


TYPICAL END FLOAT PLAN

NTS

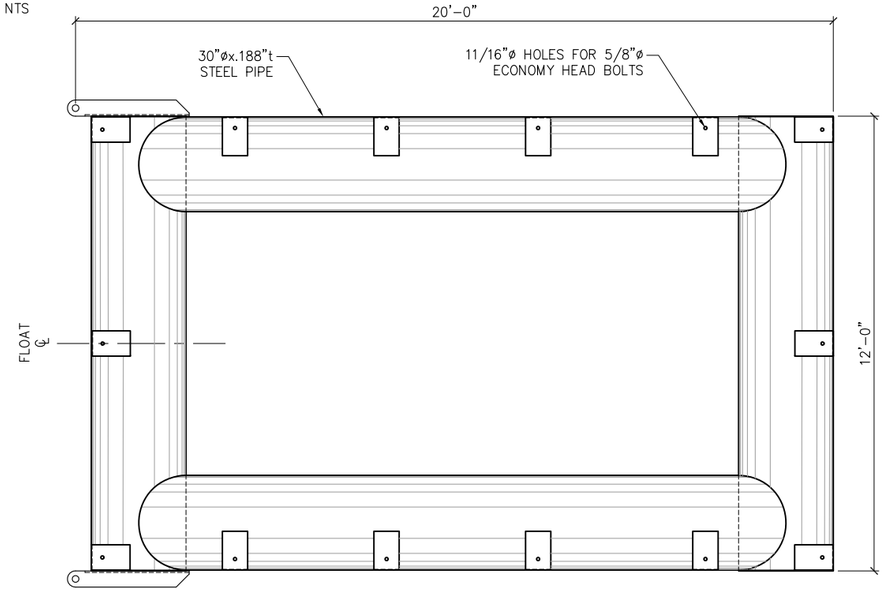
TYPICAL END FLOAT ELEVATION

NTS (FLOAT TO FLOAT OR FLOAT TO PILE COLLAR)



FLOAT PILE COLLAR OPENING DETAIL

NTS



GANGWAY LANDING FLOAT

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

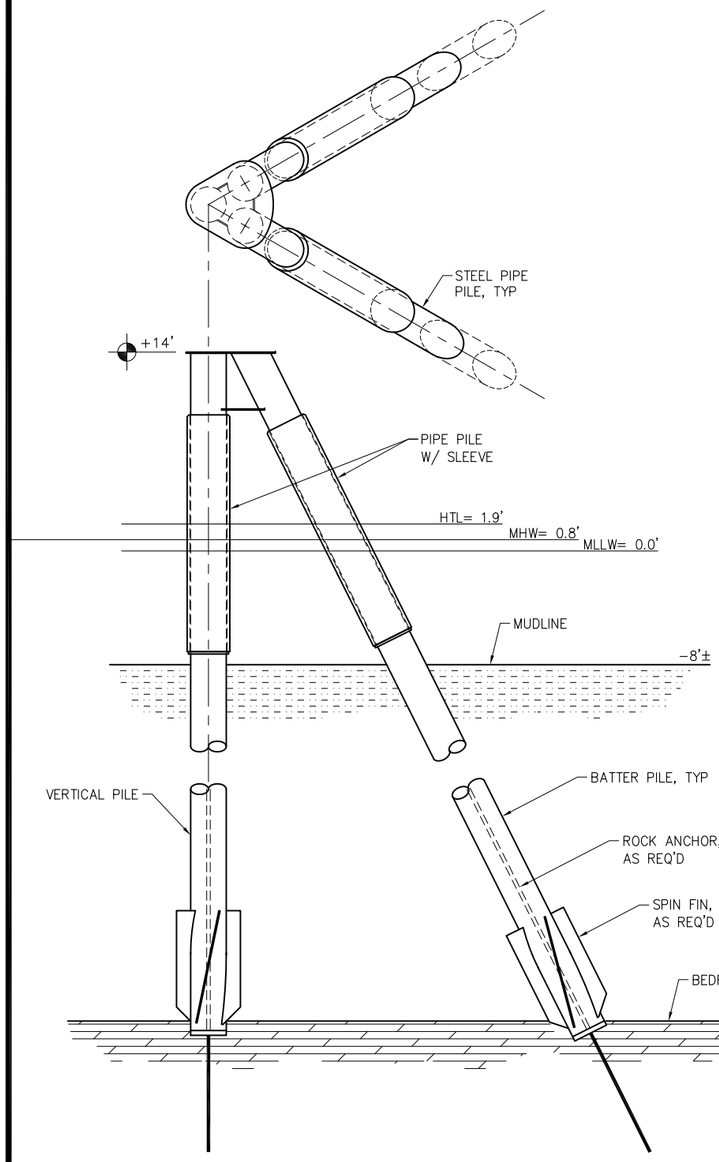
P N D
ENGINEERS, INC.

PROJECT: **CITY OF NOME SNAKE RIVER FLOATS**

TITLE: FLOAT DETAILS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 6 OF X



TYPICAL 3 PILE ANCHOR DOLPHIN ELEVATION

NTS 6 LOCATIONS

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

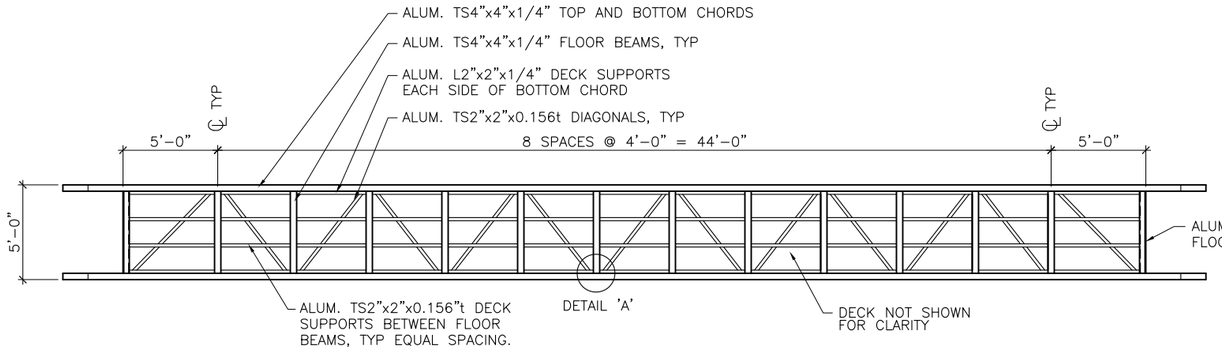
PND ENGINEERS, INC.

PROJECT: **CITY OF NOME SNAKE RIVER FLOATS**

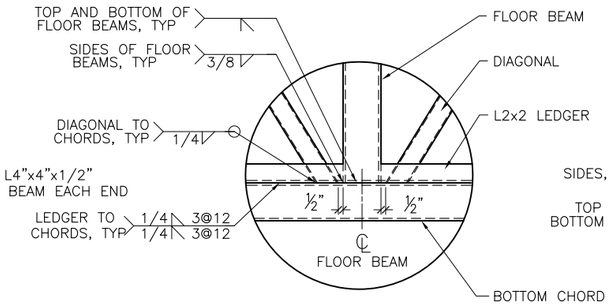
TITLE: FLOAT DOLPHIN DETAILS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

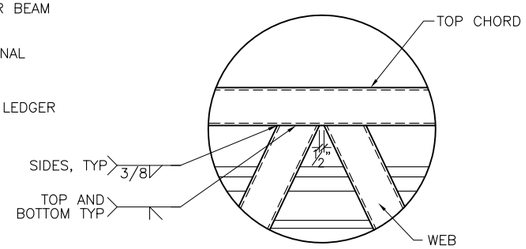
SHEET NO: 7 OF X



PLAN

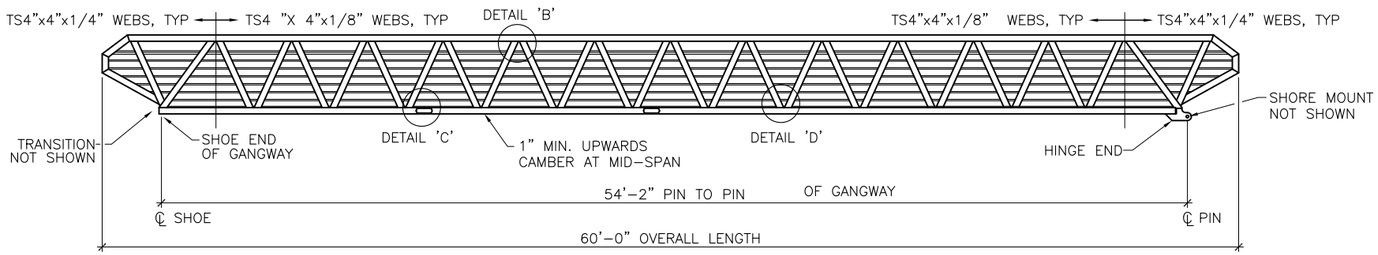


DETAIL 'A'

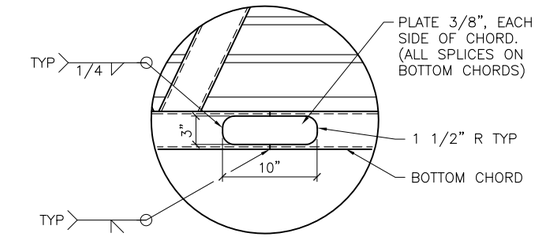


DETAIL 'B'

NOTE: ALL WELDING TO BE PERFORMED IN CONFORMANCE WITH THE LATEST AWS D1.1 (STEEL) OR D1.2 (ALUMINUM) SPECIFICATION BY AWS CERTIFIED STRUCTURAL WELDERS.

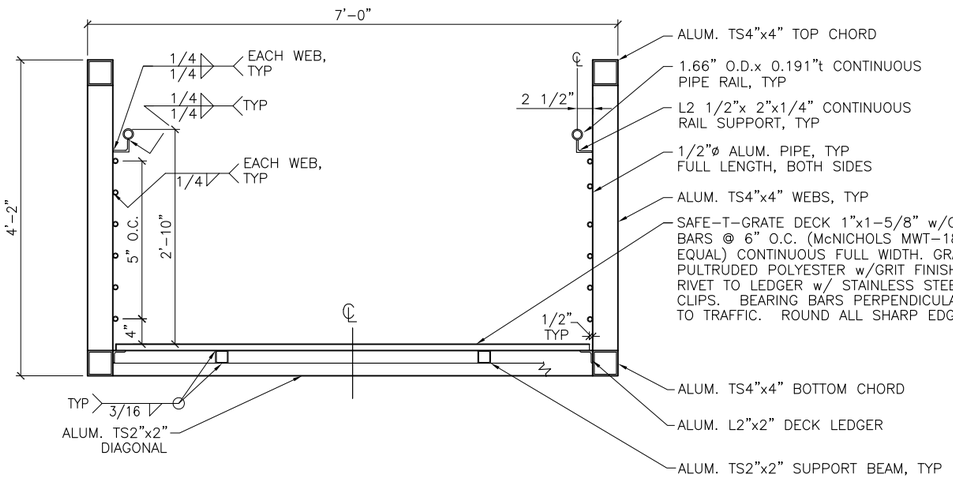


ELEVATION

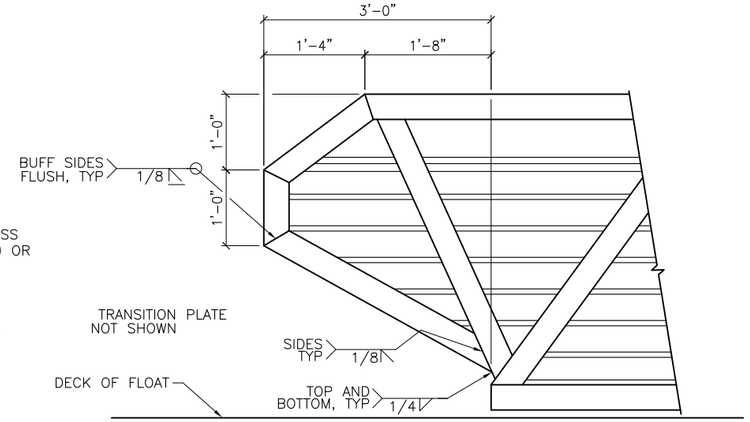


DETAIL 'C'

TOP CHORD SPLICE SIMILAR, W/O SPLICE PLATES

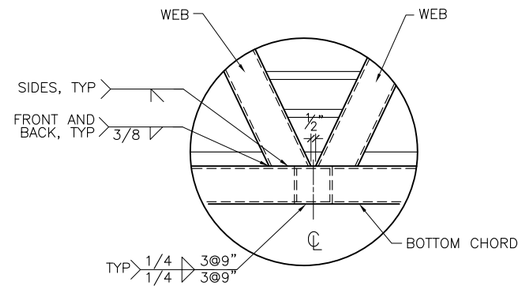


CROSS SECTION



NOTE: SHOE END OF GANGWAY SHOWN. HINGE END SIMILAR.

