



**Pease Development Authority  
Division of Ports and Harbors**

**Market Street  
Marine Terminal  
Functional Replacement Project  
Portsmouth, NH**

# **NHDES Wetlands Permit Application Amendment & Request for More Information Response**



**NHDOT Project 15731  
Federal Project A000(909)  
NHDES File No. 2022-00429**

**April 2023**

**Market Street Marine Terminal  
Functional Replacement Project  
15731  
A000(909)  
NHDES File Number 2022-00429**

**Wetlands Permit Application Amendment  
& Request for More Information Response**

Prepared by:



53 Regional Drive • Concord, NH 03301



600 State Street • Portsmouth, NH 03801

**April 2023**



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## **NHDES Revised Wetlands Permit Application Form**

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# WETLANDS PERMIT APPLICATION

Water Division/ Wetlands Bureau  
Land Resources Management



Check the status of your application: [www.des.nh.gov/onestop](http://www.des.nh.gov/onestop)

RSA/Rule: [RSA 482-A](#)/ [Env-Wt 100-900](#)

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

**1. REVIEW TIME:** Indicate your Review Time below. To determine review time, refer to [Guidance Document A](#) for instructions.

Standard Review (Minimum, Minor or Major Impact)       Expedited Review (Minimum Impact only)

**2. MITIGATION REQUIREMENT:**

If mitigation is required, a Mitigation-Pre Application meeting must occur prior to submitting this Wetlands Permit Application. To determine if mitigation is required, please refer to the [Determine if Mitigation is Required Frequently Asked Questions](#).

Mitigation Pre-Application Meeting Date: Month: 8 Day: 21 Year: 2019  
 N/A - Mitigation is not required

**3. PROJECT LOCATION:**

Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.

ADDRESS: <b>Market Street Marine Terminal</b>		TOWN/CITY: <b>Portsmouth</b>	
TAX MAP: <b>119</b>	BLOCK:	LOT: <b>5</b>	UNIT:
USGS TOPO MAP WATERBODY NAME: <b>Piscataqua River</b>	<input type="checkbox"/> NA	STREAM WATERSHED SIZE: <b>994 sq mi</b>	<input type="checkbox"/> NA
LOCATION COORDINATES (If known): <b>43.084373, -70.761500</b>		<input checked="" type="checkbox"/> Latitude/Longitude <input type="checkbox"/> UTM <input type="checkbox"/> State Plane	

**4. PROJECT DESCRIPTION:**

Provide a brief description of the project outlining the scope of work. Attach additional sheets as needed to provide a detailed explanation of your project. DO NOT reply "See Attached" in the space provided below.

**The original wetlands permit application was submitted in February 2022 (NHDES File No. 2022-00429). This application amendment is requested due to changes in impact areas. This project will consist of construction of new dock structures to extend the south and north ends of the existing wharf; installation of a new fender system; dredging of approximately 61,450 square feet of the river bed; relocation of a floating dock; and shoreside alterations.**

**5. SHORELINE FRONTAGE:**

N/A This does not have shoreline frontage.      SHORELINE FRONTAGE: **1,800'**

*Shoreline Frontage* is calculated by determining the average of the distances of the actual natural navigable shoreline frontage and a straight line drawn between the property lines, both of which are measured at the normal high water line ([Env-Wt 101.89](#)).

**6. RELATED NHDES LAND RESOURCES MANAGEMENT PERMIT APPLICATIONS ASSOCIATED WITH THIS PROJECT:**

Please indicate if any of the following permit applications are required and, if required, the status of the application. To determine if other Land Resources Management Permits are required, refer to the [Land Resources Management Webpage](#).

Permit Type	Permit Required	File Number	Permit Application Status
Alteration of Terrain Permit Per RSA 485-A:17	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Individual Sewerage Disposal per RSA 485-A:2	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Subdivision Approval Per RSA 485-A	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input type="checkbox"/> PENDING <input type="checkbox"/> DENIED
Shoreland Permit Per RSA 483-B	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	_____	<input type="checkbox"/> APPROVED <input checked="" type="checkbox"/> PENDING <input type="checkbox"/> DENIED

**7. NATURAL HERITAGE BUREAU & DESIGNATED RIVERS:**

See the [Instructions & Required Attachments](#) document for instructions to complete a & b below.

a. Natural Heritage Bureau File ID:    NHB 23 - 0281

b.  This project is within a [Designated River](#) corridor. The project is within ¼ mile of: \_\_\_\_\_; and date a copy of the application was sent to the [Local River Management Advisory Committee](#): Month: \_\_\_ Day: \_\_\_ Year: \_\_\_

N/A – This project is not within a Designated River corridor.

[lrn@des.nh.gov](mailto:lrn@des.nh.gov) or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

[www.des.nh.gov](http://www.des.nh.gov)

<b>8. APPLICANT INFORMATION (Desired permit holder)</b>			
LAST NAME, FIRST NAME, M.I.: <b>Shattuck, Tracy</b>			
TRUST / COMPANY NAME: <b>NH Division of Ports and Harbors</b>		MAILING ADDRESS: <b>555 Market Street</b>	
TOWN/CITY: <b>Portsmouth</b>		STATE: <b>NH</b>	ZIP CODE: <b>03801</b>
EMAIL or FAX: <b>t.shattuck@peasedev.org</b>		PHONE: <b>603-436-8500</b>	
ELECTRONIC COMMUNICATION: By initialing here: <u>TJS</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically.			
<b>9. PROPERTY OWNER INFORMATION (If different than applicant)</b>			
LAST NAME, FIRST NAME, M.I.:			
TRUST / COMPANY NAME:		MAILING ADDRESS:	
TOWN/CITY:		STATE:	ZIP CODE:
EMAIL or FAX:		PHONE:	
ELECTRONIC COMMUNICATION: By initialing here _____, I hereby authorize NHDES to communicate all matters relative to this application electronically.			
<b>10. AUTHORIZED AGENT INFORMATION</b>			
LAST NAME, FIRST NAME, M.I.: <b>Perron, Christine</b>		COMPANY NAME: <b>McFarland-Johnson, Inc</b>	
MAILING ADDRESS: <b>53 Regional Drive</b>			
TOWN/CITY: <b>Concord</b>		STATE: <b>NH</b>	ZIP CODE: <b>03301</b>
EMAIL or FAX: <b>cperron@mjinc.com</b>		PHONE: <b>603-225-2978</b>	
ELECTRONIC COMMUNICATION: By initialing here <u>CJP</u> , I hereby authorize NHDES to communicate all matters relative to this application electronically.			
<b>11. PROPERTY OWNER SIGNATURE:</b>			
See the <a href="#">Instructions &amp; Required Attachments</a> document for clarification of the below statements			
By signing the application, I am certifying that:			
<ol style="list-style-type: none"> <li>I authorize the applicant and/or agent indicated on this form to act in my behalf in the processing of this application, and to furnish upon request, supplemental information in support of this permit application.</li> <li>I have reviewed and submitted information &amp; attachments outlined in the <a href="#">Instructions and Required Attachment</a> document.</li> <li>All abutters have been identified in accordance with RSA 482-A:3, I and Env-Wt 100-900.</li> <li>I have read and provided the required information outlined in Env-Wt 302.04 for the applicable project type.</li> <li>I have read and understand Env-Wt 302.03 and have chosen the least impacting alternative.</li> <li>Any structure that I am proposing to repair/replace was either previously permitted by the Wetlands Bureau or would be considered grandfathered per Env-Wt 101.47.</li> <li>I have submitted a Request for Project Review (RPR) Form (<a href="http://www.nh.gov/nhdhr/review">www.nh.gov/nhdhr/review</a>) to the NH State Historic Preservation Officer (SHPO) at the NH Division of Historical Resources to identify the presence of historical/ archeological resources while coordinating with the lead federal agency for National Historic Preservation Act (NHPA) 106 compliance.</li> <li>I authorize NHDES and the municipal conservation commission to inspect the site of the proposed project.</li> <li>I have reviewed the information being submitted and that to the best of my knowledge the information is true and accurate.</li> <li>I understand that the willful submission of falsified or misrepresented information to the NHDES is a criminal act, which may result in legal action.</li> <li>I am aware that the work I am proposing may require additional state, local or federal permits which I am responsible for obtaining.</li> <li>The mailing addresses I have provided are up to date and appropriate for receipt of NHDES correspondence. NHDES will not forward returned mail.</li> </ol>			
 Property Owner Signature		<b>Tracy Shattuck</b> Print name legibly	<u>04/13/2023</u> Date

[irm@des.nh.gov](mailto:irm@des.nh.gov) or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

[www.des.nh.gov](http://www.des.nh.gov)

**MUNICIPAL SIGNATURES**

**12. CONSERVATION COMMISSION SIGNATURE**

The signature below certifies that the municipal conservation commission has reviewed this application, and:

1. Waives its right to intervene per RSA 482-A:11;
2. Believes that the application and submitted plans accurately represent the proposed project; and
3. Has no objection to permitting the proposed work.

	Print name legibly	Date
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**DIRECTIONS FOR CONSERVATION COMMISSION**

1. Expedited review ONLY requires that the conservation commission's signature is obtained in the space above.
2. Expedited review requires the Conservation Commission signature be obtained **prior** to the submittal of the original application to the Town/City Clerk for signature.
3. The Conservation Commission may refuse to sign. If the Conservation Commission does not sign this statement for any reason, the application is not eligible for expedited review and the application will be reviewed in the standard review time frame.

**13. TOWN / CITY CLERK SIGNATURE**

As required by Chapter 482-A:3 (amended 2014), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.

	Kelli L. Barnaby	Portsmouth	4/13/23
Print name legibly	Town/City	Date	

**DIRECTIONS FOR TOWN/CITY CLERK:**

Per RSA 482-A:3,I

1. For applications where "Expedited Review" is checked on page 1, if the Conservation Commission signature is not present, NHDES will accept the permit application, but it will NOT receive the expedited review time.
2. IMMEDIATELY sign the original application form and four copies in the signature space provided above;
3. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
4. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board; and
5. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

**DIRECTIONS FOR APPLICANT:**

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.

[irm@des.nh.gov](mailto:irm@des.nh.gov) or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095


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**DIRECTIONS FOR APPLICANT:**

1. Submit the single, original permit application form bearing the signature of the Town/ City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery.



**14. IMPACT AREA:**

For each jurisdictional area that will be/has been impacted, provide square feet and, if applicable, linear feet of impact.

Permanent: impacts that will remain after the project is complete.

Temporary: impacts not intended to remain (and will be restored to pre-construction conditions) after the project is completed.

Intermittent Streams: linear footage distance of disturbance is measured along the thread of the channel.

Perennial Streams/ Rivers: the total linear footage distance is calculated by summing the lengths of disturbance to the channel and each bank.

JURISDICTIONAL AREA	PERMANENT Sq. Ft. / Lin. Ft.	TEMPORARY Sq. Ft. / Lin. Ft.
Forested wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Scrub-shrub wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Emergent wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Wet meadow	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Intermittent stream channel	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Perennial Stream / River channel	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Intermittent stream	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Perennial stream / River	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Bank - Lake / Pond	/ <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Tidal water	62,050 / 343 <input type="checkbox"/> ATF	/ <input type="checkbox"/> ATF
Salt marsh	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Sand dune	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Prime wetland buffer	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Undeveloped Tidal Buffer Zone (TBZ)	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Previously-developed upland in TBZ	51,720 <input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Lake / Pond	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - River	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Docking - Tidal Water	17,400 <input type="checkbox"/> ATF	<input type="checkbox"/> ATF
Vernal Pool	<input type="checkbox"/> ATF	<input type="checkbox"/> ATF
<b>TOTAL</b>	<b>131,170 / 343</b>	<b>/</b>

**15. APPLICATION FEE:** See the [Instructions & Required Attachments](#) document for further instruction

Minimum Impact Fee or Fee for Non-enforcement related, publicly-funded and supervised restoration projects, regardless of impact classification (see RSA 482-A:3, 1(c)): Flat fee of \$ 400

Minor or Major Impact Fee: Calculate using the below table below

Permanent and Temporary (non-docking) 113,770 sq. ft. X \$0.40 = \$ 45,508

Temporary (seasonal) docking structure: \_\_\_\_\_ sq. ft. X \$2.00 = \$

Permanent docking structure: 17,400 sq. ft. X \$4.00 = \$ 69,600

**Projects proposing shoreline structures (including docks) add \$400 = \$ 400**

Total = \$ 115,508

The Application Fee is the above calculated Total or \$400, whichever is greater = \$ 10,000\*cap

[irm@des.nh.gov](mailto:irm@des.nh.gov) or (603) 271-2147

NHDES Wetlands Bureau, 29 Hazen Drive, PO Box 95, Concord, NH 03302-0095

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**\* \$10,000.00 application fee was paid with the original application**

## **Supplemental Narrative**

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**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**NHDES WETLANDS PERMIT APPLICATION AMENDMENT  
SUPPLEMENTAL NARRATIVE**

**Introduction**

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A wetlands permit application was submitted to NHDES in February 2022 for the proposed functional replacement project located at the Market Street Marine Terminal (Port of New Hampshire), in Portsmouth, New Hampshire. A Request for More Information (RFMI) was issued by NHDES on June 1, 2022 (NHDES File Number: 2022-00429). Since the submittal of the original wetlands permit application and RFMI, there have been minor changes in the proposed project and impacts to jurisdictional resource areas. The following supplemental narrative focuses on the recent design changes and other project developments that were not included in the original wetlands permit application. Please refer to the materials included in the original application for additional information on the project setting, purpose and need, and description of the overall project. Additional information addressing specific questions and concerns included in the RFMI are provided in the RFMI Response.