GANGWAY END



DETAIL 'D'

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

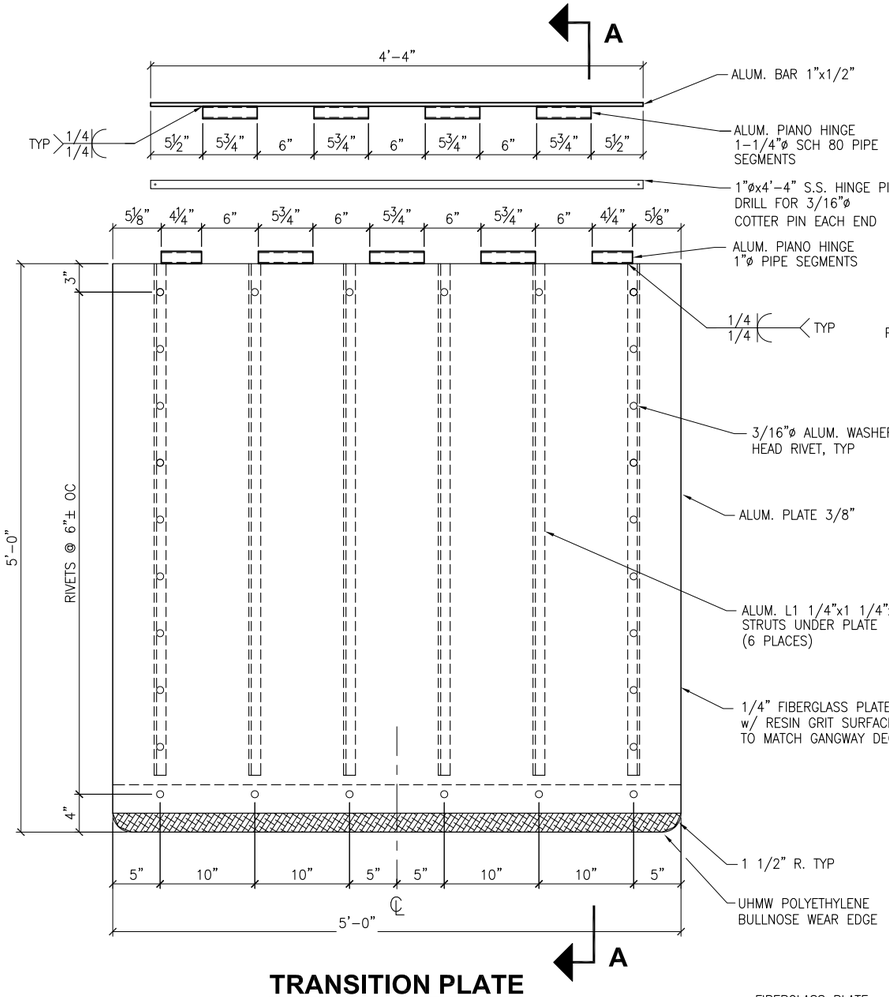
P N D
ENGINEERS, INC.

PROJECT: CITY OF NOME SNAKE RIVER FLOATS

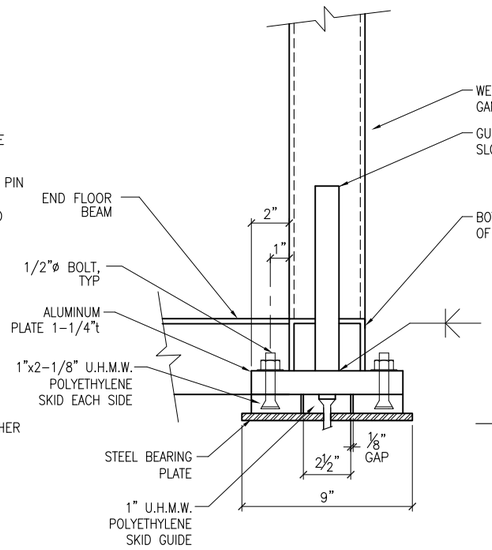
TITLE: GANGWAY DETAILS

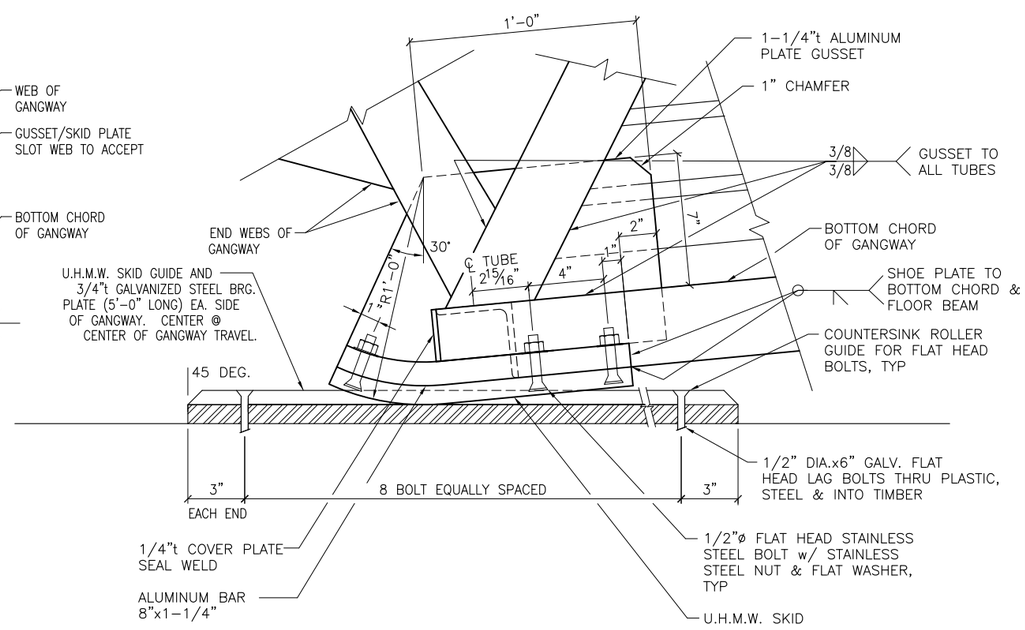
DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 9 OF X

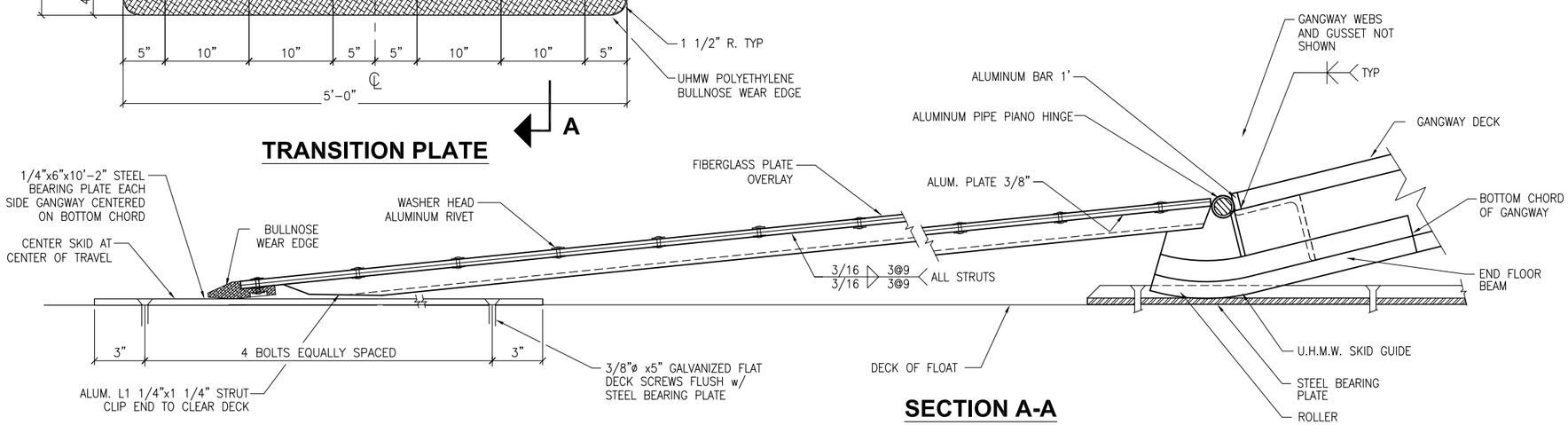


TRANSITION PLATE

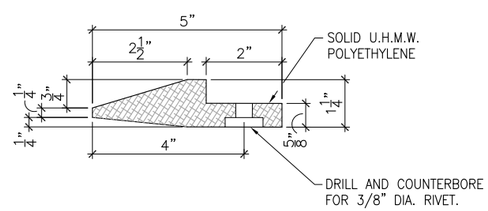




SKID ASSEMBLY



SECTION A-A



BULLNOSE WEAR EDGE

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

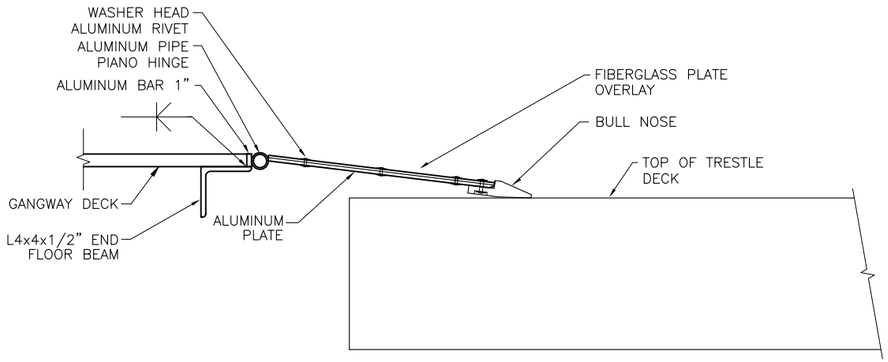
1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com
PND ENGINEERS, INC.

PROJECT: CITY OF NOME SNAKE RIVER FLOATS

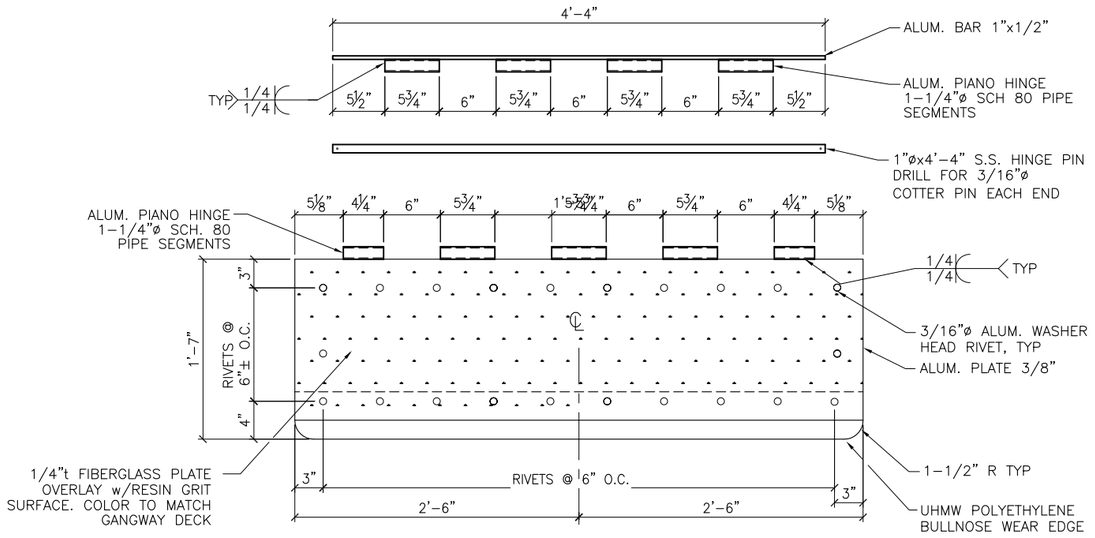
TITLE: GANGWAY DETAILS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

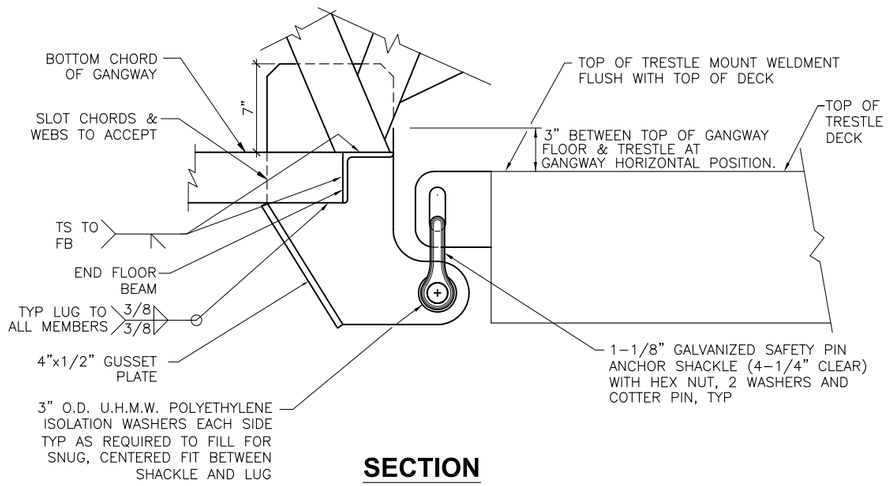
SHEET NO: 10 OF X



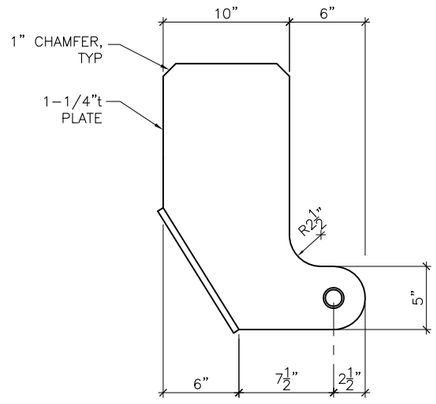
TRESTLE MOUNT CONNECTION



COVER PLATE



SECTION



GANGWAY LUG

35% DRAWINGS
2/30/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D ENGINEERS, INC.

PROJECT: CITY OF NOME SNAKE RIVER FLOATS

TITLE: GANGWAY DETAILS

DESIGNED BY:	SD	DATE:	2/22/12
CHECKED BY:	GH	PROJECT NO:	111115

SHEET NO: 11 OF X

Port of Nome Improvements

The City of Nome is requesting State funding to expand marine infrastructure to meet the growing demands of industry working in the Port of Nome.

Snake River Moorage Expansion-Phase II…….$13,700,000
The City of Nome is in a very unique position within the State of Alaska, relative to offshore lease sales in state waters for suction gold dredging. In 2011 DNR lease sales netted the State of Alaska over $9 million. As the leased waters are located just off shore of Nome, this resulted in another significant increase in the small vessel fleet operating out of the Nome Small Boat Harbor.

Nome, as a historic mining community, eagerly supports the increased local economic opportunity and the development of the State of Alaska's resources. However, this seemingly overnight growth has driven the number of offshore dredging craft from a mere 3 in 1996, to 39 in 2011. Reports indicate this fleet will nearly double in 2012.

Nome's Inner Harbor/Turning Basin met the limits of its expansion potential in 2008, yet desperately needs to increase moorage capacity to accommodate the growth of the dredging and fishing fleets. A suitable location has been located on the west side of the Snake River that will allow for a fixed ice-resistant dolphin anchored float system. The City of Nome purchased several lots adjacent to this area to develop the shore-side infrastructure necessary to support the float system.

The City of Nome is requesting an investment from the State of Alaska to provide this additional space for the offshore dredges to reduce user conflict in an already over-crowded inner harbor. 35% design drawings and cost estimate attached.

Barge (High) Ramp Loading Dock…….$3,000,000
The City's Barge Ramp inside the Small Boat Harbor has been heavily utilized since its construction in 2005, serving as a vessel launch and loading ramp for the distribution of equipment, cargo, and gravel throughout the region. The constant heavy use as a loading ramp, in addition to the erosion of the subsurface foundation, has created a depression in the concrete that needs repair.

In an effort to meet the growing demands of cargo and gravel movement, and eliminate the multi-user conflict of the existing launch ramp, a secondary structure for the cargo vessels has been determined to be the most viable solution. A location for this new open cell loading dock has been identified just north of the existing concrete launch ramp, which will be taken out of service and repaired during this project.

The growing small vessel fleet that drives the need for the additional moorage space on the Snake River, also drives this separation of use to prevent extremely long wait periods for launching. 35% design drawings and cost estimate attached.

Causeway Ramp (Middle) Dock……..……..$13,500,000
The Port of Nome Causeway has two open cell sheet pile docks; the Westgold Dock – built in 1989, and the City Dock – built in 1991. Over the past four years, Nome has seen a significant increase in large vessel traffic that often requires vessels to anchor offshore for 1 to 3 days until dock space becomes available. This growing demand is based on an expanding fleet of cargo, fuel and gravel barges that support movement of these commodities throughout the region and Western Alaska. These village communities rely heavily on Nome's ability to transship the cargo within a short window to meet construction timelines and keep costs low.

In addition, a growing number of commercial and private vessels are transiting the Northwest Passage and frequently use Nome as a stopover to resupply or hide during extreme weather. Many of the vessels supporting the research and development of resources in the Chukchi and Beaufort Seas use Nome as a resupply port, crew change location and staging area for arctic equipment.

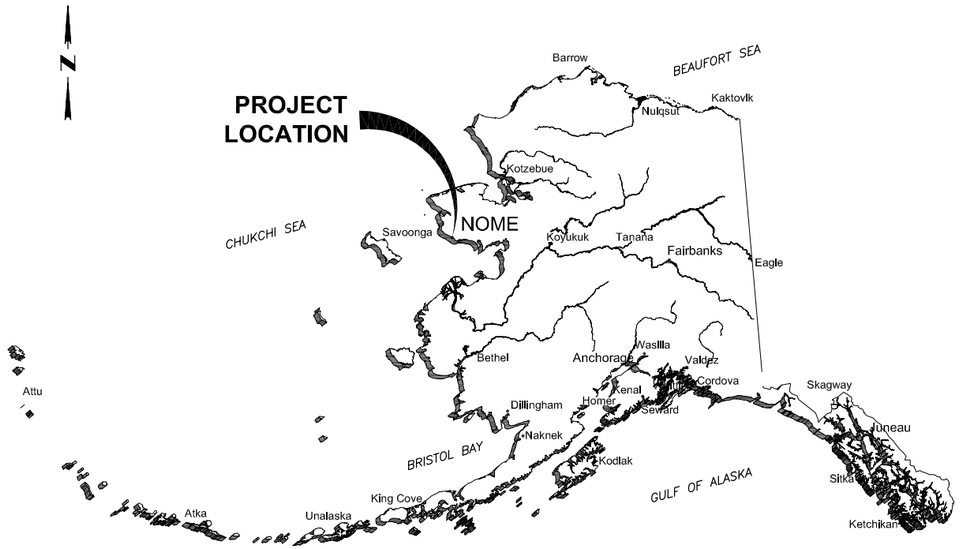
The Causeway Ramp Middle Dock Project is intended to address this critical space shortage in the outer harbor with an additional 475 feet of sheet pile between the existing docks, and a 100 foot section constructed at a lower elevation to serve as a ramp to transfer rolling stock on and off barges. This additional dock will allow for the necessary space to work a fuel and gravel barge, while still being able to accommodate a research or cruise ship. This will not only reduce vessel wait time, but also assist in keeping shipping costs down in a region that is all too familiar with the costs of marine shipping. 35% design drawings and cost estimates attached.

Deep Draft Port Design and Construction.....$150,000,000
The intense planning over the expansion and development of the Arctic has brought many projects to the fore-front to provide a deep draft port for the vessel fleet that will be required to explore, design, create, maintain and service this development. Though several areas have piqued interest among those with vision, Nome serves as the only real option with an existing port facility, adequate fuel storage, expanded medical facilities, air transportation and community structure already in place. In order to accommodate deeper draft vessels, the current depth of the outer harbor, at -22.5 MLLW, we need to extend the causeway to -35 MLLW depth. The City is updating its Port and Harbor Master plan that will determine the most viable option to reach this desired depth, and this project will design the best option and take us the last step in identifying Nome as Alaska's Deep Draft Port for the Arctic. With the historic winter refueling that just happened in Nome the USCG Icebreaker Healy was able to break shore fast ice 460 yards from the end of the causeway to allow the T/V Renda to transfer fuel. The Ice breaker Healy rested 865 yards from the end of the causeway in waters at -40 MLLW. Concept level drawings for four alternative designs and rough order magnitude cost estimates have been compiled by the City's Engineering firm.

South & East Dock Fender Repair Construction……...$1,500,000
The USACE completed the Nome Sheet Pile Replacement Project in 2007-08 as a follow up project to the Navigation Improvements Project which successfully relocated the entrance to the Small Boat Harbor and Snake River. While the new sheet pile walls serve well for cargo and fuel transfers, the mooring fenders have suffered repeated damage from the ice forces each winter, indicating the design is too light duty for an arctic climate. The City has obtained drawings for a new "floating camel" fender design. This project is construction ready.

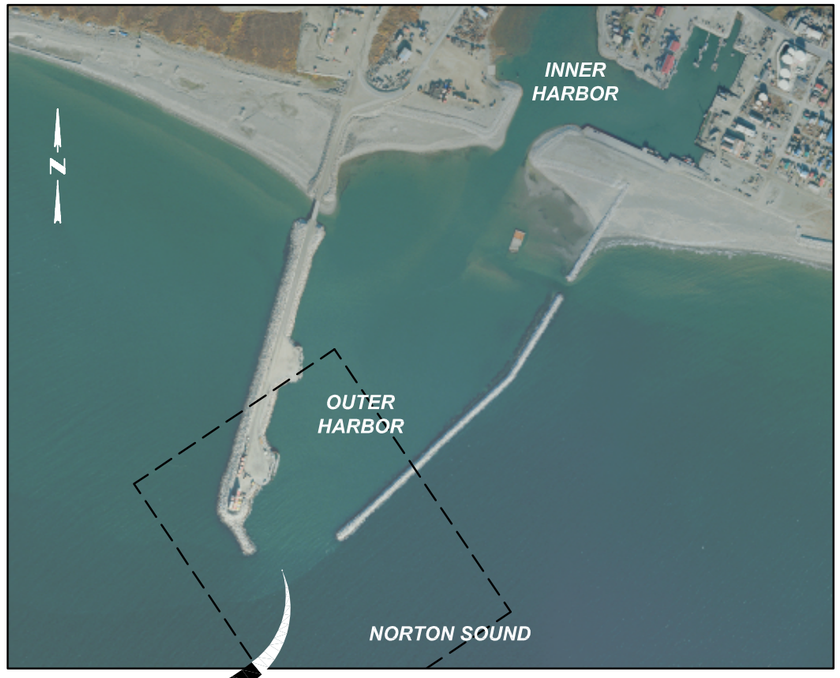
NOME CAUSEWAY EXTENSION
PORT OF NOME
CONCEPTUAL DESIGN

MARCH 2012, NOME, ALASKA



STATE OF ALASKA

SHEET INDEX



NOME OUTER HARBOR VICINITY

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

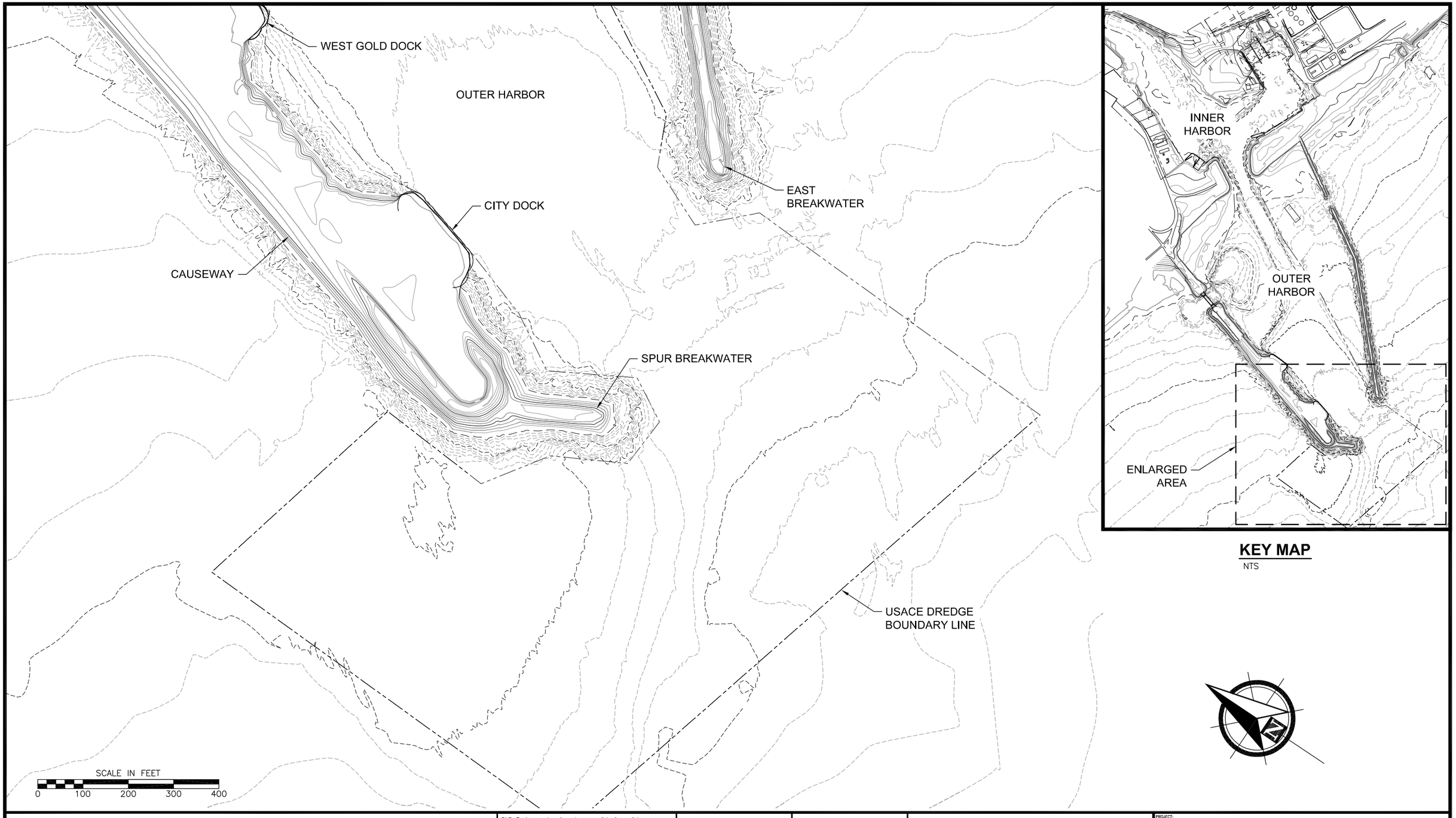
PROJECT: CITY OF NOME CAUSEWAY EXTENSION