**Project Description**

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This project will consist of the following components:

- Construction of a new dock structure approximately 60 x 120 feet to extend the south end of the existing wharf.
- Construction of a new dock structure approximately 145 x 80 feet to extend the north end of the existing wharf.
- Installation of a new fender system along the length of the main wharf.
- Dredging of approximately 61,450 square feet of the riverbed adjacent to the north end of the extended wharf.
- Relocation of the floating dock currently located off the north end of the wharf.
- Shoreside alterations, including soil and rock removal, grading, drainage, and paving within an 80,000-square foot area.

**Wharf Extension**

The two sections of proposed wharf will consist of concrete filled steel pipe piles with a reinforced concrete deck structure. 42-inch temporary steel casings will be installed, and sockets will be drilled into bedrock for the pile installation. 30-inch diameter steel piles will then be installed in the drilled holes, and the piles will then be filled with concrete. The south extension will require a total of 30 piles, with 30-inch diameter sockets, and the north extension will require a total of 44 piles of the same diameter. The estimated area of direct impacts from the socketed piles is approximately 363 square feet.

Metal debris and other obstructions including steel and timber from remnant structures and large boulders that are partially or entirely buried in the sediment of the Piscataqua River have been identified in the vicinity of the northern and southern wharf extensions, subsequent to the original wetlands permit

application submittal. These obstructions could potentially pose a barrier to the installation of the casings and piles. Obstructions will be identified during the installation of the proposed piles and will be removed as necessary using an excavator or auger type drill mounted on the existing wharf and/or a barge. The obstruction removal is located within the footprint of permanent impacts associated with the pile and deck installation and will not result in additional impact areas. Turbidity releases will be minimized through the sequential nature of the work.

The pile installation process will consist of rotary and percussion drilling contained within a steel casing. A 42-inch diameter steel casing would be installed through the overburden to the top of bedrock. The typical process would be to vibrate the casing down using a vibratory hammer with a short period with the impact hammer to assure firm bearing on bedrock. Depending on the depth of overburden, the casing may be installed with an impact hammer the entire depth. At locations with difficult geotechnical or hard driving conditions an impact hammer may be required to progress the casing. The typical duration of casing installation is approximately 60 minutes. It is anticipated that one to two piles will be installed per day depending on production and challenges encountered.

Once the temporary casing is installed to bedrock, a drilling bucket will be used within the casing to remove the remaining sediments and overburden soils. Sediment removed from the casing with the drilling bucket will be placed into containers and transferred to stockpiles on shore. After the overburden material is removed, an air hammer or other drilling equipment determined by the contractor will be used to advance a socket into bedrock. Once the bedrock is drilled, the permanent casing is installed in the rock socket. Concrete is placed within the rock socket and permanent casing using the tremie method and displacing standing water. The temporary casing is then removed using a vibratory hammer.

Drilling water released from the top of the casing from the beginning of the drilling process through installation of the piles will contain some sediment and rock fragments. Turbidity generated from these activities will be monitored per the Turbidity Control and Monitoring Plan.

The proposed Class V or VII riprap will be installed overtop and within the footprint of existing riprap. The majority of riprap will be installed underneath the proposed pier extensions. Approximately 600 square feet / 18 linear feet of riprap will be required outside the footprint of the proposed south wharf extension. The proposed riprap at this location will still be installed within the footprint of existing stone fill.

Once the piles and abutments are in place, the cast-in-place pile caps and pre-cast deck planks will be installed. The south wharf extension will be approximately 7,810 square feet and the north extension approximately 8,770 square feet.

The existing fender system will be removed and replaced with a system that can accommodate all required uses of the facility. The proposed fender system will extend to +2 feet MLLW and be designed for both barges and larger vessels. The new fender system will be installed along the entire length of the extended wharf. The fender elements will consist of rubber fender units, with a steel panel and ultra-high molecular weight polyethylene facing.

The deck elevation of the south extension will be +15.1 feet MLLW. This is approximately 1 foot higher than the existing main wharf and barge wharf, which will keep the pile caps out of the water at Mean Higher High Water (MHHW) and accommodate a possible rise in the sea level over the design life of the structure. The north extension deck elevation will be at +15.1 feet MLLW. This elevation will match the adjacent barge wharf and main wharf and provide smooth transitions between the structures, which will all now be connected. A deck elevation of +15.1 feet MLLW at this location will help make facility operations more efficient. Concrete ramps will be constructed between the existing wharf and the extensions.

## **Dredging & Blasting**

Dredging will occur within a 61,450 square foot area directly adjacent to the proposed northern wharf extension to a depth of -36 feet MLLW. The dredging depth was increased by one foot from -35 MLLW (included in the original wetlands permit application) to -36 MLLW. The resulting footprint of the dredging area subsequently increased from 55,000 to 61,450 square feet. The duration of dredging is anticipated to be approximately 3 months. Within the dredge area, an approximately 10,000 square foot area will require blasting to remove approximately 1,000 cubic yards of rock. Blasting will occur to depths of up to eight feet. The duration of blasting is anticipated to be approximately 2 to 4 weeks.

A total of approximately 16,000 cubic yards of sediment (plus a maximum overdredge of 1,800 cubic yards) and 1,000 cubic yards of rock will be removed from the dredge area, with sediment consisting primarily of sand and gravel. The total maximum dredge volume of sediment and bedrock is 18,800 cubic yards. The Contractor will use an excavator or heavy clamshell bucket for removing sediment and debris and the material will be transported by a dredge scow.

A Sampling and Analysis plan was developed through coordination with the ACOE, and sediment sampling is scheduled to be completed in April 2023 to test the sediments within the dredging area for potential contamination. The sediment sampling and analysis will be completed prior to the start of dredging and coordination with the ACOE will continue regarding the results of the sampling.

The preferred disposal site identified in the original wetlands permit application was the Cape Arundel Disposal Site located approximately 2.8 nautical miles southeast of Cape Arundel, Maine. However, this disposal site has since been closed. The disposal site for the dredged materials has been updated from the Cape Arundel Disposal Site to the Isle of Shoals North Disposal Site. The dredged material will be transported to the disposal site by barge, following an approximately 15 nautical mile haul route from the Project location to the mouth of the Piscataqua River, east to the Isle of Shoals North Disposal Site. The material will be transported by a dredge scow, with the number of trips determined by the size of the equipment used by the contractor. Coordination with the ACOE is ongoing and a Section 103 permit for Ocean Disposal of Dredged Materials will be obtained from the ACOE prior to any dredging or disposal activities.

During blasting and dredging activities, the partial demolition of the former SML Bridge abutment and the complete removal of Pier 14 will be carried out in the area of the northern wharf extension. These structures are concrete and will be demolished using a hydraulic breaker or similar equipment to break apart the concrete. Pier 14 will be removed in its entirety. The top of the bridge abutment as well as 1 foot of the exposed facing will also be removed. The remaining abutment will be left in place. All concrete debris will be removed and disposed of in an upland location.

Dredging, blasting, and the majority of concrete demolition will occur between November 15 and March 15. To minimize or avoid impacts to aquatic species, a blasting plan will be submitted by the Contractor for approval by the National Marine Fisheries Service and NHDES prior to detonation of explosives. The following measures will be included in the blasting plan and implemented during blasting:

- Stemming and decking of individual charges;
- Staggered detonation of charges in a sequential blasting circuit;
- Blasting during periods of slack tide;
- Use of a fish detecting and startle system to avoid blasting when fish are present or transiting through the area;
- Use of sonar and the presence of a fisheries and marine mammal observer; and

- Prohibiting blasting during the passage of schools of fish or in the presence of marine mammals.

Dredging and blasting specifications will be included in contract documents and are included with this application.

### **Floating Dock**

An existing floating dock is located in the area of the northern wharf extension and will be relocated off the barge wharf. The existing dock is approximately 80 feet long and 10 feet wide and will require a gangway platform approximately 5 feet wide by 18 feet long. The proposed floating dock and gangway platform will result in approximately 820 square feet of impacts within the Piscataqua River. The floating dock and gangway platform will require six rock socketed guide piles with 22-inch diameter temporary steel casings. The proposed piles for the floating dock and gangway platform will consist of 14-inch diameter, concrete filled steel pipe piles. The pile installation for the floating dock will follow a similar installation procedure as described in the Wharf Extension section above. External guide pile assemblies will be attached to either end of the floating dock. The floating dock configuration will allow for berthing on the outboard side only.

### **Shoreside Work**

The shoreside alterations will consist of the removal of approximately 6,000 cubic yards of soil and rock, grading, and paving the area under the former location of the SML Bridge to increase laydown area by approximately 34,000 square feet, improve access to the barge wharf and small boat facilities, and provide shoreside access to the northern wharf extension. Two shoreside bollards will be installed to secure the forward lines of vessels. The existing shoreside bollards will remain in place. All shoreside work will be located above the Highest Observable Tide Line (HOTL) and will not require in-water work. All appropriate sedimentation and erosion control measures, including silt socks, inlet filters, and sediment traps, will be installed during construction to avoid impacts to the river.

Shoreside work will include grading and paving to direct stormwater to catch basins. The proposed stormwater system is designed to match the existing stormwater treatment devices located on the site. The northern area will be graded to direct stormwater to two new catch basins with double inlet grates for collection. The catch basins will drain to two new offline 6-foot diameter hydrodynamic vortex separators to provide stormwater treatment before discharging through headwalls into the Piscataqua River. The existing drainage on the barge wharf and surrounding areas will remain. The southern area will reestablish drainage directing stormwater into the existing hydrodynamic vortex separator. Stormwater treatment areas are not proposed given the limited space available and also due to concerns with contaminated soils.

The proposed shoreside work will involve approximately 47,490 square feet of impacts within the Developed Tidal Buffer Zone at the northern wharf extension, and 4,230 square feet of impacts within the Developed Tidal Buffer Zone at the southern wharf extension.

Portions of the shoreside alterations described above will be located within the 100-foot tidal buffer zone and 250-foot protected shoreland of the Piscataqua River. The entire tidal buffer zone and protected shoreland within the project area is developed, consisting of approximately 6.5 acres of the existing Port of NH facility. Within this area, approximately 0.5 acre at the north end of the wharf is not currently paved. This area was located under the former Sarah Mildred Long Bridge and is sparsely vegetated with grass. There are no trees or saplings within the 250' protected shoreland. The grassed area is already used as a work area for the Port. The project proposes to pave this area to create a more suitable work area and to provide access to the northern wharf extension.

Area of the lot within 250' of the reference line (highest observable tide line) = 6.5 acres

Percentage of lot covered by pre-construction impervious area within 250' of the reference line = 97.5%

Percentage of lot to be covered by post-construction impervious area within 250' of the reference line upon completion of the project = 100%

As noted above, stormwater runoff will be collected in catch basins that will outlet into hydrodynamic vortex separators. The Port of NH is authorized under an EPA Industrial Multi-Sector General Permit. The facility has a robust maintenance program for stormwater structures.

## **NHDES RFMI Response**

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April 7, 2023

Kristin L. Duclos, Wetlands Specialist  
NHDES Wetlands Bureau  
29 Hazen Drive  
Concord, NH 03302-0095

**RE: NHDES Request for More Information Response  
Standard Dredge and Fill Wetlands Permit Application (RSA 482-A)  
NHDES File Number: 2022-00429  
Subject Property: Market Street Marine Terminal, Portsmouth, Tax Map #119, Lot #5**

The following response is in regard to the NHDES Request for More Information dated June 1, 2022, for the project referenced above.

1. In accordance with Env-Wt 501.01(d) and as required by RSA 482-A:3, I(e)(1), the applicant must provide notice of the application to abutting property owners in writing by certified mail or other delivery method that provides proof of receipt prior to filing an application. Based on the attachments provided with the application, the abutting property owners at Portsmouth Tax Map #119, Lot #6 as well as the owners of the Boston & Maine Railroad right of way (ROW) that abuts the subject property were not notified of the project. Please provide the following as a part of the response to this letter:
  - a. Provide notice of the application to all abutters, in writing by certified mail or other delivery method that provides proof of receipt as required by RSA 482-A:3, I(e)(1) and in accordance with Env-Wt 501.01(d). Provide copies of certified postal receipts or other proof of receipt of the notices that are required by RSA 482-A:3, I(e) as a part of the response to this letter.

**RESPONSE:**

*All project abutters were notified via certified mail on March 29, 2023. See attached certified mail receipts for tax parcels 119-6 and 121-1.*

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- b. Provide a copy or tracing of a town tax map showing the property of the applicant, the location of the proposed project on the property, and the location of properties of abutters with each lot labeled with the abutter's name(s) and mailing address(es) in accordance with Env-Wt 501.02(a)(1). A list containing the names, mailing address, and tax map/lot number(s) of each abutter to the subject property where work is proposed may also be provided to cross reference.

**RESPONSE:**

Figure 2 – Tax Map (see attached), was revised to include the entire property of the applicant, location of the proposed project on the property, and locations of abutting properties with each lot labeled with the map-lot number, property address, abutter’s name, and abutter’s mailing address. A list containing the names, mailing address, and tax map/lot numbers of both abutters is provided in **Table 1** below.

**Table 1. Market Street Marine Terminal Functional Replacement Project Abutters**

Property Location	Map-Lot	Owner	Mailing Address	Mailing City, Zip
MARKET ST	121-1	CSX TRANSPORTATION	500 Water Street, 15th Floor	Jacksonville, FL 32202
227 MARKET ST	119-6	227 MARKET STREET LLC	27 Austin Street	Portsmouth, NH 03801

- 
2. Please provide a copy of the existing conditions plan that includes the following:
- a. The location of all wetlands delineated in accordance with Env-Wt 301.01, and whether any wetlands are designated as prime wetlands in accordance with RSA 482-A:15 as required by Env-Wt 501.02(a)(2)j.