TITLE: COVER

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 1 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\01 Cover & Index.dwg, 01, 3/21/2012 2:41:04 PM, james, 1:2



KEY MAP
NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

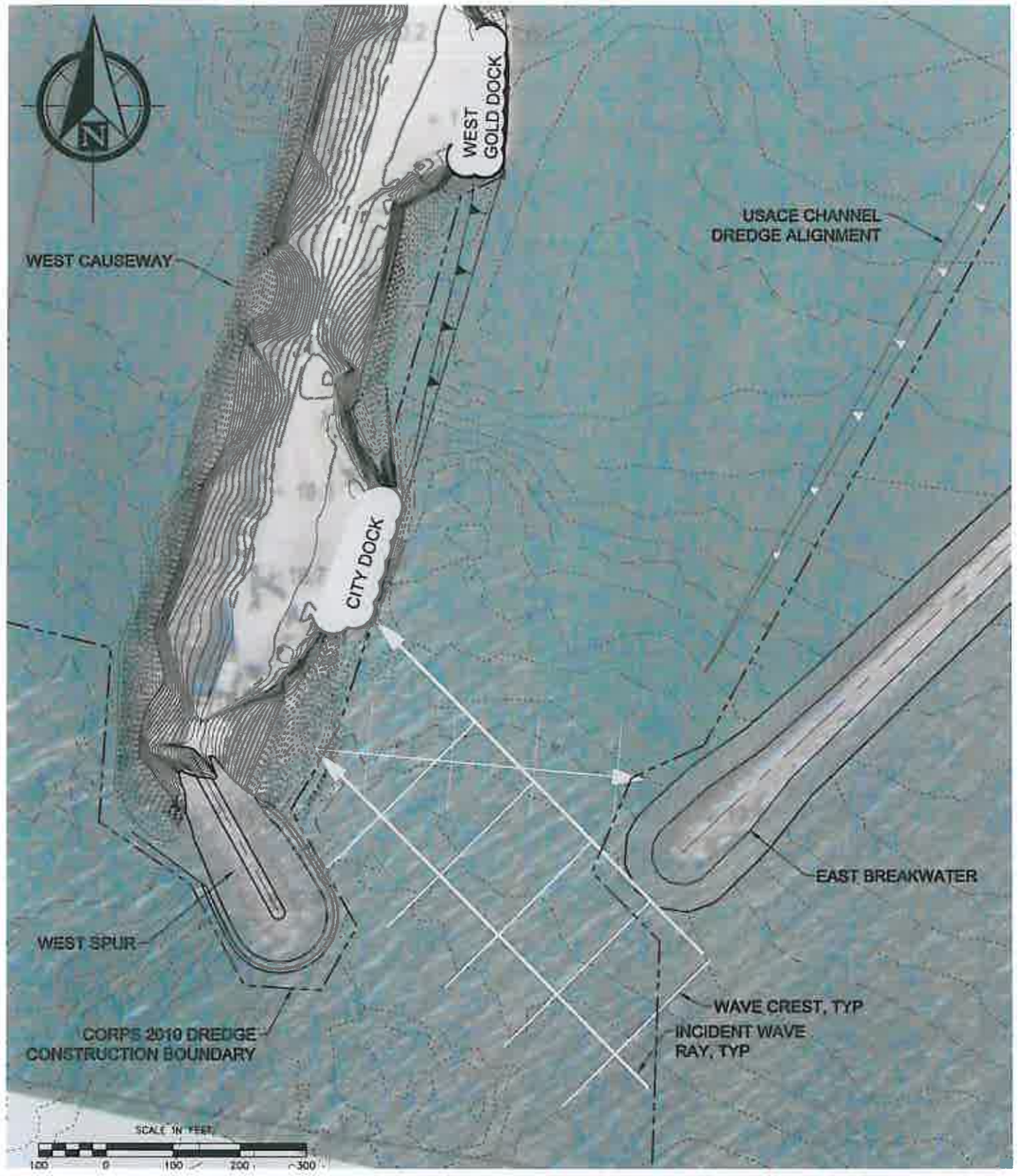
PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

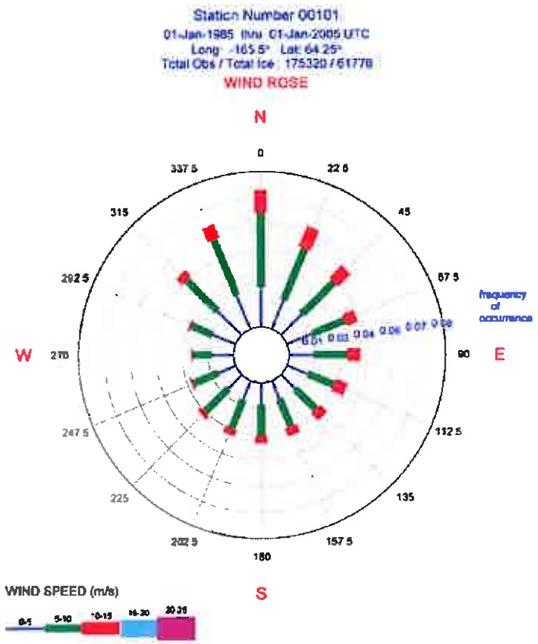
TITLE:
EXISTING CONDITIONS

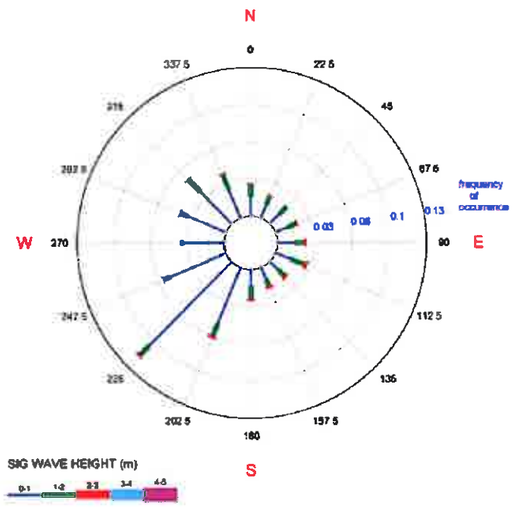
DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 2 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\02 Existing Conditions.dwg, 02, 3/21/2012 3:12:58 PM, james, 1:2







NOTES:

1. PARALLEL WAVE CRESTS DRAWN FOR TYPICAL 5-SECOND WAVE.
2. WAVE CRESTS IN THE AIR PHOTOGRAPH ARE MUCH SHORTER AND REPRESENT 2.5-SECOND WAVES.
3. INCIDENT WAVE RAYS AND REFLECTED WAVE RAYS ARE SHOWN WITH ARROWS.
4. EXAMPLE WAVE APPROACH DIRECTION 135.°
5. WIND AND WAVE SUMMARIES BY USACE WAVE INFORMATION STUDY (WIS) HINDCAST.

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

PROJECT
CITY OF NOME CAUSEWAY EXTENSION

TITLE
WAVE REFLECTION

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO. 3 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\03 Wave Reflection.dwg, 03, 3/21/2012 3:39:21 PM, jamas, 1:2

DREDGE LIMIT

DREDGE LIMIT

SOUTHEAST BREAKWATER

650'±

EXISTING EAST BREAKEWATER

DREDGE TO -35' MLLW

300'x100' BARGE

OUTER CAUSEWAY DOCKS

ROAD CENTERLINE

700' SHIP

DREDGE TO -25' MLLW

WEST GOLD DOCK

FENDER & DOLPHIN, TYP

MIDDLE CAUSEWAY REVETMENT

CITY DOCK

ROADWAY EXTENSION

BREACH w/ 100' BRIDGE

CAUSEWAY ARMOR REVETMENT

BRIDGE ABUTMENT, TYP

EXISTING CAUSEWAY

BRIDGE REVETMENT

SCALE IN FEET

0 150 300 450 600

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D ENGINEERS, INC.

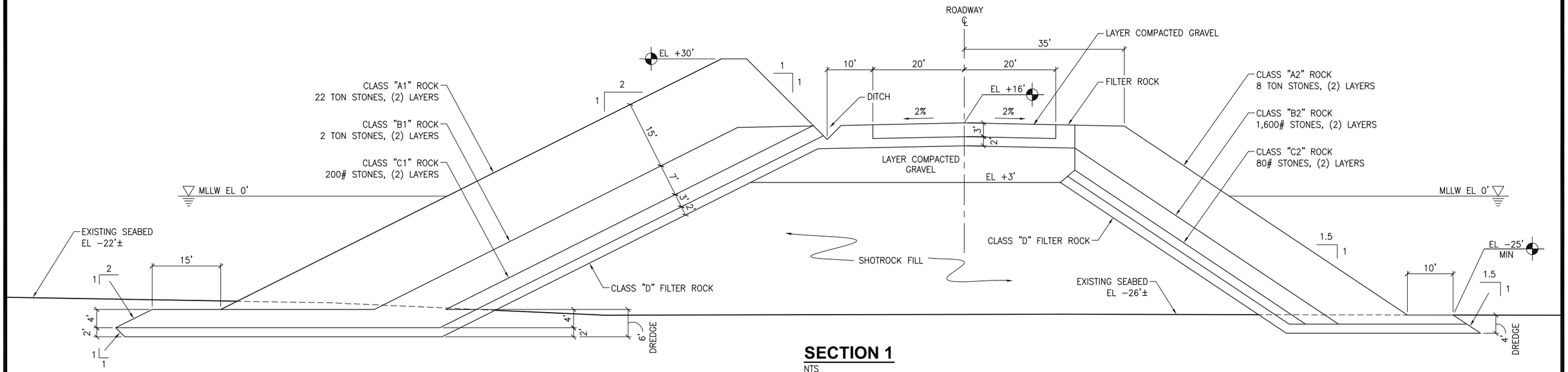
PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
OPTION A-1
ARMOR REVETMENT & DOCK

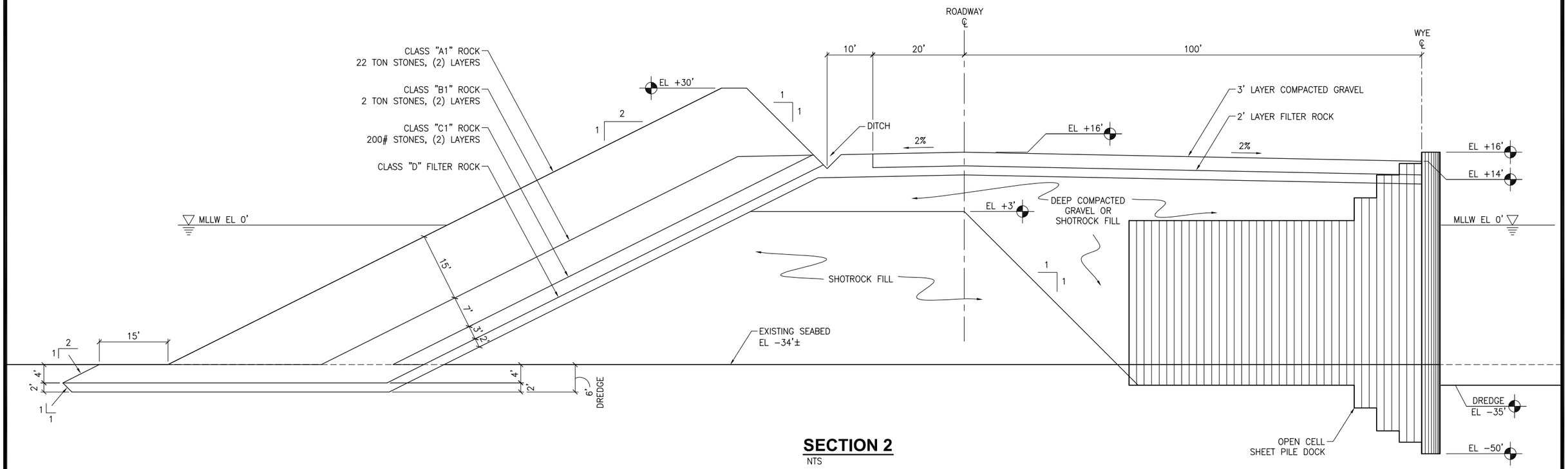
DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 4 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\04_06_08_09_10_11 Options A-D.dwg, 04, 3/21/2012 2:47:54 PM, james, 12