**RESPONSE:**

Please refer to the attached revised Impact Plans for the updated existing conditions plan. There are no palustrine wetlands located in the proposed project area. The Piscataqua River is the only jurisdictional resource in the vicinity of the proposed project. The Highest Observable Tide Line (HOTL) has been delineated and is shown on the plans. The HOTL marks the jurisdictional limit of the Piscataqua River. The 100-foot Tidal Buffer Zone (TBZ) is based on the HOTL and is also depicted on the plans. There are no designated prime wetlands or associated 100-foot prime wetland buffers in the vicinity of the project.

- 
- b. The wetlands classification for all delineated resources identified on plans as required for all major projects in accordance with Env-Wt 301.02(b).

**RESPONSE:**

The Piscataqua River is classified as an Estuarine Subtidal System, with an Unconsolidated Bottom, and a Saltwater Subtidal Water Regime (E1UBL). There are no additional wetlands or surface waters delineated in the project area. The E1UBL classification for the Piscataqua River has been added to the plans in accordance with Env-Wt 301.02(b) (see Sheet 8 of 18).

- 
- c. A plan note identifying the means and methods used to perform the delineation, the date on which the wetland delineation took place, and the name of the wetland scientist responsible for the wetland delineation in accordance with Env-Wt 501.02(a)(2)k. and Env-Wt 501.02(b)(3).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan (Sheet 6 of 18). Wetlands and surface waters were delineated by Christine Perron (CWS No. 294), of McFarland-Johnson, Inc. on April 2, 2019, in accordance with the Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region, Version 2.0, January 2012, US Army Corps of Engineers.*

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- d. The stamp of the certified wetland scientist responsible for the delineation of the resources as required for all major projects in accordance with Env-Wt 301.01(g).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan (Sheet 6 of 18), including the stamp of Christine Perron (CWS No. 294) of McFarland-Johnson, Inc.*

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- e. The location and footprint of all existing structures on the property in accordance with Env-Wt 501.02(c).

**RESPONSE:**

*Please refer to 3.a., 3.b., 3.c., and 3.d. below for how the requirements of Env-Wt 501.02(c) have been addressed.*

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3. As this project affects the surface water shoreline of the Piscataqua River, please revise the plans to include the following in accordance with Env-Wt 501.02(c):

- a. The general shape of the shoreline of the full project parcel including the full length of frontage and the highest observable tidal line for tidal waters in accordance with Env-Wt 501.02(c)(1).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan (Sheet 6 of 18) that includes the shoreline and HOTL along the full project parcel (tax map 119, lot 5).*

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- b. The footprint of all existing and proposed structures on the property in accordance with Env-Wt 501.02(c)(2).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan (Sheet 6 of 18) and project overview plan sheet (Sheet 7 of 18) depicting the footprints of existing and proposed structures on the property (tax map 119, lot5).*

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- c. The intended use of each proposed structure in accordance with Env-Wt 501.02(c)(3).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated project overview plan sheet including the intended uses.*

**Northern and Southern Wharf Extension**

*Intended Use: Provide additional berthing length along the main wharf to mitigate the lost functionality of the barge wharf resulting from the Sarah Mildred Long Bridge realignment.*

**Dredging/Blasting**

*Water depths along the northern end of the main wharf are too shallow for some vessels with deeper drafts. The proposed dredging to a depth of -36 foot MLLW would increase the water depth and allow vessels to use the entire length of the wharf.*

**Fender System**

*The proposed fender system will replace the existing deficient fender system that does not currently accommodate barges through all tidal ranges. The new fender system will allow for safe docking during all tidal ranges, increasing the safety and efficiency of the wharf.*

**Floating Dock Relocation**

*The relocation of the floating dock to the northern side of the wharf will provide additional docking for smaller vessels and will allow the entire length of the main wharf to remain open for larger vessels.*

**Shoreside Alterations**

*The shoreside alterations are limited to soil and rock removal, regrading, paving, and drainage improvements. The proposed alterations will increase the operational efficiency and safety of the wharf.*

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- d. The distance from existing and proposed work to abutting property lines in accordance with Env-Wt 501.02(c)(4).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan and project overview plan sheet depicting the distances from existing and proposed work to the abutting property lines.*

*The southern wharf extension and shoreside improvements are located approximately 960 feet north northwest of parcel 119-6.*

*The proposed shoreside improvements at the northern end of the wharf are located approximately 14.5 feet east of parcel 121-1 at the closest point.*

*The proposed dredging limits are located approximately six feet from the Federal navigation Channel at the closest point.*

- 
4. Please revise the plans to include the following in accordance with Env-Wt 501.02(a):
- a. An overview of the full property and proposed impact areas in relation to the property lines in accordance with Env-Wt 501.02(a)(2)(e).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan and project overview plan sheet (Sheets 6 and 7) depicting the full property, proposed impact areas in relation to the property lines, and approximate distances to abutting properties.*

- 
- b. The existing and proposed topography, including a reference elevation as the project is proposing to permanently later the topography of the site in accordance with Env-Wt 501.02(a)(2)(n).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan and project overview plan sheet (Sheets 6 and 7) that includes the existing topography and proposed grading.*

- 
- c. Lightly shaded or stippled areas indicating the limits of all temporary and permanent impacts in jurisdiction labeled with the square footage of impact, including wetlands, surface water and their banks, and areas within 100 feet from the highest observable tide in accordance with Env-Wt 501.02(a)(2)(o). Additionally, please revise the plans to identify the location and square footage of impact beyond the 100-foot tidal buffer zone and within the protected shoreland to be permitted under separate cover in accordance with RSA 483-B in accordance with Env-Wt 501.02(d)(4).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for updated impact areas. Permanent impacts have been shaded. No temporary impacts outside of permanent impact areas are anticipated. Impacts located beyond the 100-foot TBZ and within the protected shoreland have been added to the impact plans as stippled areas.*

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- d. The location of the 100-year floodplain as required in accordance with Env-Wt 501.02(a)(2)(m).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan that includes the location of the 100-year floodplain. Impacts to the floodplain and base flood elevation associated with the proposed piles, riprap, and seawall will be offset by the proposed dredging. Therefore, the proposed project is not anticipated to result in an increase in the base flood elevation within the floodplain of the Piscataqua River, or otherwise result in increased risks to human life or property.*

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- e. The proposed methods of erosion, siltation, and turbidity controls indicated graphically and labeled, or annotated as necessary in accordance with Env-Wt 501.02(a)(2)(q).

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the proposed methods and locations of erosion, siltation, and turbidity controls.*

*Sedimentation and erosion controls for the proposed shoreside alterations include but are not limited to silt filter socks, inlet filters, and temporary sediment traps. These BMPs will be installed and maintained during construction to minimize and avoid impacts to the water quality of the Piscataqua River.*

*No in-water controls area proposed due to the water velocities of the Piscataqua River in the vicinity of the proposed project. In order to minimize sedimentation and turbidity releases, the proposed in-water work will be completed sequentially. A Turbidity Control and Monitoring Plan has been prepared and is enclosed with this response.*

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- f. As this project involves construction of a steel sheet pile retaining wall in tidal waters, the information required by Env-Wt 404 as required in accordance with Env-Wt 501.02(a)(2)(s).

**RESPONSE:**

*Env-Wt 404 CRITERIA FOR SHORELINE STABILIZATION*

Env-Wt 404.01 Least Intrusive Method.

*The proposed section of sheet pile seawall along the south and north wharf extensions are no longer proposed. Instead, a grade beam will be installed at these location and additional riprap will be placed along this section of the shoreline. In order to minimize impacts, the proposed riprap will be placed ovetop and within the footprint of existing riprap and largely within the footprint of the proposed wharf extension.*

*The footprints of proposed riprap have been minimized to reduce impacts to the adjacent river. The additional riprap is required to help stabilize the shoreline and protect the proposed infrastructure.*

Env-Wt 404.02 Diversion of Water.

*Shoreside work will include grading that directs stormwater to catch basins. The proposed stormwater system is designed to match the existing stormwater treatment devices located on the site. The northern area is graded to direct stormwater to two new catch basins with double inlet grates for collection. The catch basins drain to two new offline six-foot diameter hydrodynamic vortex separators to provide stormwater treatment before discharging through headwalls into the river. The existing drainage on the barge wharf and surrounding areas will remain.*

Env-Wt 404.03 Vegetative Stabilization.

*The proposed project is located within and directly adjacent to an active wharf that consists almost entirely of impervious paved surface areas. Vegetation is limited to herbaceous vegetation growing in waste areas and on slopes in the vicinity of the previous Sarah Mildred Long Bridge alignment. There are no saplings or shrubs located within the project area or the entire property boundary. The existing grass areas will be regraded, and paved to create a more suitable work area, increased functionality of the wharf, and to provide access to the northern wharf extension.*

*The location of the proposed project does not allow vegetation, sand beach/dunes, or vegetated dunes to be incorporated into the project. The project is located on a highly developed property with an active wharf used for industrial/commercial purposes.*

Env-Wt 404.04 Rip-rap.

*Riprap is proposed along the southern and northern wharf extensions within areas where riprap is currently installed. Refer to Sheet 14 of 18 of the revised plan set for additional information. The additional riprap would not expand upon the footprint of the existing riprap. Additional riprap material would be installed ovetop existing riprap. The shoreline at this location has been armored with riprap due to the velocities of the Piscataqua River, turbulence from vessels, restricted space, and presence of critical infrastructure.*

*At the northern and southern wharf extensions the proposed riprap will have a maximum depth of approximately five feet. The proposed riprap would be Class V or VII.*

*The sizes and particle size distribution are summarized in the Riprap Summary Table on Sheet 14 of 18.*

*Env-Wt 404.05 Walls.*

*Not Applicable – The proposed project no longer includes seawalls. The originally proposed walls have been redesigned and grade beams are no proposed along the north and south wharf extensions. Additional riprap will be installed in these areas as described above.*

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5. The plans indicate that the proposed project is located within 200 feet of a Federal Navigation Project. In accordance with Env-Wt 501.02(b)(2), please provide the distance between any structures associated with the proposed project and the Federal Navigation Project site.

**RESPONSE:**

*Please refer to the attached revised Impact Plans for the updated existing conditions plan that includes the location of the Federal Navigation Channel and the approximate distance between the proposed structures and work from the Federal Navigation Channel. The proposed dredging limits are located approximately six feet from the Federal Navigation Channel at the closest point.*

*The proposed southern wharf extension is located approximately 80 feet southwest of the Federal Navigation Channel. The proposed northern wharf extension is located approximately 170 feet west of the Federal Navigation Channel.*

*The navigation channel is an Army Corps Civil Works project. Coordination with the Army Corps is ongoing under the federal Section 408 program to verify that changes to the authorized Civil Works project will not be injurious to the public interest and will not impair the usefulness of the project.*

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6. Please submit a statement from the Pease Development Authority Division of Ports and Harbors (“DP&H”) chief harbormaster, or designee, relative to the proposed structures’ impact on navigation to demonstrate that the proposed docking structures and associated dredging will not endanger navigation, recreation, or commerce in accordance with Env-Wt 302.04(a)(8).

**RESPONSE:**

*See attached correspondence from the PDA DPH Chief Harbor Master. The PDA DPH is the applicant and project owner.*

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7. Please revise the construction sequence required in accordance with Env-Wt 501.02(a)(5) to include information regarding the installation and maintenance of all proposed erosion,



sedimentation, and turbidity controls to be installed prior to the initiation of each phase of the project and how they will be maintained and utilized throughout the duration of this project.

**RESPONSE:**

*Please refer to the attached revised Construction Sequence that provides additional information regarding the proposed erosion, sedimentation, and turbidity controls. A Turbidity Control and Monitoring Plan (attached) has been developed and will be implemented during construction to ensure that water quality impacts in the Piscataqua River are minimized.*

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8. In accordance with Env-Wt 402.21, regarding the modification of existing structures, the department shall not approve any change in size, location, or configuration of an existing structure unless the applicant demonstrates, and the department finds, that the modification is less environmentally-impacting or provides for fewer boat slips and less construction surface area over public submerged lands than the current configuration. Based on the plans provided, the proposed docking and wharf structures will be adding approximately 26,868 square feet of new construction surface area over public submerged lands for the North pier extension, South pier extension, and floating dock combined. Please provide documentation to support that the proposed modifications of the docking structures are less environmentally-impacting than the existing structure or revise the plans to reduce the surface area of the construction over public submerged lands in accordance with Env-Wt 402.21.

**RESPONSE:**

*A waiver for Env-Wt 402.21 has been prepared and is included with this submittal.*

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9. In accordance with the criteria for Piers, Docks, Wharves, and Floats in Env-Wt 606.03(c), superstructures shall not completely shield the underlying area from direct sunlight. Based on the plans and supplementary application materials provided, the proposed wharf extensions will not meet this design criteria. Please redesign the proposed wharf extensions to allow direct sunlight to pass through the structure in accordance with Env-Wt 606.03(c).

**RESPONSE:**

*A waiver for Env-Wt 606.03(c) has been prepared and is included with this submittal.*

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10. In accordance with the criteria for Piers, Docks, Wharves, and Floats in Env-Wt 606.03(a), projects shall be designed such that supporting cribs, piles, and caissons occupy no more than 5 percent of total volume under the structure at mean high water to allow most wave and current energy to pass through and prevent deepening of the area. Please indicate what percentage of the total volume under the structure will be occupied by cribs, piles, and caissons at mean high water in accordance with Env-Wt 606.03(a).