SECTION 1
NTS



SECTION 2
NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

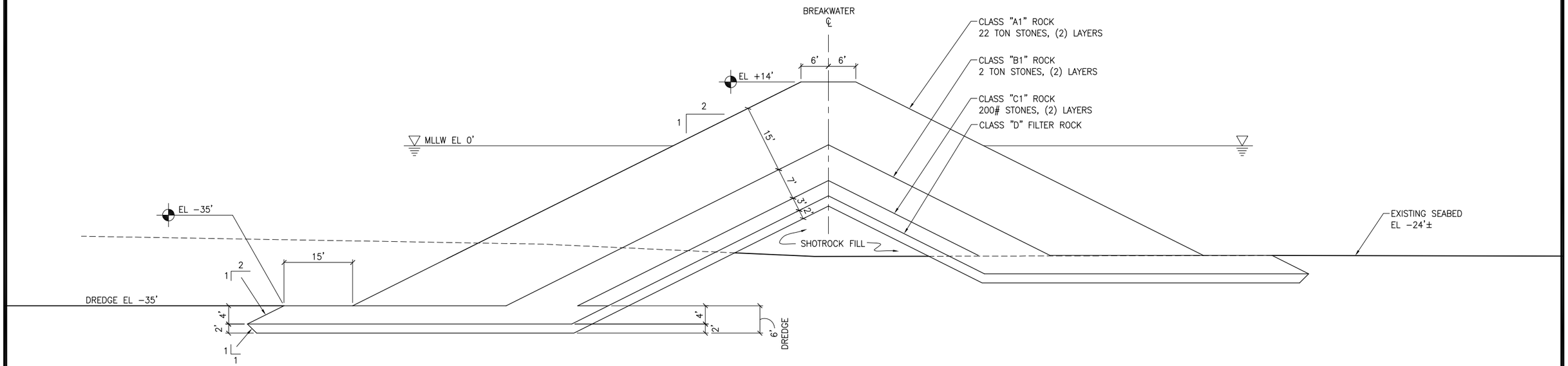
PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
OPTION A -1
SECTIONS

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 5 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\05_07 Sections.dwg, 05, 3/21/2012 3:08:11 PM, james, 1:2



SECTION 3
BREAKWATER

NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
BREAKWATER ARMOR SECTION 3

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 6 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\05_07 Sections.dwg, 06, 3/21/2012 3:07:38 PM, jjames, 1:2

DREDGE LIMIT

DREDGE LIMIT

SOUTHEAST BREAKWATER

EXISTING EAST BREAKEWATER

DREDGE TO -35' MLLW

750'±

300'x100' BARGE

OUTER CAUSEWAY DOCKS

ROAD CENTERLINE

700' SHIP

DREDGE TO -25' MLLW

WEST GOLD DOCK

BULKHEAD SHORE PROTECTION

CITY DOCK

ROADWAY EXTENSION

BREACH w/ 100' BRIDGE

CAUSEWAY BULKHEAD

BRIDGE ABUTMENT, TYP

BRIDGE REVETMENT

EXISTING CAUSEWAY

SCALE IN FEET

0 150 300 450 600

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

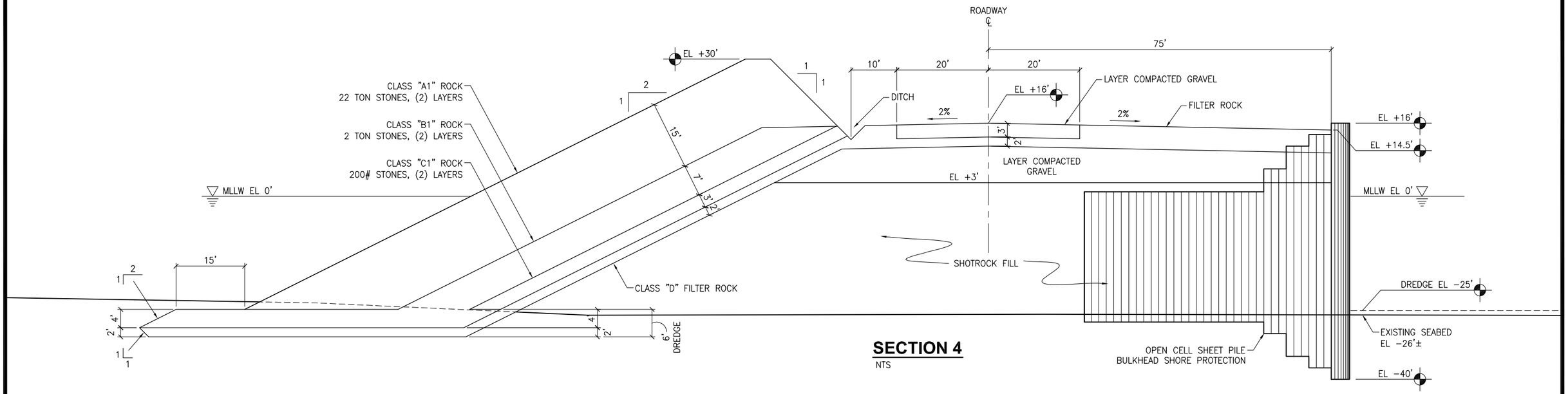
PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
OPTION A-2
BULKHEAD & DOCK

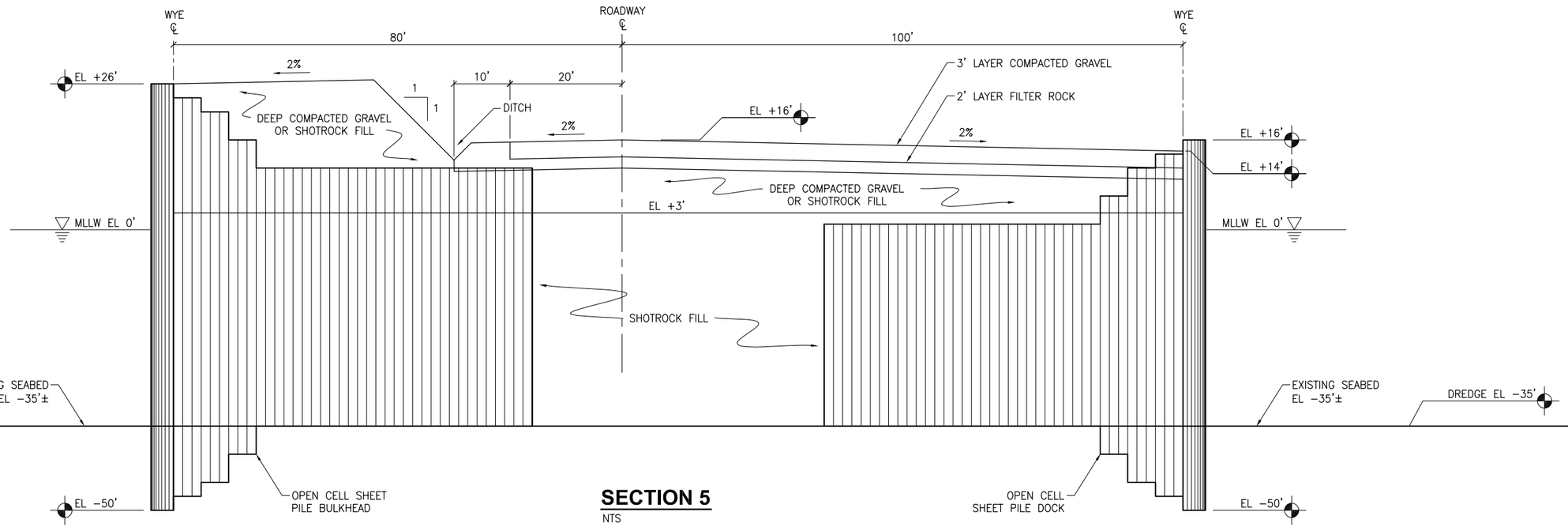
DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 7 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\04_06_08_09_10_11 Options A-D.dwg, 07, 3/21/2012 2:46:59 PM, james, 12



SECTION 4
NTS



SECTION 5
NTS

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

P N D
ENGINEERS, INC.

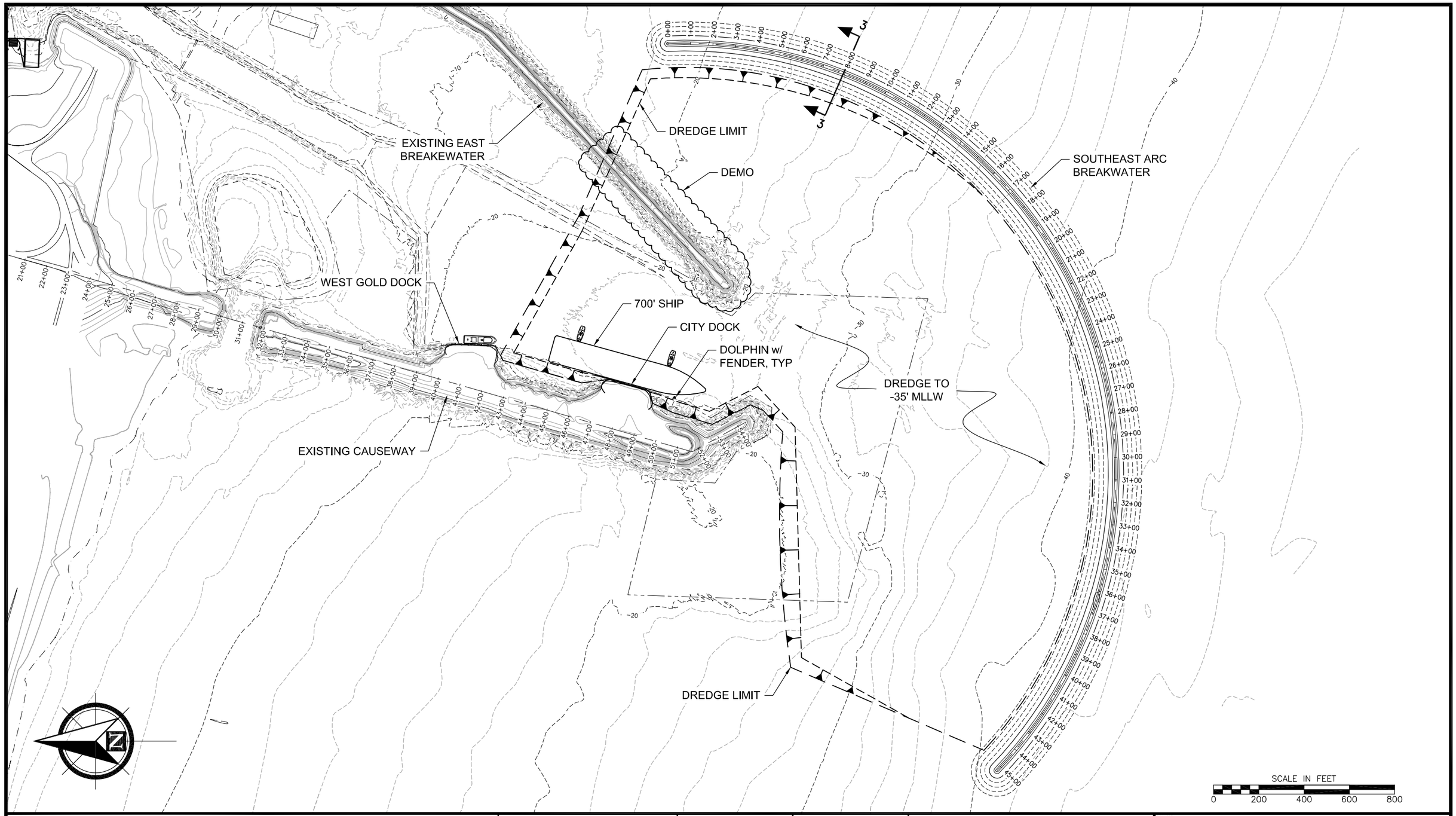
PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
OPTION A -
BULKHEAD & DOCK SECTIONS

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: **8** OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\05_07 Sections.dwg, 08, 3/21/2012 3:06:56 PM, james, 1:2



OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

PROJECT:
CITY OF NOME CAUSEWAY EXTENSION

TITLE:
OPTION B
DREDGE

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 9 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\04_06_08_09_10_11 Options A-D.dwg, 09, 3/21/2012 3:35:35 PM, james, 12

EXISTING EAST BREAKEWATER

DREDGE LIMIT

850'±

DREDGE TO -35' MLLW

OUTER CAUSEWAY DOCK

700' SHIP

DREDGE TO -25' MLLW

WEST GOLD DOCK

CITY DOCK

MIDDLE CAUSEWAY REVETMENT

ROADWAY EXTENSION

CAUSEWAY BULKHEAD

ROAD CENTERLINE

BREACH w/ 100' BRIDGE

BRIDGE ABUTMENT, TYP

BRIDGE REVETMENT

EXISTING CAUSEWAY

SCALE IN FEET

0 150 300 450 600

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND.

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

PROJECT: **CITY OF NOME CAUSEWAY EXTENSION**

TITLE: OPTION C
800' DOCK & BULKHEAD

DESIGNED BY:	GH	DATE:	3/21/12
CHECKED BY:	GH	PROJECT NO:	111011

SHEET NO: 10 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\04_06_08_09_10_11 Options A-D.dwg, 10, 3/21/2012 2:45:01 PM, james, 1:2

OPEN CELL® AND OPEN CELL SHEET PILE®
ARE REGISTERED TRADEMARKS OF PND ENGINEERS, INC.
THE OPEN CELL SYSTEM IS PATENTED
PATENT – US 6,715,964 B2
PATENT – US 7,018,141 B2
PATENT – US 7,488,140 B2

CONCEPT
3/21/12

PND Engineers, Inc. is not responsible for safety programs, methods or procedures of operation, or the construction of the design shown on these drawings. Where specifications are general or not called out, the specifications shall conform to standards of industry. Drawings are for use on this project only and are not intended for reuse without written approval from PND. Drawings are also not to be used in any manner that would constitute a detriment directly or indirectly to PND

REV	DATE	DESCRIPTION

DATE: _____

DATE: _____

1506 West 36th Avenue
Anchorage, Alaska 99503
Phone: 907.561.1011
Fax: 907.563.4220
www.pndengineers.com

PND ENGINEERS, INC.

CITY OF NOME CAUSEWAY EXTENSION

OPTION D
500' DOCK & BULKHEAD

DESIGNED BY:	DH	DATE:	3/21/12
CHECKED BY:	SH	PROJECT NO:	111011

SHEET NO 11 OF 11

J:\2011\111115 Nome Snake River Float\Drawings\Nome Causeway Extension\04_06_08_09_10_11 Options A-D.dwg, 11, 3/21/2012 3:02:07 PM, james, 1:2

P | N | D
ENGINEERS, INC.

March 21, 2012 PND 111011.30

Ms. Joy Baker
Harbormaster
P.O. Box 281
Nome, AK 99762

Subject: Nome Causeway Extension Concepts

Dear Ms. Baker:

At your request we have prepared the attached concept level drawings and rough order of magnitude (ROM) cost estimates for providing deep draft vessel dock at the Nome outer harbor. The following narrative describes the alternatives and analyzes their pros and cons. Key findings and recommendations are provided.

This investigation is limited in scope due to time and budget constraints. Normally, for a project of this magnitude, a master plan would be developed that includes gathering and review of existing data, analysis of metocean design conditions, field investigations of site conditions and soils, analysis of potential material sources and alternatives, and a review of future shipping needs, and the sizes of potential ships at the facility. Additional issues to be considered include constructability, permitting and agency reviews, funding sources, maintenance and operations, and life-cycle costs and benefits. This limited investigation is a reconnaissance study prior to a more detailed alternatives analysis.

PND has extensive experience in Nome, including design of the existing docks on the causeway, and consulting for the builders of the east breakwater during construction. This report builds on previous work by PND and others, including the Nome Causeway Ramp Dock Study (PND, 2011), an east breakwater design study report (United States Army Corps of Engineers (USACE), 2005) and metocean modeling by USACE using data collected by National Oceanic and Atmospheric Administration (NOAA) and the National Data Buoy Center (NDBC).

Deepwater Berth Alternatives

Four concept plan designs have been considered which have different levels of protection from waves and currents.

A. Concepts A1 and A2—Maximum Protected Harbor : These two alternatives are intended to provide all weather—all tides access for large ships. The intent is to provide a refuge for large ships during a storm, including barges towing large modules and equipment to the North Slope. The design criteria would require wide entrance channels, tugboats on standby for maneuvering, and a robust fender and mooring system. This option would be the most expensive

but would provide the most additional berths. The protected harbor could be developed by constructing an extension to the existing causeway in addition to a detached breakwater to protect from waves from the southeast. Concept A2 uses armor rock only in the Southeast Breakwater, with the majority of the western extension being built of OPEN CELL® bulkheads.

B. Concept B—Harbor Deepening of Existing Harbor with New Breakwater: This alternative, as shown in the concept drawings, consists of widening the entrance of the existing harbor by demolishing a portion of the east breakwater, providing a new southeast arc breakwater, and deepening to -35 feet the existing entrance and berth up to West Gold Dock. One or more tugs would assist with berthing. Future space for protected moorage might be developed within the existing outer harbor along the east side. The possible draft of future moorage would be determined by analysis.

C. Concept C—Moderate Weather Berth with Extension to Deeper Water. As deep water is available nearby a protected harbor may not be necessary. This option does not include an eastern breakwater and is therefore exposed to southern and eastern waves.

D. Concept D—500 Foot Long Moderate Weather Berth with Extension to Deeper Water. This option provides nearly the same orientation as Concept C, taking advantage of using the new berth to help shelter the existing outer harbor to the maximum extent possible with this shorter berth. Additional cells on the southern tip or mooring dolphins could extend the berth length at a later time. This option is also exposed to weather from the east and southeast, but provides a berth on both sides for alternating use, depending on the wind and wave conditions, or berthing on both sides in clear weather.

We have developed concept level drawings adequate for material quantity determinations and development of ROM cost estimates.

The Causeway stationing was requested by the City for reference. This is seen on the plan drawings. The stationing is believed to be the original project stationing, was obtained from Kiewit Construction in approximately 2004, and starts with 0+00 in the Snake River near the Port Road Bridge, approximately 3,000 feet from the existing 0-ft MLLW contour. The approximate distance from a particular point on the causeway to this " new shoreline" is found by subtracting 3,000. The extension concepts also have stationing that begins at a common point near the end of the causeway, as seen in the plan drawings (attached sheets 4, 7, 9, 10 and 11).

Deepwater Berth Design Criteria

This study is focused on concept designs that extend the existing causeway from its current -22' MLLW dredge depth (which is sufficient for existing barges docking in Nome) to service a proposed new basin dredged to -35' MLLW. Ideally the causeway extension should provide both access for small ships and protection from wind, waves and currents.

The primary design vessel is assumed to be a D-7 Class cargo ship (Figure 1) with the following dimensions:
LOA: 710 feet (length overall)
LBP: 676 feet (length between perpendiculars)
Breadth (extreme): 78.21 feet
Depth (molded): 51 feet
Draft: 33.13 feet (Summer Load Line)
Displacement: 37,474 tons (Summer Load Line)
Deadweight: 20,966 tons (Summer Load Line)
Capacity: 1,668 TEU max (Twenty-foot equivalent units)

Figure 1. D-7 Class Container Ship (Horizon Lines)

A separate berth for tugboats (Figure 2) should be considered. Crowley Ocean Class DP2 tugboats have the following overall dimensions:
Length: 156 feet
Breadth: 46 feet
Depth: 25 feet
Draft: 21 feet

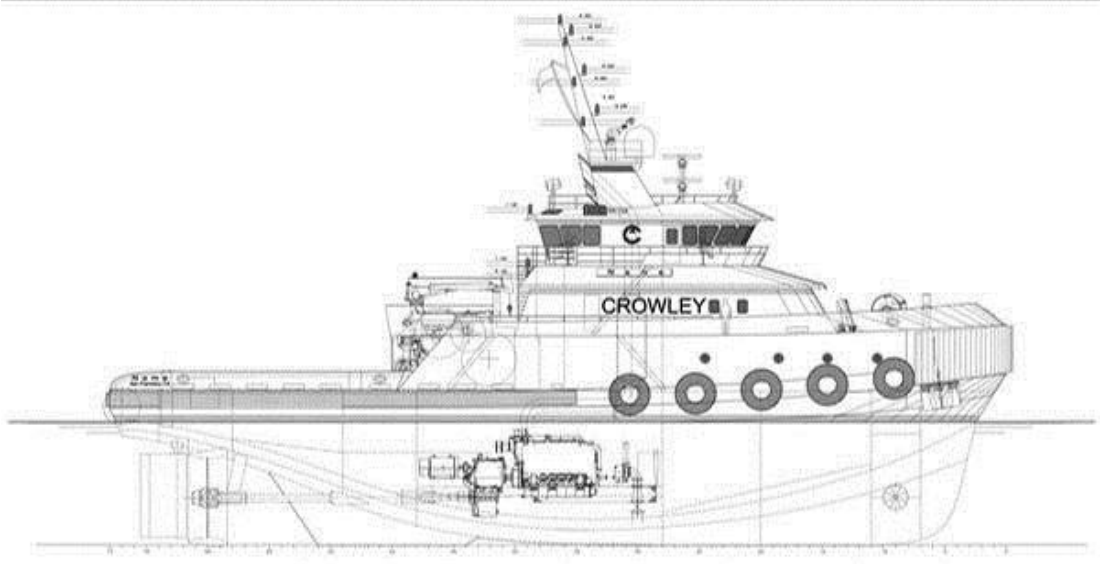


Figure 2. Crowley Ocean Class DP2 Tugboat

Figure 3. Barge—400x100x15 Feet Draft (McDonough Marine, Marmac 400)

Metocean Criteria

There are no wave buoys near Nome. Wave summaries in Figures 4 and 5 are from the Wave Information Study (WIS) hindcast at wavepoint 82101 located approximately 20 miles offshore of Nome. In the WIS hindcast, a numerical model of waves and winds was developed using bathymetry and historical weather data to simulate the hindcast conditions. Hindcast data was compared to actual NOAA wave and meteorological data where it was available to verify the model. As was noted in a study for a possible new outer harbor dock with Ro-Ro Ramp, the wave hindcast shows that large magnitude

storms occur between the ESE (112.5º) and S (180º). Storms with long period waves that will affect ships at berth may necessitate additional breakwaters toward the east.

At the Nome Causeway, hindcasted wind and wave parameters are the best available information at the present time. Field measurements of waves and currents are recommended to optimize the design and develop operational criteria for the harbor. Since 2005, tides and meteorological observations have been recorded at the Nome Causeway. The wave height, period, and direction near the Causeway should be measured hourly for at least one open water season, and used to estimate the percentage of time each month that the metocean conditions would exceed the acceptable threshold for using the proposed dock at the causeway extension. The measured data will also be useful for calibrating a local numerical model of waves, currents and sediment transport. Direct measurements of sediment movement is also feasible as part of a deployment of instruments to measure waves, currents and water levels.

The existing causeway and east breakwater were designed in part by assuming depth limited wave heights (personal communication between PND and USACE Alaska District). This is a conservative assumption and means the design wave height is the largest wave that can reach the armor rock considering the water depth. This assumption may unnecessarily increase the armor costs for extending the breakwaters to deeper water. Metocean design criteria should be developed based on measured and hindcast wave and maximum ice conditions in order to control costs and the required size of armor rock. Armor rock size increases with the cube of the wave height (a doubling of the wave height, results in the rock size needing to be eight times heavier). The larger size of armor also costs more to produce per ton, and requires more thickness in the cross section. All these factors can cause an escalation of cost beyond what is feasible to construct using a traditional revetment design.

The USACE WIS Station 82100 indicates that the 100-year-return-period wave height in a water depth of 65 feet is about 7 meters (23 feet). This is about the same as the depth limited wave height at a breakwater in a water depth of 46 feet. The planned causeway extension reaches the 40-foot-MLLW contour approximately. Assuming a 6-foot storm surge during the design storm event, the depth limited significant wave height would be approximately Hs=23 feet. This would result in a median armor rock size of 64 tons, assuming non-special rock placement and an outer slope of 2:1. If special placement were assumed, and the outer slope were flattened to 4:1 the armor rock size could be approximately 16 tons. For the cost estimates provided, it was assumed that 22-ton median size rock could be obtained and placed at a finished slope of 2:1 in the deepest water, as shown in sheets 5, 6 and 8.

Ice runs, presumably generated by winds or other large scale circulation phenomenon, have occurred during spring ice breakup. A notable Nome ice run beginning on May 5, 2004 caused a large pile up of ice on the docks (Figure 6) and bent some of the fender pile. The outer harbor is now shielded from ice runs by the east breakwater.

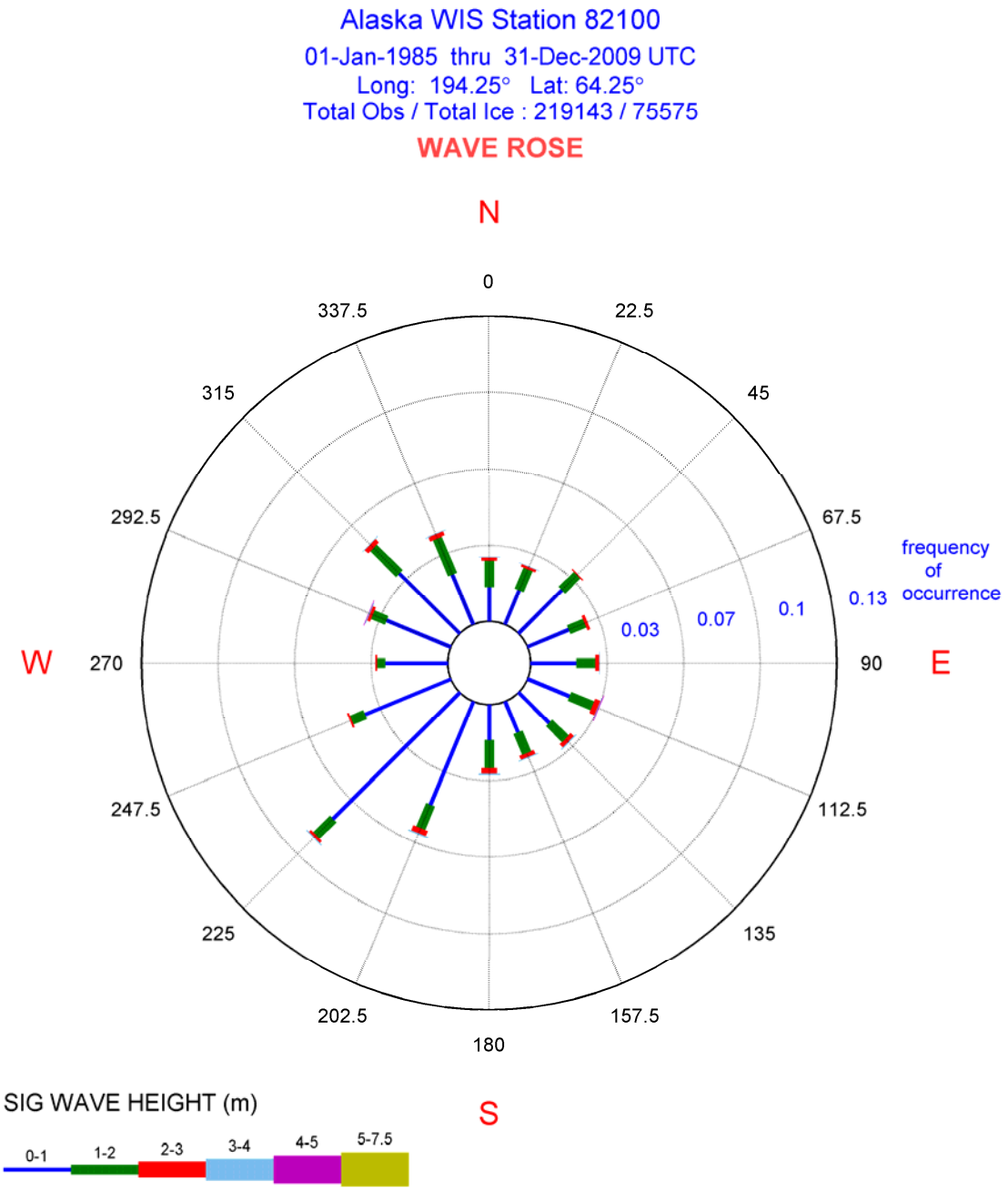


Figure 4. Wave Rose WIS Station 82100
(Depth 65 feet, 17 nautical miles southwest of Nome)