**RESPONSE:**

*At mean high water (MHW) the supporting piles will occupy approximately 0.8 percent of the total volume under the structure of the north wharf extension, and approximately 0.9 percent of the total volume under the south wharf extension. The proposed wharf extensions are under the five percent threshold and therefore meet the requirements of Env-Wt 606.03(a).*

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11. The application indicates that there is past evidence of eelgrass beds within the vicinity of the project. In order to meet the design requirements in Env-Wt 606.03(f), Env-Wt 606.06(c) and meet the requirements in Env-Wt 302.04(a)(7), please perform a survey for eelgrass beds in the vicinity of the project and submit any supplementary maps and other applicable documentation identifying the project location and extent of all proposed impacts in relation to all historic and existing eelgrass beds and if any are located within the vicinity of the project, please revise the plans to identify the location of those resources.

**RESPONSE:**

*Eelgrass beds have not been documented in the project area. The following is a summary of the historically mapped eelgrass bed data layers included on the NHDES WPPT:*

*2017 – No eelgrass mapped in the vicinity*

*2016 – No eelgrass mapped in the vicinity*

*2006 – Eelgrass bed located approximately 315' north and 1,100' northeast of the wharf.*

*1996 – Eelgrass bed located approximately 120' north and 1,050' northeast of the wharf.*

*1986 – No eelgrass mapped in the vicinity*

*At the request of NOAA, eelgrass surveys were conducted in July and August 2013, by MaineDOT dive crews for the Sarah Mildred Long Bridge Replacement Project. The study areas included in the survey included areas in the vicinity of previously documented eelgrass beds, including the area north of the existing bridge in the vicinity of the proposed floating dock, as well as the northern end of the wharf extending out beyond Pier 15. The results of the survey indicated sporadic eelgrass shoots, but not a dense enough population of plants to form a bed. The study areas from the 2013 surveys are depicted on Figures 1 and 2 below.*

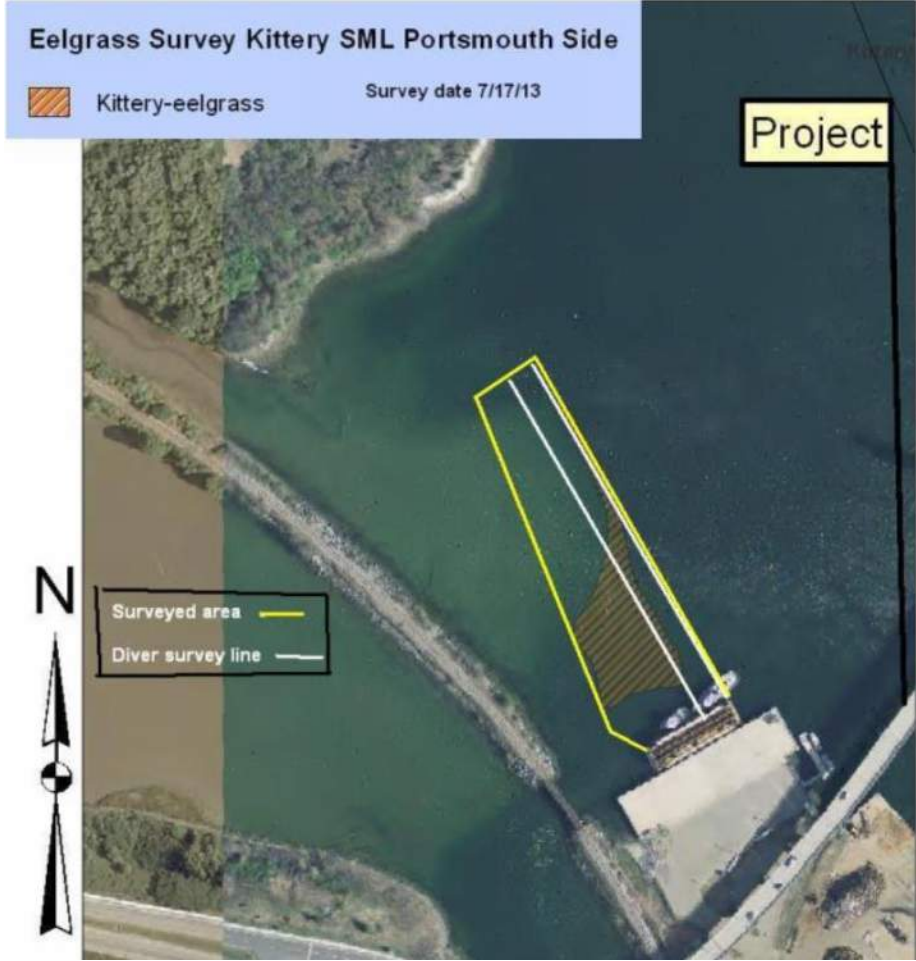


Figure 1: July 7, 2013, Eelgrass Survey Study Area 1

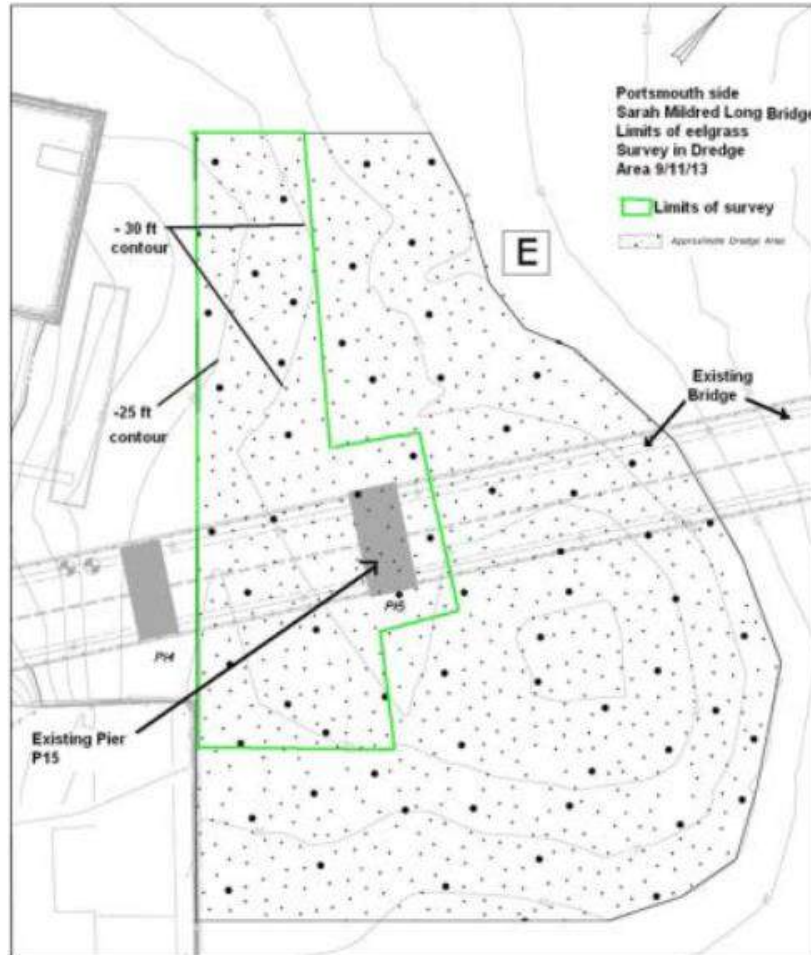


Figure 2: September 11, 2013, Eelgrass Survey Study Area 2

*Coordination regarding the proposed project has occurred with the appropriate resource agencies and eelgrass beds were not identified as a potential concern for the proposed project. The proposed project was submitted to the NH NHB and the DataCheck Results Letter did not identify any eelgrass concerns or documented beds in the vicinity. The project was also discussed at the April 2019 NHDOT Natural Resource Agency Meeting, and no eelgrass concerns were brought up. A field review with agency staff was conducted on April 2, 2019, and Mike Johnson (NOAA NMFS) confirmed that the proposed project is not located within historic eelgrass beds.*

*The proposed wharf extensions and floating dock are not anticipated to result in impacts to eelgrass beds. No further surveys are proposed.*

- 
12. Please submit revised plans that include construction details for the proposed floating dock that meets the design requirements in Env-Wt 606.03.

**RESPONSE:**

*Please refer to the attached revised Impact Plans (Sheet 18 of 18) for details of the proposed floating dock.*

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13. In accordance with Env-Wt 304.11(d), dredging shall not disturb contaminated layers of sediment, unless specifically identified and permitted with protective conditions. In order to meet the requirements of Env-Wt 304.11(d), please provide information about any identified or potential contamination sources within the proposed dredge area and include a dredge management plan that includes details regarding how all identified and potential contamination sources will be fully contained throughout the duration of the project. Please coordinate with the NHDES Waste Management Division, the NH Dredge Management Task Force, and the Water Quality Planning Section of the NHDES Watershed Management Bureau for guidance and provide a copy of all correspondence as a part of the response to this letter.

**RESPONSE:**

*Please refer to the attached Sampling and Analysis Plan for the proposed dredging that has been approved by the US Army Corps of Engineers. The harbor was given a moderate risk ranking due to historical and current industrial uses. However, the project area was given a low-moderate risk ranking due to site characteristics, location, and the available historical data, which all suggest a low potential for contamination because of the coarse nature of the sediments and the high energy environment of the project area.*

*Sediment sampling from three locations within the dredge area is anticipated to be completed in April 2023. Sediment and water samples from the dredge area will undergo physical, chemical, and biological analysis. The attached sampling plan outlines the procedures for the sampling and analysis in greater detail.*

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14. The pre-application meeting notes submitted with the application indicate that NHDES staff recommended that the applicant meet with the New Hampshire Dredge Management Task Force. Please indicate whether the applicant attended a pre-application meeting with the New Hampshire Dredge Management Task Force and submit a copy of any correspondence or recommendations provided as a part of the response to this letter.

**RESPONSE:**

*The Applicant, the PDA DPH, is a member of the New Hampshire Dredge Management Task Force, and the proposed project has been discussed during at least two of the Task Force's quarterly meetings in September 2018 and October 2019. The meeting minutes from those two meetings are included with this submission. The project will be reviewed at another task force meeting once the sediment sampling is complete.*

15. In accordance with Env-Wt 304.06(c) and Env-Wt 304.11(f), appropriate controls, such as cofferdams, siltation curtains, or non-porous curtains, shall be used to enclose a dredging project

and contain turbidity for all dredging projects. Please submit a dredge management plan identifying the containment methods proposed to prevent contaminants and turbidity from escaping the dredge site in accordance with Env-Wt 304.06(c), Env-Wt 304.11(f), and Env-Wt 304.11(d).

**RESPONSE:**

*The proposed project, including the proposed dredging, does not include cofferdams, siltation curtains, or other non-porous curtains due to the complications with the currents and high velocity of the Piscataqua River. It is not feasible to install these types of physical controls due to the existing conditions and water velocities. The substrate within the action area largely consists of gravel, coarse sand, cobbles, and ledge due to the high water velocities that can approach 3.5 knots per hour (6 feet per second) or more, which flushes the area of lighter, unconsolidated material. The heavier particles that are not moved downstream by the current are not likely to be re-suspended by the proposed socket drilling or seawall construction. Therefore, the increased turbidity in the river is expected to be minimal. In order to minimize impacts to fish species, dredging will occur between November 15 and March 15. Further, construction activities will be sequential, which will further minimize increases in turbidity. A Turbidity Control and Monitoring Plan (attached) has been developed and will be implemented during construction to further minimize potential water quality impacts. Blasting and dredging specifications will be included in contract documents and are enclosed.*

- 
16. In accordance with Env-Wt 304.11(a), dredge spoils shall be disposed of out of the areas under the jurisdiction of the department unless other disposition is specifically permitted. As of the date of this letter, the application indicates that the dredge spoils will be disposed of at the Arundel Disposal site in Maine. If this is the site that will be used for disposal, please provide copies of any permits, contracts, or other supporting documentation that contains detailed information regarding how the dredge spoils will be collected and transported, and where and how the dredge spoils will be disposed.

**RESPONSE:**

*The Cape Arundel Disposal Site was closed after the submittal of this Wetlands Permit Application. Through coordination with the US Army Corps of Engineers, the proposed disposal site is now the Isle of Shoals North Disposal Site. The Isle of Shoals North Disposal Site is located approximately 15 nautical miles east of Portsmouth, NH. The disposal site is located outside the jurisdiction of NHDES. Coordination with the US Army Corps of Engineers regarding dredging and the disposal of dredged material has been ongoing. A Sampling and Analysis Plan was developed through coordination with the Corps and sediment sampling within the dredging area is anticipated to be completed in April 2023, prior to the start of any dredging. A Section 103 permit for Ocean Disposal of Dredged Materials will be obtained from the US Army Corps of Engineers prior to any dredging activities.*

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17. Please revise the plans of the proposed dredge area to include cross section details showing the existing and proposed contours within the proposed dredge area at multiple locations through the proposed dredge area in accordance with Env-Wt 501.02(a)(2)(n).

**RESPONSE:**

*Please refer to Sheets 11 and 12 of the revised plan set for the proposed dredging area, cross section and profile. The Contractor will be required to complete a pre-dredge and post-dredge hydrographic survey.*

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18. All projects for shoreline structures must be constructed in a manner that meets the requirements of RSA 483-B as required in accordance with Env-Wt 401.01(c). Please submit the following to demonstrate compliance with the requirements in RSA 483-B:

- a. This project proposes to increase the total impervious area of this property within the protected shoreland from 97.5% to 100.0%. In accordance with RSA 483-B:9, V(g)(1), no more than 30% of the area of a lot located within the protected shoreland may be impervious, unless a stormwater management system designed and certified by a professional engineer is implemented. Please note that the system design must demonstrate that the post-development volume and peak flow rate based on the 10-year, 24-hour storm event, shall not exceed the pre-development condition. In addition, if the impervious surface area will exceed 30 percent and the tree, sapling, shrub, and groundcover in the waterfront buffer does not meet the point score requirement of RSA 483-B:9, V(a)(2)(D) in any segment, then in accordance with RSA 483-B:9, V(g)(3), the plans would also need to be revised to include the locations and species type of proposed native plantings within the waterfront buffer where restoration is required to meet compliance with RSA 483-B:9, V(a). Please note that the plantings should be in sufficient quantity, type and location either to meet the minimum score for each shoreline grid segment or provide at least an equivalent level of protection as offered by the minimum score. In order to meet this requirement, provide either the information identified above or revise the plans to remove existing impervious area elsewhere on the property in order to result in no net increase in total impervious surface on the property and revise all applicable application materials to reflect this change in order to demonstrate compliance with RSA 483-B:9, V(g)(1).