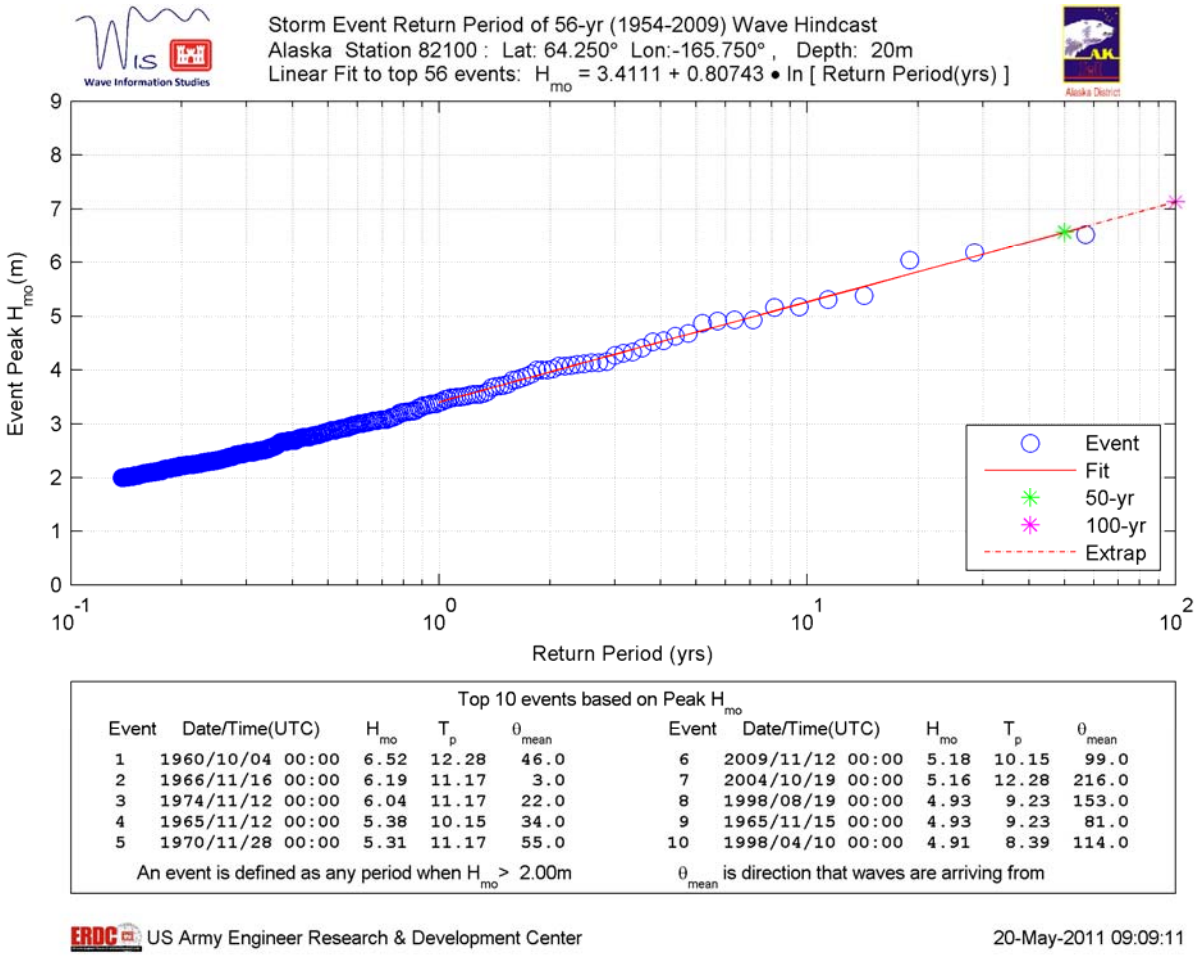


Figure 5. Wave Hindcast WIS Station 82100 (17 nautical miles southwest of Nome)

Figure 6. Ice run-up on Causeway's east side on May 5, 2004 (prior to construction of the east breakwater)

Pressure ridges which form along the existing harbor mouth in some years severely restrict the inflow of seawater into the harbor. As a result the harbor ice formed must be considered to be fresh water ice, which results in substantially higher design loads than sea ice.

On January 3, 2012, the University of Alaska Fairbanks (UAF) sent a team to determine the Nome ice conditions at the request of the Coast Guard. Ice measurements and a survey of the ice ridges that had formed at the outer harbor entrance indicated that inflow of saline water was severely restricted at the time. On January 3, the outer harbor ice thickness near the gap ranged from 2.5–3 feet and was predominately fresh water ice.

On March 1, 2012, PND found fresh water ice in 8 locations (Figure 7) from the Port Road bridge at the Snake River to the outer harbor was 3.4–3.7 feet thickness. As noted by the UAF team and collaborated by local experience (Mr. Fred Tocktoo), slightly thinner ice occurred in the entrance channel (IH-6).

Figure 7. 2012 Nome Harbor ice thickness and salinity sample locations

The proposed harbor expansion can also be expected to form fresh water ice within it's boundaries, if it is protected from wave attack and ice runs. Ice pressure ridges will form at the entrance gaps, restricting the inflow of seawater, by driving ice under the typical sheet ice.

The Nome 50-year design freezing index is approximately 6,000 Fahrenheit degree days.

The design freshwater ice thickness is 4 feet for the inner and outer harbor.

Dredging and Longshore Sediment Transport

A key question is the amount of maintenance dredging that may be required with any deepening or expansion of the existing basin and channel. A related question is the potential impact on nearby shorelines due to blocking or interfering with the natural sediment transport pathways. The prevailing direction of longshore sediment transport is west to east, as indicated by the pattern of historic erosion and accretion and the fate of dredged material placed on shore. Figure 7 shows the clear accretion of sediment filling

up to the Causeway. Another example of this transport is the accumulation of sediment shown on the west side at the tip on the Causeway (Sheet 2). Dredged sediment is currently placed east of the harbor, on the downdrift side of the entrance channel, to nourish the beaches and circumvent the blocking of sediments caused by the causeway and breakwater.

Estimating the amount of dredging required would involve a study of pre and post dredge bathymetry data collected by contractors for USACE and the City. Additional work could also include applying numerical wave, current and sediment transport models, measurement of waves, currents and suspended sediment concentrations with instruments on the seafloor. A detailed plan for investigation of sediment transport, shoreline change and maintenance dredging should be developed as part of the master planning for any new port facilities.

Each of the options could have variable amount of maintenance dredging required to maintain draft and should be studied to determine these maintenance costs.

Motion of Ships at the Dock

Evaluation of ship motions and dock operational criteria requires analysis of the combined effect of wind, waves, tides and currents and their interaction with the ship and mooring system. Physical models in a wave basin and/or numerical models are commonly applied for new port developments to evaluate the motion of vessels at the planned dock and the design of harbor protection and moorings and fenders.

Another key question is the percentage of time ship motions at the planned docks would be unacceptable (Figures 8-9). This cannot be determined without a more advanced dock and mooring design and analysis of metocean data. Figure 8 shows some elements that make a harbor more susceptible to ship motion. The Nome situation clearly has winds, waves larger than 4 feet, and long period waves (see Figure 10 for a summary of hindcasted wave extremes).

FACTOR	SPECIAL ANALYSIS REQUIRED
Wind	> 45 mph for small craft > 75 mph for larger vessels
Wind waves	> 1.5 ft for small craft > 4 ft for larger vessels
Wind gust fronts	Yes for SPMs
Current	> 3 knots
Ship waves and passing ship effects	Yes for special cases (see Kizakkevariath, 1989; Occasion, 1996; Weggel and Sorensen, 1984 & 1986)
Long waves (seiches and tidal waves or tsunamis)	Yes
Berthing and using mooring as a break	Yes (see MIL-HDBK-1025/1)
Parting tension member	May be static or dynamic
Ship impact or other sudden force on the ship	Yes (if directed)
Earthquakes (spud moored or stiff systems)	Yes
Explosion, landslide, impact	Yes (if directed)
Tornado (reference NUREG 1974)	Yes
Flood, sudden water level rise	Yes (if directed)
Ice forcing	Yes (if a factor)
Ship/mooring system dynamically unstable (e.g., SPM)	Yes (dynamic behavior of ships at SPMs can be especially complex)
Forcing period near a natural period of the mooring system	Yes; if the forcing period is from 80% to 120% of a system natural period

Note: SPM = single point mooring

Figure 8. Conditions Requiring Special Analysis – Mooring Design
(Unified Facilities Criteria UFC 4-159-03, October 2005, Department of Defense).

(b) Recommended Motion Criteria for Safe Working Conditions[1] (after PIANC, 1995)

Vessel Type	Cargo Handling Equipment	Surge (m)	Sway (m)	Heave (m)	Yaw (°)	Pitch (°)	Roll (°)
Fishing vessels 10-3000 GRT[2]	Elevator crane Lift-on/off Suction pump	0.15 1.0 2.0	0.15 1.0 1.0	- 0.4 -	- 3 -	- 3 -	- 3 -
Freighters& coasters <10000 DWT[3]	Ship's gear Quarry cranes	1.0 1.0	1.2 1.2	0.6 0.8	1 2	1 1	2 3
Ferries, Roll-On/ Roll-Off (RO/RO)	Side ramp[4] Dew/storm ramp Linkspan Rail ramp	0.6 0.8 0.4 0.1	0.6 0.6 0.6 0.1	0.6 0.8 0.8 0.4	1 1 3 -	1 1 2 1	2 4 4 1
General cargo 5000-10000 DWT	-	2.0	1.5	1.0	3	2	5
Container vessels	100% efficient 50% efficient	1.0 2.0	0.6 1.2	0.8 1.2	1 1.5	1 2	3 6
Bulk carriers 30000-150000 DWT	Cranes Elevator/ bucket-wheel Conveyor belt	2.0 1.0 5.0	1.8 0.5 2.5	1.0 1.0 -	2 2 3	2 2 -	6 2 -
Oil tankers	Loading arms	3.0[5]	3.0	-	-	-	-
Gas tankers	Loading arms	2.0	2.0	-	2	2	2

Notes for Table 3-8(b):
[1]Motions refer to peak-to-peak values (except for sway, which is zero-to-peak)
[2]GRT = Gross Registered Tons expressed as internal volume of ship in units of 100 ft^3 (2.83 m^3)
[3]DWT = Dead Weight Tons, which is the total weight of the vessel and cargo expressed in long tons (1016 kg) or metric tons (1000 kg)
[4]Ramps equipped with rollers.
[5]For exposed locations, loading arms usually allow for 5.0-meter motion.

Figure 9. Recommended Criteria for Safe Working Conditons – Mooring Design (UFC 4-159-03, October 2005).

		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
	Direction Band(deg)->	0	22.5	45	67.5	90	112.5	135	157.5	180	202.5	225	247.5	270	292.5	315	337.5	totals	% of total time
H_s>8 feet	Hourly wave occurrences with greater than 8 ft significant height in 20 years	5	15	2	13	49	102	88	84	108	150	85	23	3	42	47	32	**848**	**1.3**
	% of waves greater than 8 ft from all wave occurrences of this direction sector	0.2	0.7	0.1	0.6	2	3	4	4	4	2	0.7	0.4	0.08	0.9	0.9	0.8		
T_p>5 sec.	Hourly wave occurrences with wave period greater than 5 seconds in 20 years	629	513	525	611	919	1336	851	870	1738	5149	9856	3887	1835	2276	3294	1369	**35658**	**56.5**
	% of hourly wave occurrences with wave period greater than 5 seconds from all wave occurrences of this direction sector	22	24	25	30	36	46	43	45	64	78	85	64	49	52	61	33		

Based on USACE Wave Information Studies Hindcast for wave 101 station 20 miles offshore of Nome

Figure 10. Wave Extremes near Nome

Material sources

Armor rock

The causeway could be designed to use rock from the Cape Nome quarry. This quarry is located approximately 16 miles by road or 13.5 miles by water to its shallow draft load out facility. The Nome quarry has supplied good quality armor rock for a number of projects in the northeast Pacific Ocean. An investigation of the cost and available quantity of rock from Cape Nome and other potential sites is needed to optimize the design of any new facility. During construction of the east breakwater in 2005, rock from the Nome quarry tended to fracture during blasting with a preferred shape and gradation.