**RESPONSE:**

*The existing site is a commercial/industrial wharf that has been developed for the current use. A Shoreland Permit Application and Alteration of Terrain Permit Application will be submitted to NHDES. Due to the commercial development of the site and a lack of natural vegetation within the Waterfront Buffer or Natural Woodland Buffer, a waiver will be required for some of the requirements of RSA 483-B that cannot be met.*

*The site currently has a warehouse building, a security kiosk building, several small sheds, truck scales, asphalt pavement for open salt storage and isolated areas of gravel and sparsely vegetated spaces. The existing site has some degree of stormwater treatment for*

certain areas. The pavement adjacent to the main wharf has an existing closed drainage network that provides stormwater treatment through two hydrodynamic particle separators to remove sediment from the runoff before it is discharged through the outfalls. The northern barge wharf and paved area has an existing closed drainage system that does not include any treatment. Both systems discharge into the Piscataqua River, which is a tidal water body. Due to the limited grade change and the high groundwater table, similar methods of stormwater treatment were determined to be the only feasible methods for this site. As part of this project, two new hydrodynamic particle separators are proposed on the drainage outfalls near the northern barge wharf where the site improvements are proposed. A majority of the stormwater runoff from the site's paved surfaces will now be routed through hydrodynamic particle separators, therefore improving the water quality above the current conditions.

A comparison of pre- versus post-development stormwater flows is not provided because the project discharges directly to the Piscataqua River. In addition, infiltration to reduce runoff is not desirable at this site because of the presence of contaminated soils.

It is not feasible to remove existing impervious surface on the property due to the current commercial and industrial uses.

There are currently no saplings, shrubs or trees located on the property. Planting of saplings and shrubs on the site is also not feasible due to a lack of suitable growing conditions within the Waterfront Buffer and Natural Woodland Buffer. The only vegetation on the site consists of herbaceous weeds growing in waste areas.

The details of the waiver requests for some of the minimum standards in RSA 483-B will be addressed in the Shoreland Permit Application.

- 
- b. As this project involves impacts within the waterfront buffer, please revise the plans to include the following as required pursuant to Env-Wt 401.01(c), and Env-Wq 1406.10(f):
- i. A plan showing each segment of waterfront buffer that will be impacted by the project.

**RESPONSE:**

*Waterfront Buffer grid segments were not developed due to the existing site conditions and a lack of vegetation within the Waterfront Buffer. A waiver of RSA 483-B:9, V(a) will be requested from NHDES.*

- ii. The location and diameter of all existing trees and saplings, at least up to that which is sufficient to meet the point requirement specified in RSA 483-B:9, V(a)(2); and (3).



**RESPONSE:**

*N/A – there are no existing trees and saplings located on the property within the Waterfront Buffer. A waiver of RSA 483-B:9, V(a) is anticipated to be requested.*

- iii. A designation of the trees to be cut during the project, if any, including the diameter of all trees and saplings at 4-½ feet from the ground, and the names of the existing species, using either the scientific names or common names.

**RESPONSE:**

*N/A – The proposed project does not involve any tree cutting.*

- c. Please revise the plans to include the following information as required for all projects within the protected shoreland as defined by RSA 483-B as required in accordance with Env-Wt 501.02(d) and Env-Wq 1406.09:

- i. The reference line, the primary building line, the limits of the natural woodland buffer, and the protected shoreland as those terms are defined in RSA 483-B:4.

**RESPONSE:**

*Please refer to Sheet 9 of 18 for the reference line (HOTL), Waterfront Buffer, Natural Woodland Buffer, and Protected Shoreland lines.*

- ii. The dimensions and locations of all existing and proposed structures, impervious areas, disturbed areas, areas within the natural woodland buffer to remain in an unaltered state, and all other relevant features necessary to clearly define both existing conditions and the proposed project.

**RESPONSE:**

*Please refer to Sheet 9 of 18 for the dimensions and locations of proposed impacts within the Protected Shoreland. The existing lot has been entirely developed for commercial and industrial use. There is no remaining Natural Woodland Buffer located on the lot. A waiver will be requested with the Shoreland Permit Application.*

- iii. The total disturbed area within the protected shoreland including the dimensions, locations, and descriptions of all proposed temporary impacts associated with completion of the project.

**RESPONSE:**

*The total disturbed area within the protected shoreland (beyond the 100' Tidal Buffer Zone – previously permitted wetland impacts) is approximately 26,410 square feet. These impacts are associated with the proposed shoreside improvements, including soil and rock removal, grading, and paving.*

- iv. A delineation of all existing and proposed disturbed areas and all vegetated areas to be maintained in an unaltered state within the natural woodland buffer in accordance with RSA 483-B:9, V(b).

**RESPONSE:**

*N/A – No Natural Woodland Buffer currently exists on the lot due to existing development and commercial/industrial land uses. For this reason, a waiver of RSA 483-B:9, V(b) will be requested with the Shoreland Permit Application.*

19. As stated in the pre-application meeting held for this project on August 21, 2019, mitigation is required for this project in accordance with Env-Wt 302.03(b) and a complete mitigation proposal as specified in Env-Wt 501.06 must be provided with the application in accordance with Env-Wt 501.02(a)(7). However, the submitted compensatory mitigation proposal states that the proposed mitigation for this project is to supply an unspecified amount of funding to complete “Phase II” of the Cutts Cove restoration project (NHDES Wetland Permit #2016-01460) in Portsmouth. This proposal does not meet the completeness requirements in Env-Wt 501.07(b) as an explanation as to why permittee-responsible mitigation is not feasible, was not provided in accordance with Env-Wt 501.05, nor was a preliminary estimate of the in-lieu mitigation payment provided with the application as required in accordance with Env-Wt 501.06(e).

**RESPONSE:**

*The original mitigation proposal for the proposed Project and the associated impacts to the Piscataqua River included funding for the completion of the Cutts Cove Living Shoreline Restoration Project located approximately 500 feet southwest of the Project. However, concerns have been raised regarding the viability and success of the existing restoration project. Therefore, mitigation will instead be provided through the Aquatic Resource Mitigation (ARM) Fund via an in-lieu fee payment. Coordination with the US Army Corps of Engineers and NHDES regarding the final mitigation payment is ongoing, and will be finalized following the submittal of this RFMI response and permit application amendment Details on the mitigation payment will be provided to NHDES prior to permit issuance.*

20. In order to satisfy the mitigation requirements for this project, please contact NHDES Mitigation Coordinator, Lori Sommer, at lori.sommer@des.nh.gov or at (603) 271-4059, to confirm any in-lieu fee calculations and include a copy of all correspondence as a part of the response to this letter and provide a revised mitigation proposal that includes all information required in accordance with Env-Wt 501.06(e) and Env-Wt 803.05.

**RESPONSE:**

*Lori Sommer has retired since the issuance of this RFMI. As stated above, coordination with NHDES and the USACE is ongoing to determine the final in-lieu fee payment amount.*

21. The application mentions the construction of new stormwater management features including the installation of new stormwater outflow structures. Please revise the plans to identify the

location of these proposed outflow structures and revise the application materials to provide all information and documentation necessary to meet Env-Wt 403.02, including the following:

- a. Revise the plans to identify the locations of all known and historic eelgrass beds within the vicinity of the project and provide supplementary documentation to demonstrate that the proposed outflow structures will not cause scouring or endanger vegetation, finfish, crustacea, shellfish or wildlife in accordance with Env-Wt 403.02(a).

**RESPONSE:**

*The proposed 15" stormwater outfall is depicted on the revised plan set (Sheet 7 of 18) included with this response. No current or historic eelgrass beds are located in close proximity to the proposed outfall structure. The outfall is located within an area of existing riprap. The proposed outfall is not anticipated to cause scour or endangered existing vegetation, finfish, crustacea, shellfish or other wildlife.*

- 
- b. Submit a statement from the Pease Development Authority Division of Ports and Harbors ("DP&H") chief harbormaster, or designee, relative to the proposed structure's impact on navigation to demonstrate that the proposed outflow structures will not endanger navigation, recreation, or commerce in accordance with Env-Wt 403.02(b).

**RESPONSE:**

*See attached correspondence from the PDS DPH Chief Harbor Master.*

- 
22. The application mentions the construction of steel sheet pile retaining walls as a part of this project. Please submit all information required for bank stabilization projects involving retaining walls in accordance with Env-Wt 404.05(b) and revise the plans to include all cross sections and other plan requirements in accordance with Env-Wt 501.02(a)(2)(s).

**RESPONSE:**

*The steel sheet pile wall that was originally proposed at the south wharf extension has been replaced with a grade beam and additional riprap overtop and within the footprint of existing riprap. Additional plans and cross sections of the north extension are included on Sheets 10, 13, 14, 15, 16, and 17.*

- 
23. The comments from the NH Fish and Game Department (NHF&G) provided with the application reference a different NHB Datacheck Report ID (NHB18-1674) than the NHB Datacheck that was submitted with this application (NHB21-3815). Please obtain updated comments from NHF&G regarding the sensitive species identified in the updated NHB Datacheck Report (NHB21-3815) and provide a copy of all correspondence as part of your response to this letter in accordance with Rule Env-Wt 302.04(a)(7).

**RESPONSE:**

*An updated NHB DataCheck Results Letter (NHB23-0281) was requested from NHB and issued on February 7, 2023. Follow up coordination with NHFG regarding the updated NHB DataCheck Results Letter occurred on February 8, 2023. NHFG did not have any additional comments or concerns regarding the proposed project. The NHB DataCheck Results Letter (NHB23-0281) and correspondence with NHFG are included with this submittal.*

Sincerely,

Tracy R. Shattuck  
Chief Harbor Master

## **Abutter Notification Certified Mail Receipts**

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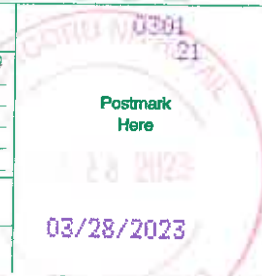
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<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00

Postage \$0.63

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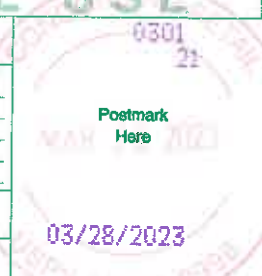
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Portsmouth, NH 03801

Certified Mail Fee	\$4.15
Extra Services & Fees (check box, add fee as appropriate)	\$5.35
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<input type="checkbox"/> Adult Signature Restricted Delivery	\$0.00

Postage \$0.63

Total Postage and Fees \$6.13



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27 Austin ST  
Portsmouth, NH 03801





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
## **Figure 2 – Tax Map (Revised)**

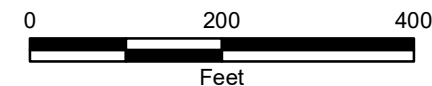
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**Portsmouth Wharf Functional Replacement Project Area**

-  Proposed Dredge Area
-  Proposed Wharf Extension
-  Proposed Shoreside Improvements
-  Proposed Floating Dock

-  Rockingham County Tax Parcels
-  Project/Applicant Property (119-5)
-  Project Abutters
-  New Hampshire Railroads



PEASE DEVELOPMENT AUTHORITY  
MAIN PIER FUNCTIONAL REPLACEMENT

**TAX MAP**

SCALE: 1 inch = 200 feet	DATE: APRIL 2023	FIGURE: 2
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 **McFarland Johnson**



## **PDA Harbor Master Response Letter**

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February 9, 2023

NH Department of Environmental Service  
Coastal Division  
Pease Field Office  
222 International Drive, Suite 175  
Portsmouth, NH 03801

Attn: Kristin Duclos

Re: NH State Pier expansion project

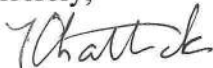
Dear Kristin,

We reviewed plans for the expansion of an existing pier on the Piscataqua River in Portsmouth on property belonging to

State of New Hampshire  
555 Market Street  
Portsmouth, NH  
Map 119 Lot 5

We examined the proposed site and found that the structure will have no negative effect on navigation in the channel.

Sincerely,



Tracy R. Shattuck  
Chief Harbor Master

Cc: Stephanie Desing  
Appledore Marine Engineering  
600 State Street  
Portsmouth, NH 03801

## **Construction Sequence (Revised)**

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**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**Construction Sequence**

The total duration of construction is anticipated to be approximately 18 months. The construction start date is not yet known, and final construction sequencing will be determined by the Contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Work along the shoreline will be completed during lower tides when possible.

- Provide blasting plan to the US Army Corps of Engineers, National Marine Fisheries Service, NH Fish & Game, NHDOT, and NHDES at least 21 days prior to anticipated start of blasting.
- Complete dredging and blasting between November 15 and March 15. The duration of dredging is anticipated to be approximately 3 months. The duration of blasting is anticipated to be approximately 2 to 4 weeks. All material from dredging and blasting will be loaded on a dredge scow and transported to the Isle of Shoals North Disposal Site located approximately 15 nautical miles east of Portsmouth, New Hampshire. Due to the water velocities in the Piscataqua River no sedimentation or turbidity controls are proposed during the blasting or dredging. A Turbidity Control and Monitoring Plan has been developed and will be followed during construction.
- Remove Pier 14 and bridge abutment to limits depicted on plans. Remove concrete debris from water. No sedimentation or turbidity controls are proposed during the bridge pier and abutment removal due to the water velocities in the Piscataqua River.
- Remove existing floating dock; cut existing guide piles 5 feet below the river bottom.
- Drill sockets for piles for wharf extensions and floating dock. No sedimentation or turbidity controls are proposed during the drilling and pile driving due to the water velocities in the Piscataqua River. This work will be sequential in nature. Metal debris has been identified in the sediment of the Piscataqua River in the vicinity of the proposed wharf extensions. Some of these obstructions may need to be removed as needed using an excavator mounted on the existing wharf and/or a barge in order to install the proposed piles. A Turbidity Control and Monitoring Plan has been developed and will be followed during construction.
- Install piles; fill with concrete.
- Install floating dock.
- Install additional riprap at south and north wharf extensions. Riprap will be placed with a clamshell bucket and not dumped into place. Riprap will be free of mud, debris, or other materials when it is installed.
- Install cast-in-place grade beam, pile caps, pre-cast deck planks, and cast-in-place deck topping.
- Remove existing fender system.
- Install new fender system.
- Install silt socks, inlet filters, and sediment traps for shoreside work. These sediment and erosion controls will be maintained throughout the duration of construction.

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**Construction Sequence**

- Construct temporary sedimentation traps.
- Complete shoreside construction (drainage, grading, paving). All work will be carried out according to the Self-Implementing Plan and Materials Management Plan for the proper management of materials generated from each category of impacted soils.
- Remove all erosion and sediment control measures.

## **Sampling and Analysis Plan**

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**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

1. **Project Description:** The applicant is proposing to mechanically dredge approximately 26,300 cubic yards (CY) of material from shoaled areas totaling 3 acres within the property's vessel berth, located in the town of Portsmouth, NH (Figure 1). This area will be dredged to the proposed depth of -36 feet at mean lower low water (MLLW) plus one foot of allowable overdepth (Figure 2). The applicant proposes to dispose of this material at the Isles of Shoals North Disposal Site (IOSN).

This sampling and analysis plan (SAP) has been developed by the New England District (NAE) U.S. Army Corps of Engineers (USACE) to gather information to support a dredged material suitability determination for the open water disposal alternative associated with this project. The first phase of sampling will include sampling and testing of dredge site sediment for grain size in order to confirm exclusionary criteria. If necessary, a second phase of testing will be completed for bulk chemistry in order to identify contaminants of concern and create a biological testing compositing plan. A secondary sampling plan describing sampling of dredge site sediment and water for elutriate and biological testing will be provided if necessary. The results of testing will be evaluated against the most recent NAE dataset for the IOSN reference area. All sampling and analysis activities described in this plan shall follow the requirements set forth in the "*Regional Implementation Manual for the Evaluation of Dredged Material Proposed for Disposal in New England Waters*" (RIM) dated May 6, 2004. A copy of the RIM may be downloaded from the NAE website: <http://www.nae.usace.army.mil/Missions/Regulatory/DredgedMaterialProgram/RegionalImplementationManual.aspx>

2. **Conceptual Site Model:** NAE reviewed historic testing data, water quality data, spill records, and adjacent land use information to develop a conceptual site model (CSM) for the proposed project. The CSM was used to characterize the system and identify potential sources of contamination, site-specific contaminants of concern, exposure pathways, and biological receptors in order to inform this sampling and analysis plan.

Project Setting: The property is associated with the Pease Development Authority Market Street Marine Terminal on the Piscataqua River. The Market Street Terminal is the state's only deep water, public access, general cargo marine terminal. It has 8 acres of paved surface and a 50,000 square foot warehouse. The project site historically started as a railyard for the Boston and Maine Railroad. In the late 1800's, a wood preservative plant was built that used mercuric chloride for the kyanizing process. Starting in this time frame and

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

continuing to the 1930's and 1940's, an oil company was resident there and established operations along with a scrap metal export company, a road salt storage facility and transfer station for commercial dry cargo. The facility was converted to a marine terminal in 1961. The current configuration was constructed in 1963 and 1977.

The terminal is adjacent to the southwestern side of the Sarah Mildred Long Bridge which carries the US Route 1 Bypass over the Piscataqua River and is located by the tidal outlet for Inner Cutts Cove and North Mill Pond which drains the inner parts of Portsmouth Harbor. The port is less than a mile downriver from Interstate 95, two miles from Pease International Tradeport's airport and business parks, and four miles from the open ocean. Onsite rail access via the Pan Am Railway is also available at the port. Across the river from the Marine Terminal is the Portsmouth Navy Yard. In addition, the Pease Airforce Base is located approximately 2 miles inland of the project site. The Piscataqua Federal Navigation Project (FNP) -35 foot MLLW channel is located adjacent to the project area, to the north.

Water Quality: Water quality in the project area is dictated by tidal exchange with the Gulf of Maine and with freshwater input from the Piscataqua River and its tributaries to the north, North Mill Pond, and overland runoff (Figure 1). In addition, the Peirce Island Wastewater Treatment Facility discharges approximately 1.5 million gallons of effluent into the Piscataqua River each day from a point approximately 1.3 miles southeast of the project area (<https://www.cityofportsmouth.com/publicworks/wastewater/peirce-island-wastewater-facility>). The State of New Hampshire classifies the waters of the lower Piscataqua River as Category 5-P (NHDES, 2020 [https://www4.des.state.nh.us/onestoppub/SWQA/010600031001\\_2020.pdf](https://www4.des.state.nh.us/onestoppub/SWQA/010600031001_2020.pdf)). Category 5-P waters are impaired or threatened for one or more designated uses by a pollutant(s), and requires a total maximum daily load (TMDL).

Dredge History and Existing Testing Data: There is no known dredging that has occurred at the site since its construction in 1963 and 1977. Sampling and testing of the surface material for grain size analysis in 2018 documented sediments as predominately gravel with sand. Historic geotechnical borings within the dredge footprint from 1975, 2013, and 2018 document the entire interval of material to be dredged as predominantly coarse sand and/or gravel.

Spill Data: Based on information provided by the applicant and a review of the New Hampshire Department of Environmental Services (NHDES) One Stop Document Online Search Portal (<https://www4.des.state.nh.us/DESONestop/BasicSearch.aspx>), NAE determined that there have been several spill incidents over the years since the project was last permitted to be dredged. In the last ten years there have been



**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

several small gasoline, diesel, and oil spills in the general area as well as a release of 50,000 gallons of sewage from the Peirce Island Wastewater Treatment Facility. The former Pease International Air Force Base Superfund site is located approximately 2 miles north and inland of the project area. The Superfund site has documented the presence of metals, volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), and pesticides throughout the property in the soil and groundwater. Remedy optimization, operation and maintenance, and long-term monitoring work are ongoing until all cleanup goals have been met at the site.

The adjacent Barge Wharf was used for marine fabrication projects. Soil testing was conducted in 2005 and 2010 at the Barge Wharf site and the 2012 report documented the presence of metals (arsenic, lead, mercury, zinc), PAHs, and polychlorinated biphenyls (PCBs) on land.

Risk Ranking: Following the tier one review of the site, the harbor was given a **moderate** risk ranking according to the following matrix due to historical and current industrial uses. However, the project area was given a **low-moderate** risk ranking due to site characteristics, location, and the available historical data which all suggest a low potential for contamination because of the coarse nature of the sediments and the high energy environment of the project area.

**Table 1: Project Risk Ranking**

<b>Rank</b>	<b>Guidelines</b>
Low	Few or no sources of contamination. Data available to verify no significant potential for adverse biological effects.
Low-Moderate	Few or no sources of contamination but existing data is insufficient to confirm ranking.
Moderate	Contamination sources exist within the vicinity of the project with the potential to produce chemical concentrations that may cause adverse biological effects.
High	Known sources of contamination within the project area and historical data exists that has previously failed biological testing.

3. **Sample Collection:** In the first phase of testing the applicant shall collect sediment cores from four locations within the proposed dredge area as specified in Table 2 (also see Figure 3). These locations were selected based on information from the CSM described above, the low to moderate risk ranking for the project, and shoaled areas identified in the project conditions survey submitted by the applicant. All core samples shall be collected to the proposed dredge depth plus overdredge amount using inert core liners. Estimated core lengths based on the bathymetry provided by the applicant are provided in Table 2, but the actual required core lengths shall be determined at the time of the sampling effort using measured water depths at each location corrected to MLLW. In order to ensure

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

that the core samples adequately represent the dredge interval at each location, all cores to be used for this project shall have a recovered length that is within 75% of the core penetration depth. In addition, any cores that display significant disturbance such as compaction or wash out shall be disregarded. If the cores from any location do not meet the acceptability criteria after six attempts, then the applicant should retain the best core from that location and contact NAE for further guidance. The penetration and recovery for the core used for the grain size sample should be recorded on the sample log.

Upon collection, all cores shall be measured and maintained in an upright position for a minimum of 15 minutes to allow any fine-grained material to settle. After a core has settled, it shall be re-measured before any overlying water is drained, taking care to not include overlying water with sediment flocculant in the measurement. All cores shall be split lengthwise, photographed with a stadia rod for scale, and described in accordance with ASTM D 2488 (Standard Practice for Description and Identification of Soils). Samples shall be collected from the dredge interval (dredge depth + overdepth) within each core for grain size as described in the sections below. It is recommended that bulk chemistry samples be collected and archived for possible future analysis in case the results of the grain size analysis show that the project is not exclusionary. If the dredge interval within a core is homogenous then the entire length may be composited as a single sample with the grain size/archive chemistry sample interval noted on the sampling log. If any core shows significant stratification or obvious signs of contamination, then subsamples shall be collected from each layer and noted on the sampling log and the applicant shall consult NAE for guidance prior to the start of analysis. The term “significant stratification” includes any distinct change in sediment composition that could represent a change in depositional history or waterway usage such as a change in color or lithology. Compositing of dissimilar sediment layers without prior approval from NAE will result in the rejection of any resulting data products.

All sediments held for testing shall be stored in accordance with the requirements in Table 3 (from Table 8-2 in *Evaluation of Dredged Material Proposed for Ocean Disposal, Testing Manual, 1991*). Sample chain of custody forms shall be maintained by the applicant and submitted to NAE with the data package described in section 5 of this SAP.

Based on the results of the grain size sediment testing, NAE will decide whether the project meets exclusionary criteria. If it does not, then bulk chemistry analysis will be required. Based on the results of that bulk chemistry analysis, NAE will provide the applicant with a biological testing sampling plan.

Vessel positioning shall be achieved using a Global Positioning System (GPS) that has been calibrated on site using a known reference point. The required

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

horizontal accuracy at each sample location shall be 10 feet or less. All coordinate data shall be reported in geographic NAD 83 decimal degree format. All depth data shall be reported in tenths of feet. Water depths at each location are to be determined with an accuracy of  $\pm 0.1$  feet (relative to MLLW). All depth data shall be reported in tenths of feet.

Sample data including date, time, latitude, longitude, GPS accuracy at each sample station, measured water depth, tidal correction, core penetration, recovery, and grain size/archive chemistry sample intervals(s) shall be recorded in a sampling log (Figure 4 or equivalent) and provided to NAE with the applicant's core descriptions and photographs.

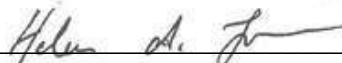
4. **Sample Analysis:** Sediment and water samples from the dredge area shall undergo physical, chemical, and biological analysis as described in the sections below. All laboratories used for this project shall have an approved Laboratory Quality Assurance Plan (LQAP) on file with NAE. Any data produced by a lab without an approved LQAP will not be accepted. The RIM, a list of laboratories with approved LQAPs, and the reporting format and requirements for electronic submission of data are available for download through the NAE website: <http://www.nae.usace.army.mil/Missions/Regulatory/Dredged-Material-Program/>.

Grain Size and Bulk Sediment Chemistry: All samples from the proposed dredge footprint shall be individually analyzed for grain size. If necessary, based on the results of grain size analysis, samples will also need to be analyzed for bulk sediment chemistry. Testing parameters, analytical methods, and reporting limits to be used are outlined in Table 4. The listed analytical methods are recommended but can be replaced by other methods that will provide the required reporting limits. Additional guidance on the physical and chemical analysis of sediments can be found in chapter 5 of the RIM. If necessary, NAE will provide the applicant with a sampling plan for biological testing based on sample proximity, physical characteristics recorded during the core description process, and the results of grain size and bulk chemistry analysis.

5. **Reporting requirements:** All sediment testing data is required to be submitted electronically in the electronic data deliverable (EDD) format available on the NAE website (<http://www.nae.usace.army.mil/Missions/Disposal-Area-Monitoring-System-DAMOS/Electronic-Data-Deliverables.aspx>). Hard copy data submission is also required but may be substituted with a printer friendly, easy-to-read format (e.g., PDF, MS Word). Any analytes not detected shall be reported as half the method detection limit (MDL) and qualified with a "U". RIM quality control summary tables are required to be submitted with each project dataset. These tables are found in Appendix II of the RIM.