Gravel

Nome's former large scale gold mining operations have produced a number of sites with thawed gravels which should be suitable as general fill materials, all within 5 miles of the site. Conceivably some of the beach or dredge sand currently mined/dredged at the harbor could be used for some fill materials.

Shotrock fill
In some cases course grained self-compacting fill (i.e. shotrock) may be more economical than deep compaction of granular fill. Additionally shot rock would tend to be more stable during storms while open water construction is progressing. Shot rock could be available from the Cape Nome quarry or from waste materials from other hard-rock mines or quarries in the area.

Armor Revetment
The breakwaters and option A1 provides an armor revetment with a rock cross section similar to what the USACE designed for the existing east breakwater, constructed in 2005. See Figure 11 and Figure 12. The median armor rock size at the breakwater tip was 22 tons (ranging from 19 to 27 tons in design). PND assumed this section for our concept design and cost estimate. A revised section, possibly with larger armor rock, may be needed depending on the design wave height and ice forces and water depth for the new facilities. All rock breakwaters require an increasingly wider base in deep water, similar to the way a pyramid volume expands with increasing height. The quantity of fill and rock is clearly sensitive to the design wave height and water depths and strongly influence the overall cost of construction.

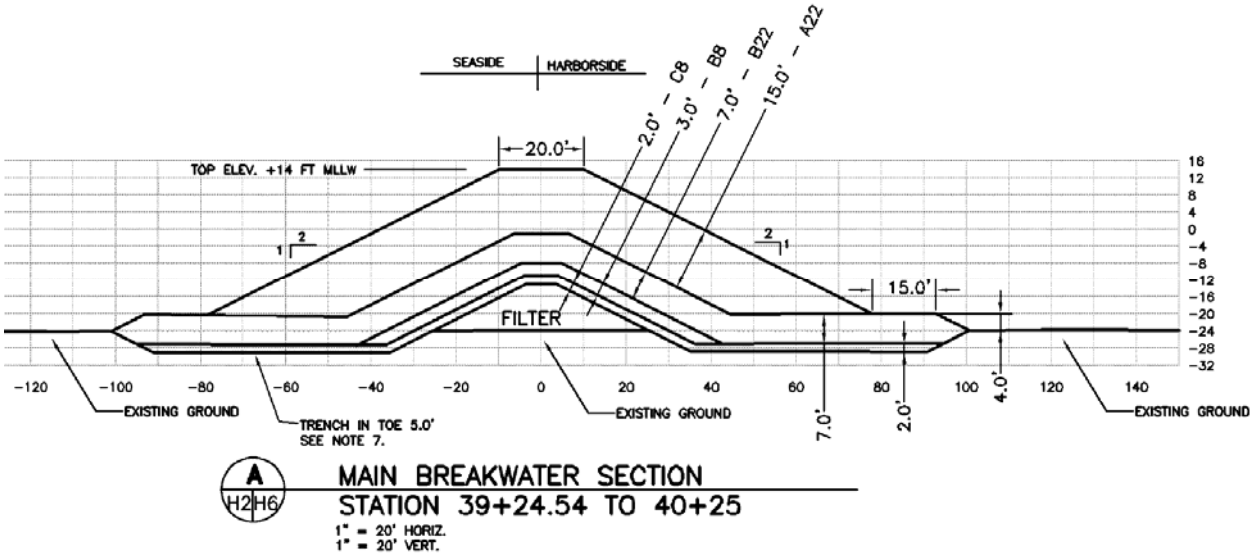


Figure 11. Typical Section – East Breakwater (USACE Design Drawing, 2005)

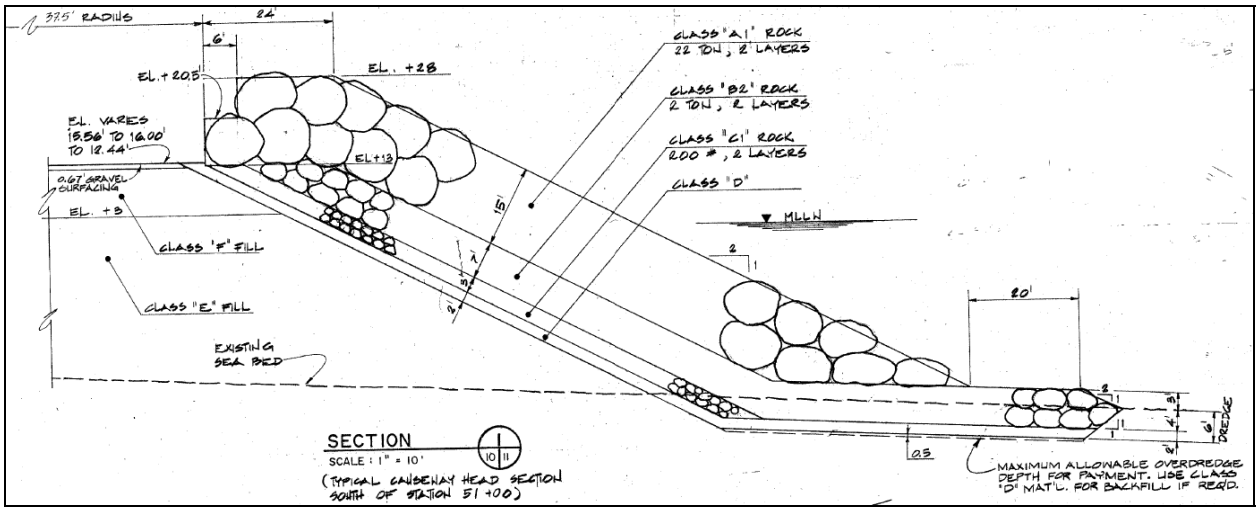


Figure 12. Typical Section – Causeway Armor Rock (USACE Design Drawing, 1984)


Figure 13. Photograph of Outer Tip of East Breakwater in 2005.

The very large 22 ton armor rock on the outer layer are required to resist both wave action and ice shoving or plucking of stones. Multiple layers of stone, with progressively finer gradations are provided under the outer armor rock to prevent migration of the finer materials from the core. The rock breakwater appears to have been stable even with large ice runs and storm events that have occurred since construction in 2005.

A dynamically stable revetment should also be analyzed for consideration. This type of revetment could be optimized to include heavier ice belting rock on a steep slope that is resistant to ice plucking and then use smaller (less costly) rock with shallower slopes on the lower base below expected ice plowing elevation, to significantly reduce revetment costs.

In this method, slopes are shallower. Rock gradations are looser making them cheaper to produce. Stones are not individually placed. It is possible to have material loss during severe events, but the material is more easily replaced than are individual stones. Also, lost materials will be on the outer perimeter and less likely to affect the navigation channel.

Concepts A, C and D will likely require another causeway bridge to accommodate pass-through of fish and other marine life. A breach bridge was included in the cost estimates.

The existing narrows on the southern end between the causeway and the east breakwater provides only about 400' of width with heavy rock on each side. When the revetment protection is used (Option A1) fender dolphins may be provided or a bulkhead with fenders (Option A2) could be provided to minimize problems with barges transiting into the new middle harbor.

The causeway dock extensions proposed would not provide a turning basin between the existing causeway and breakwater for design ships under all conditions. A protected harbor including turning basin for docking larger ships would likely require a development project that is larger in scope and cost. A future alternatives analysis should consider all feasible options.

Concept Plans
Concept plans A, B, C and D have been developed and are shown in the attached drawings.

Concept A
The layout of options A provides for a west extension of the causeway with an eastern breakwater added. Two alternatives are provided for costing; see attached sheets 4-8.

The Concept A geometry provides some shielding from the prevailing winds and most significant waves coming from the Northwest, west, southwest and south. The angled approach limits the length of the causeway to construct and limits the waves that currently transit into current outer harbor. Two cross sections were included for cost analysis: a conventional armor revetment with bulkhead docks and a bulkhead option.

Concept A provides an eastern offshore breakwater for wave protection. The new breakwater is necessary if a harbor of refuge is required during large storms, and will significantly improve mooring conditions during marginal conditions. A harbor with a dock providing shelter during all tides and all sea conditions will require breakwaters that

protect from waves from the east to south to west (azimuth directions 110° to 270°). Without the eastern breakwater, the deep water berth will not only be exposed from the east but will also be more subject to reflection of waves off the bulkhead.

The two alternatives provided for costing include: a traditional armor revetment similar to what was used for the existing breakwater (A1) and a bulkhead (A2). Cellular structures have been shown to be robust in conditions with similar ice conditions. The Nome breach bridge abutments and Northstar Island dock are OPEN CELL® bulkheads while the off-loader facility at Red Dog dock is a closed cell bulkhead. During November 2011 storm, the Cape Nome closed cell had erosion problems at the top of the cell with some damage to the tops of the sheetpile that should be repairable.

Concept B
Concept B provides -35' MLLW draft berth provided by deepening the existing outer harbor and extending the dredging to deeper water. See attached Sheet 9.

This concept would require modifying the east breakwater, deepening an entrance channel, and providing a long sweeping Southeast Arc Breakwater to provide wave protection. In the option, a portion of the east breakwater near the tip would be demolished to create additional space for maneuvering. Future additional berthing area could be developed by widening the existing inner harbor entrance channel, and building a separate access from shore adjacent to the east breakwater.

Concept C
Concept C provides -35' MLLW draft berth by extending the causeway to a length adequate for the design vessel and then dredging to deeper water. No eastern breakwater would be provided. Concept C provides additional wave protection to the existing outer harbor, and is oriented to shield the berth from the predominant wave direction and the longest period waves. See attached Sheet 10.

Concept D
Concept D provides two -35'MLLW draft berths by extending the causeway to a length adequate for a 500-foot-long vessel, with the ability to increase the berth length at a future time. The dock extension is slightly narrower than the other OPEN CELL docks proposed, to save steel and fill costs. See attached Sheet 11.

Construction Costs
ROM construction costs were based on the Nome Causeway Extension Conceptual Design Drawings dated 3-21-2012. Cape Nome Quarry was the assumed rock source and rock costs were approximated based on the assumption that a contractor would develop their own rock materials from the quarry source after paying reasonable royalties to the owners. Some items not explicitly shown in the drawings were included in the cost totals, for example, water and fuel line extensions, high mast lights, surveying, bonds and insurance, and mobilization. Planning included design studies and modeling, engineering design, a geotechnical investigation, permitting, and construction administration.

Cost Comparison

Concept	Construction	Planning	Maintenance	Protection Compared
A1	$229 M	$10 M	Low	Entrance Gaps
A2	$188 M	$8 M	Low	Entrance Gaps
B	$164 M	$11 M	Moderate	Entrance Gaps
C	$77 M	$6 M	High	Fully exposed
D	$43 M	$5 M	High	Fully exposed

Notes:
1. Assumes 10% construction contingency.
2. Assumes standard rock revetment sections and other details shown in Nome Causeway Extension Port of Nome Conceptual Design, March 21, 2012.

Recommendations
Lacking a clear definition of project needs, we have provided a range of concepts including: 1) a robust sheltered port, 2) modifying and using existing facilities as much as possible, 3) providing much less protection and 4) providing a minimal facility. Most of the options could conceivably be built in phases. The needs of the project should be further defined with detailed mooring conditions and the level of necessary protection determined. The cost impacts of protection are significant as shown by this study. An estimate of future shipping should be performed, to include: the sizes and frequency of potential ships transiting, berthing, or seeking refuge at the facility. Detailed special analysis may be required as recommended (see Figures 8 and 9) to determine if adequate at berth performance is provided.

Currently there is no site specific field data for waves and currents at this site. PND has performed some ice studies ancillary to other Nome harbor projects. Additional field studies should be performed to better understand winds, waves and ice conditions and forces at the proposed site. Longshore sediment transport data needs to be collected and analyzed. Maintenance dredging should be studied to help program these long term maintenance costs.

Constructing with rock materials should be re-evaluated to consider whether dynamically stable rock placement methods could be used to provide a significant cost savings. A scale model ice test should be considered in this effort.

An evaluation of constructability will need to be performed. This study has shown that substantial saving can be realized in the deeper water by constructing steel bulkheads. A second advantage is the possibility of berthing on both sides of a bulkhead. The dredging limits were not shown nor were costs calculated to include the 35-ft draft on the west sides for Concepts A2 or C.

Permitting will be a significant effort for this project and agency input should be gathered early in the planning process.

Sincerely,
PND Engineers, Inc. Anchorage Office

Garth Howlett, Principal

Sandra Morris, Senior Engineer

Encl. Nome Causeway Extension Port of Nome Conceptual Drawings 1-11