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

6. **Contact Information:** Questions about this plan should be directed to Helen Jones (phone: 978-318-8241 e-mail: [Helen.A.Jones@usace.army.mil](mailto:Helen.A.Jones@usace.army.mil))



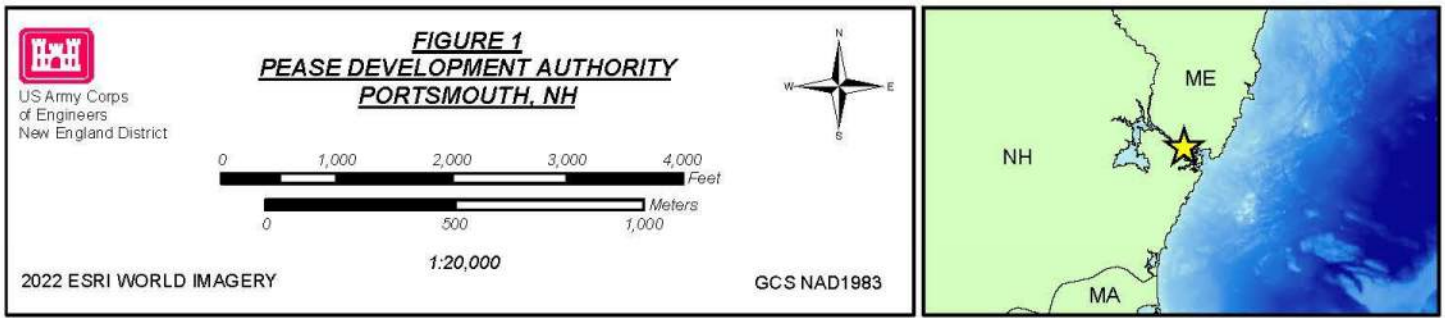
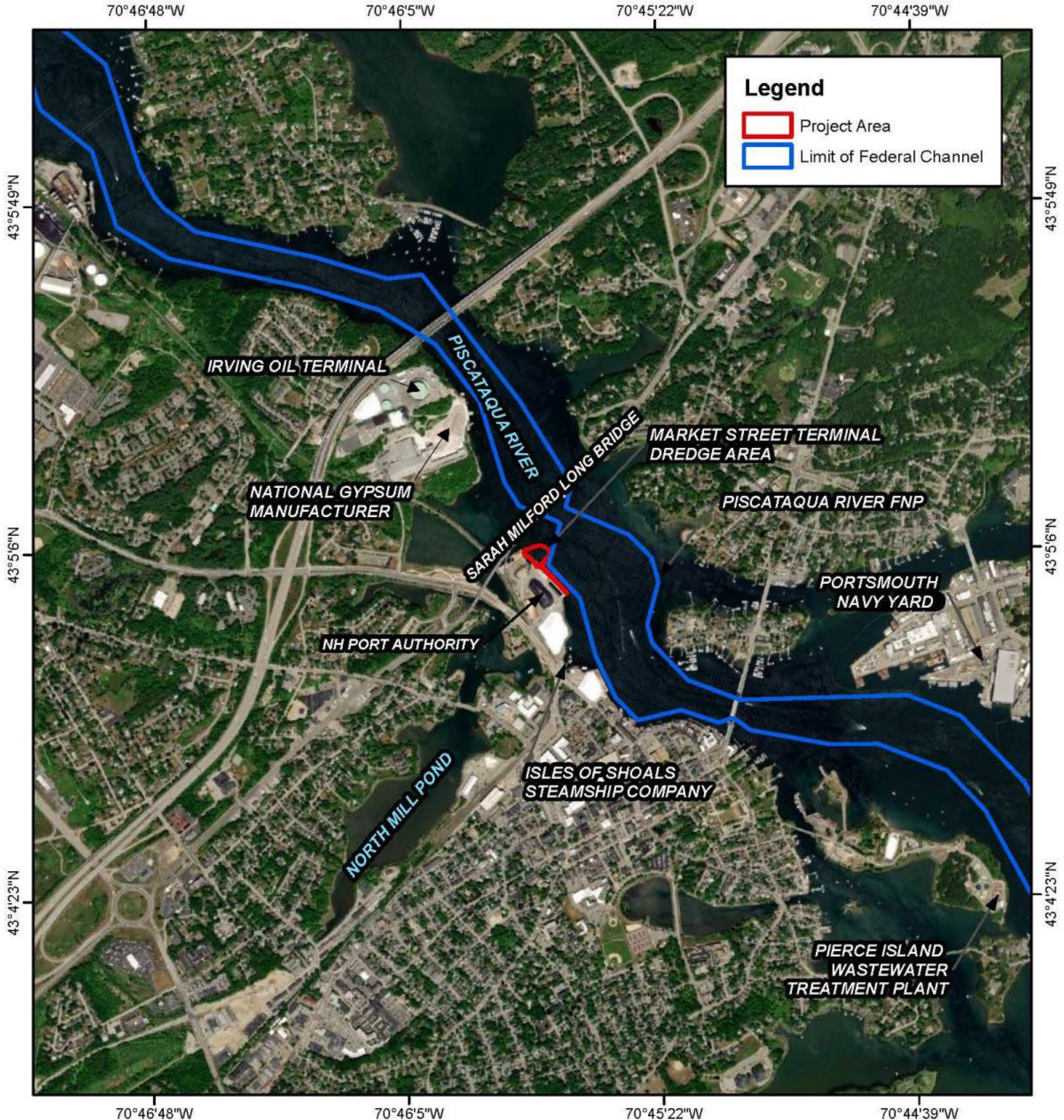
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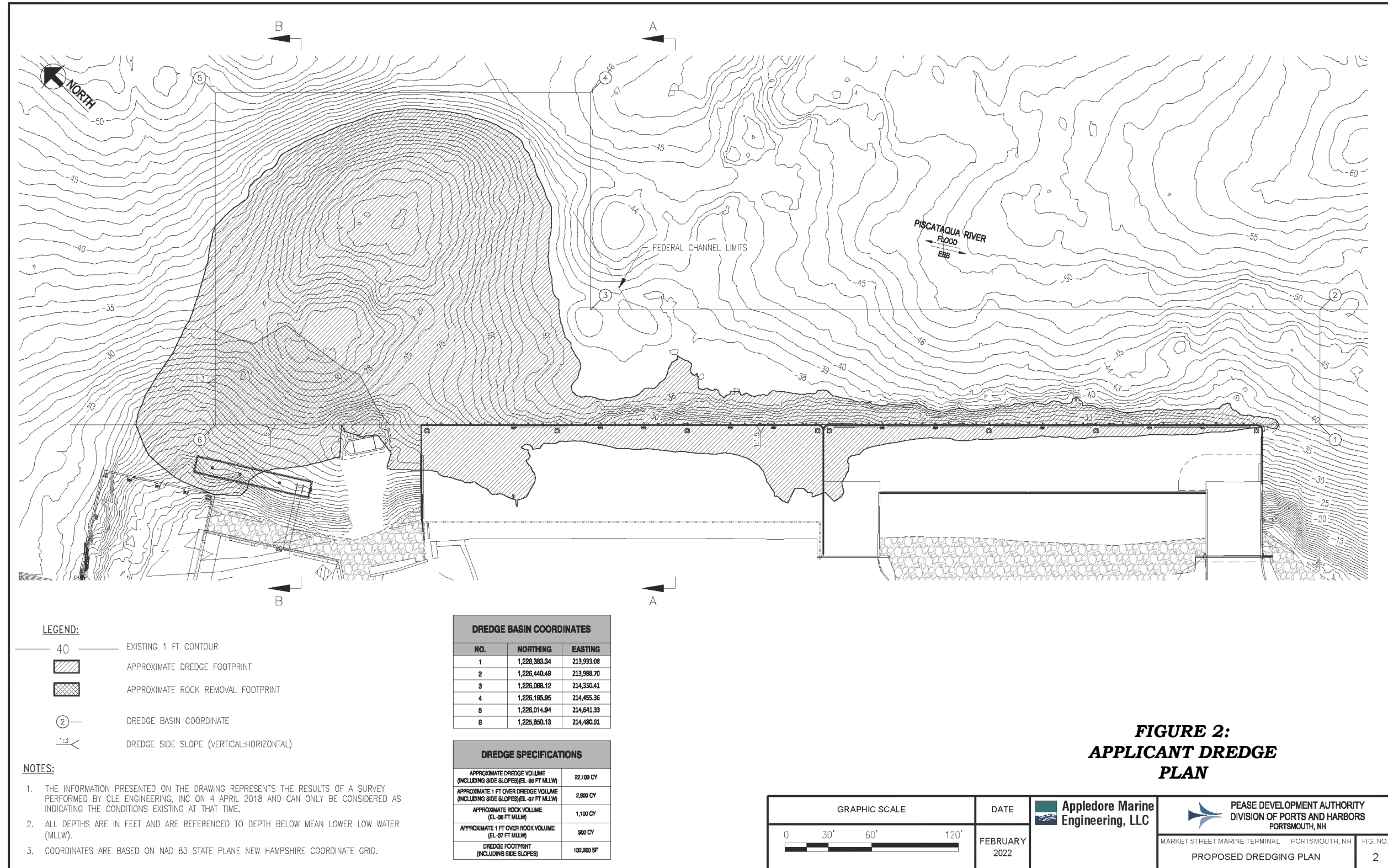
Helen A. Jones  
Technical Specialist  
Dredged Material Management Team  
New England District  
U.S. Army Corps of Engineers

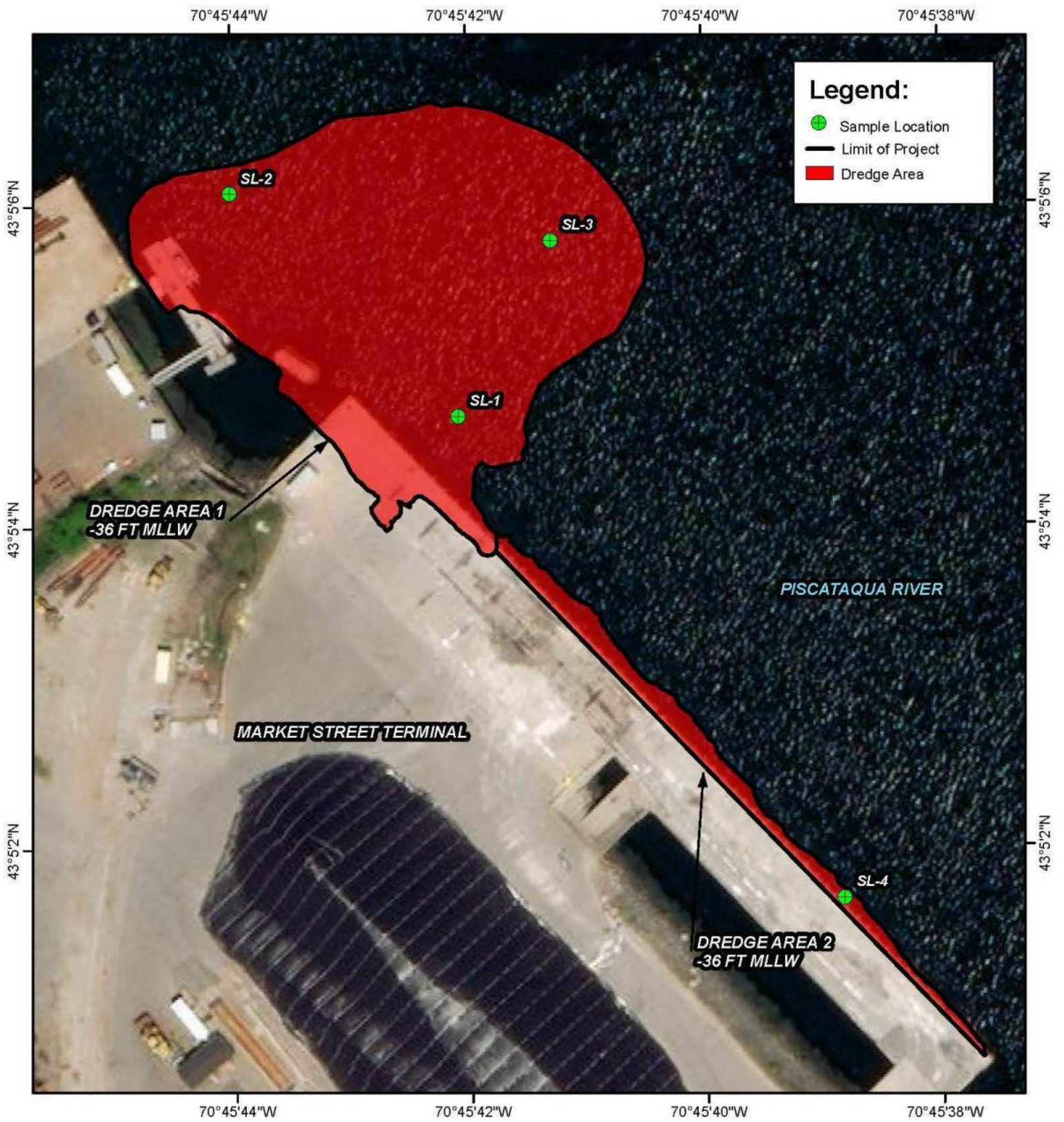
**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619


**Table 2: Market Street Marine Terminal Sample Locations**

<b>Station</b>	<b>Latitude (NAD 83)</b>	<b>Longitude (NAD 83)</b>	<b>Survey Depth (Feet MLLW)</b>	<b>Project Depth (Feet MLLW)</b>	<b>Overdepth (Feet)</b>	<b>Estimated Core length (Feet)</b>
SL-1	-70.761688	43.084633	-30.1	-36.0	1.0	6.9
SL-2	-70.762224	43.085020	-23.3	-36.0	1.0	13.7
SL-3	-70.761469	43.084937	-20.8	-36.0	1.0	16.2
SL-4	-70.760787	43.083798	-33.1	-36.0	1.0	3.9



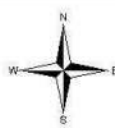







US Army Corps of Engineers  
New England District

**FIGURE 3**  
**PEASE DEVELOPMENT AUTHORITY**  
**2022 SAMPLE LOCATIONS**





0 200

Feet

0 30 60

Meters

2022 ESRI WORLD IMAGERY

1:1,000

GCS NAD1983



**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

**TABLE 3: RECOMMENDED PROCEDURES FOR SAMPLE COLLECTION, PRESERVATION, AND STORAGE**

<u>Analyses</u>	<u>Collection Method</u>	<u>Sample Volume</u>	<u>Container</u>	<u>Preservation Technique</u>	<u>Storage Conditions</u>	<u>Holding Time<sup>d</sup></u>
<b>Sediment</b>						
<b>Chemical/Physical Analyses</b>						
Metals	Grab/corer	200 mL	Precleaned polyethylene jar <sup>e</sup>	Refrigerate. Dry ice <sup>b</sup> or freezer storage is recommended for extended holding times.	≤ 4° C <sup>c</sup>	Hg - 30 days Others - 6 Months <sup>d</sup>
Organic Compounds	Grab/corer	475 mL	Solvent-rinsed glass jar with Teflon lid <sup>e</sup>	Refrigerate. Dry ice <sup>b</sup> or freezer storage is recommended for extended holding times.	≤ 4° C/dark <sup>d</sup>	14 days <sup>d</sup>
Particle Size	Grab/corer	75 mL	Whirl-pac bag <sup>c</sup>	Refrigerate	≤ 4° C <sup>c</sup>	Undetermined
Total Organic Carbon	Grab/corer	3 L	Heat treated glass vial with Teflon lined lid <sup>e</sup>	Refrigerate. Dry ice <sup>c</sup> or freezer storage is recommended for extended holding times.	≤ 4° C <sup>c</sup>	14 days

<sup>a</sup> This table contains only a summary of collection, preservation, and storage procedures for samples. The cited references should be consulted for a more detailed description of these procedures.

<sup>b</sup> These holding times are for sediment, water, and tissue based on guidance that is sometimes administrative rather than technical in nature. There are no promulgated, scientifically based holding time criteria for sediments, tissues, or elutriates. References should be consulted if holding times for sample extracts are desired. Holding times are from the time of sample collection.

<sup>c</sup> NOAA (1989).

<sup>d</sup> Tetra Tech (1986a)

<sup>e</sup> Sample may be held for up to one year if maintained ≤ -20° C

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

**TABLE 4: BULK SEDIMENT TESTING PARAMETERS**

<u>Parameter</u>	<u>Analytical Method</u>	<u>Reporting Limit (ppm)</u>
<b>Metals</b>		
Arsenic	6010B, 6020, 7060, 7061	0.4
Cadmium	6010B, 6020, 7130, 7131	0.07
Chromium	6010B, 6020, 7190, 7191	0.5
Copper	6010B, 6020, 7210	0.5
Lead	6010B, 6020, 7420, 7421	0.5
Mercury	7471	0.02
Nickel	6010B, 6020, 7520	0.5
Zinc	6010B, 6020, 7950	1.0
<b>PCBs (total by NOAA summation of congeners)</b>		
See next page	8082A	0.001
<b>Pesticides</b>		
Aldrin	NOAA (1993), 8081B	0.001
cis- & trans-Chlordane	Heptachlor epoxide	
4,4'-DDT, DDD, DDE	Hexachlorobenzene	
Dieldrin	Lindane	
$\alpha$ & $\beta$ Endosulfan	Methoxychlor	
Endrin	cis- & trans-Nonachlor	
Heptachlor	Oxychlordane	
	Toxaphene	0.025
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>		
Acenaphthene	8270C-SIM	0.01
Acenaphthylene	Chrysene	
Anthracene	Dibenzo(a,h)anthracene	
Benzo(a)anthracene	Fluoranthene	
Benzo(a)pyrene	Fluorene	
Benzo(b)fluoranthene	Indeno(1, 2, 3-cd)pyrene	
Benzo(k)fluoranthene	Naphthalene	
Benzo(g, h, i)perylene	Phenanthrene	
	Pyrene	
Total Organic Carbon	Plumb (1981), APHA (1995)	0.1%
Percent Moisture	Plumb (1981), EPA (1992), PSEP (1986)	1.0%
Grain Size	Wet Sieve (#4, 10, 40, 200)	

**FINAL** Sampling and Analysis Plan for Pease Development Authority Market Street Marine Terminal, Portsmouth, New Hampshire, File Number NAE-2018-1619

**TABLE 4: BULK SEDIMENT TESTING PARAMETERS (CONTINUED)**

PCB CONGENERS

Analytical Method: NOAA (1993), 8082A

Reporting Limit: 1 ppb

Congeners:

8*	2,4' diCB
18*	2,2',5 triCB
28*	2,4,4' triCB
44*	2,2',3,5' tetraCB
49	2,2',4',5 tetraCB
52*	2,2',5,5' tetraCB
66*	2,3',4,4' tetraCB
87	2,2',3,4,5' pentaCB
101*	2,2',4,5,5' pentaCB
105*	2,3,3',4,4' pentaCB
118*	2,3',4,4',5 pentaCB
128*	2,3,3',4,4' hexaCB
138*	2,2',3,4,4',5' hexaCB
153*	2,2',4,4',5,5' hexaCB
170*	2,2',3,3',4,4',5 heptaCB
180*	2,2',3,4,4',5,5' heptaCB
183	2,2',3,4,4',5',6 heptaCB
184	2,2',3,4,4',6,6' heptaCB
187*	2,2',3,4',5,5',6 heptaCB
195*	2,2',3,3',4,4',5,6 octaCB
206*	2,2',3,3',4,4',5,5',6 nonaCB
209*	2,2',3,3',4,4',5,5',6,6' decaCB

\* denotes a congener to be used in estimating Total PCB. To calculate Total PCB, sum the concentrations of all eighteen congeners marked with a "\*" and multiply by 2.

The specified methods are recommendations only. Other acceptable methodologies capable of meeting the Reporting Limits can be used. Sample preparation methodologies (e.g. extraction and cleanup) and sample size may need to be modified to achieve the required Reporting Limits.

**FIGURE 4: EXAMPLE CORE LOG DATA SHEET**

PROJECT NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

PROJECT LOCATION: \_\_\_\_\_ SEA STATE: \_\_\_\_\_

VESSEL: \_\_\_\_\_ POSITIONING EQUIPMENT: \_\_\_\_\_

SAMPLING EQUIPMENT: \_\_\_\_\_

SAMPLING PERSONNEL: \_\_\_\_\_ LOGGED BY: \_\_\_\_\_

CORE ID: \_\_\_\_\_ TIME: \_\_\_\_\_

LATITUDE: \_\_\_\_\_ LONGITUDE: \_\_\_\_\_ POSITION ACCURACY: \_\_\_\_\_

MEASURED WATER DEPTH: \_\_\_\_\_ CORRECTED WATER DEPTH: \_\_\_\_\_

TARGET PENETRATION: \_\_\_\_\_ ACTUAL PENETRATION: \_\_\_\_\_ RECOVERY: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

SAMPLE INTERVAL(S): \_\_\_\_\_

CORE PHOTO:	CORE DESCRIPTION:
<p><i>Insert core photograph with scale</i></p>	<p><i>Insert field notes and ASTM description of core</i></p>

## **Draft Materials Management Plan**

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The Draft Materials Management Plan can be accessed via the link below:

<https://mjinc-my.sharepoint.com/:b:/p/shoffmann/EempMvywYRBMkU1dPMEBUokBO725DW9Z7X7spDVt0U3ouw?e=PHiPJh>

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## **Dredge Management Task Force Meeting Minutes**

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# **New Hampshire Dredge Management Task Force Meeting Minutes – September 12, 2018**

**The meeting was held on Wednesday, September 12, 2018 at 10:00 AM at the New Hampshire Department of Environmental Services, 222 International Drive, Suite 175, Pease Tradeport, Portsmouth, NH 03801.**

## **Attending members in alphabetical order:**

Jean Brochi, Environmental Protection Agency (EPA)  
Olga Guza-Pabst, EPA (via call-in)  
Mark Habel, Army Corps of Engineers (ACOE)  
Kerry Holmes, Senator Hassan  
Sarah Holmes, Senator Shaheen  
Michael Johnson, National Marine Fisheries Service (NMFS)  
Richard Kristoff, ACOE  
Eben Lewis, NH Department of Environmental Services (NHDES) Wetlands Bureau  
Geno Marconi, Pease Development Authority – Division of Ports and Harbors (PDA-DPH)  
Erika Mark, ACOE  
Ed O'Donnell, ACOE  
Cheri Patterson, New Hampshire Fish & Game Department (NHF&G)  
Tracy Shattuck, PDA-DPH  
Dr. Fred Short, University of New Hampshire (UNH)  
Coral Siligato, ACOE  
Matt Tessier, ACOE  
Dr. Larry Ward, UNH  
Chris Williams, Chair, NHDES Coastal Program

## **Guests:**

Leo Axtin, PDA-DPH  
Chris Barron, Normandeau Associates  
Don Blouin, Town of Rye  
Brendan Clifford, NHF&G  
Steve Couture, NHDES Coastal Program  
Elizabeth DeCelles, ACOE  
Mike Dionne, NHF&G  
Les Eastman, Eastman's Fishing Fleet  
Noah Elwood, Appledore Marine Engineering  
Jennifer Hale, Town of Hampton Department of Public Works (DPW)  
Chris Jacobs, Town of Hampton DPW  
Aboul Khan, Town of Seabrook Board of Selectmen  
Theresa Kyle, Town of Seabrook Board of Selectmen  
Deirdre Larkin, Town of Rye  
Dr. Tom Lippmann, UNH  
William Manzi, Manager, Town of Seabrook  
Duncan Mellor, Tighe and Bond  
Andy Nielsen, Senator Shaheen (via call-in)  
Melissa Paly, Conservation Law Foundation  
Alex Pelczar, Senator Collins



**Guests cont...**

Bonita Pothier, Senator King

Seth Prescott, NH Dept. of Natural & Cultural Resources, Division of Parks & Recreation

Mike Rabideau, Town of Seabrook Planning Board

Todd Randall, ACOE

Susan Reynolds, Town of Rye

Vanessa Swasey, Appledore Marine Engineering

Frederick Welch, Manager, Town of Hampton

Phil Winslow, Town of Rye Board of Selectmen

**Legislative Update:**

Sarah Holmes of Senator Shaheen's Office stated that the Army Corps of Engineers (ACOE) is scheduled to receive its full Federal Fiscal Year 2019 (FFY19) funding later this week. The Senator will work to have the Hampton-Seabrook Harbor maintenance dredging project included in the ACOE's work plan for 2019.

Alex Pelczar of Senator Collins Office stated that the Water Resources Development Act (WRDA) Bill was passed out of Senate committee yesterday and is likely to be voted on by the House of Representatives later this week.

Andy Nielsen of Senator Shaheen's Office stated that the Senator is hopeful that WRDA will be passed in the next couple of weeks and then signed into law.

Ed O'Donnell, ACOE, stated that the WRDA Bill includes language keeping the Cape Arundel Dredged Material Disposal Site open until 2021.

**Portsmouth Harbor/Piscataqua River Navigation Improvement Project:**

Ms. Mark, ACOE Project Manager, stated that the ACOE is waiting to see if the project will be funded in the FFY19 Workplan. The ACOE continues to work with the municipalities in Massachusetts to use the dredged material for beach nourishment. The ACOE is also investigating whether to include the Simplex Shoal maintenance dredging project as part of the Turning Basin Improvement Project.

Todd Randall, ACOE, stated that the ACOE recently completed work to incorporate comments provided by EPA on the Draft Environmental Assessment (EA) for Designation of the Isles of Shoals North (ISN) Disposal Site. The ACOE has sent the Draft EA back to EPA for review and intends to convene a meeting with resource agency staff this fall to review the findings of the EA and determine a path forward.

Mike Johnson, NMFS, inquired about the status of eelgrass in the vicinity of the proposed project. He stated that based on a 2017 aerial survey conducted by Dr. Short at UNH, it appears that eelgrass beds in the vicinity of the project have expanded and that surveys conducted by the ACOE may be outdated. Dr. Short confirmed that eelgrass beds in the vicinity of the proposed project have indeed expanded. Todd Randall stated that the ACOE's most recent eelgrass survey was conducted in the summer of 2016. Mr. Randall stated that the ACOE's assessment of proposed eelgrass impacts does not include data from Dr. Short's 2017 survey. Dr. Short agreed to provide the 2017 eelgrass survey data to the ACOE.

### **Rye Harbor Maintenance Dredging:**

Ed O'Donnell, ACOE, stated that the ACOE's most recent survey conducted in 2014 indicates that approximately 42,000 cubic yards of fine-grained material needs to be removed from the federal channels and anchorages and approximately 8,000 cubic yards needs to be removed from the state anchorage. To date the ACOE has spent nearly \$300,000 on surveys and sampling and testing of harbor sediments. The ACOE has completed a suitability determination and determined that the material is suitable for offshore disposal at the Cape Arundel Disposal Site. The ACOE is currently working on the Draft Environmental Assessment (EA) and hopes to complete it by the end of the year. After completion of the Draft EA the ACOE will proceed with coordination with state and federal resource agencies. Mr. O'Donnell reminded members that the ACOE currently does not have funding to conduct dredging. The ACOE estimates that dredging will cost \$1.5 to \$2 million.

Geno Marconi, Pease Development Authority Division of Ports and Harbors (PDA-DPH) stated that PDA-DPH intends to have the state anchorage dredged when the federal channels and anchorages are dredged. Mr. O'Donnell stated that if PDA-DPH intends to have the state anchorage dredged by the same contractor hired by the ACOE to dredge the federal channels and anchorages a Project Cooperation Agreement would be required between the ACOE and PDA-DPH.

Phil Winslow, Town of Rye, stated that there's been additional shoaling of the harbor since ACOE's 2014 survey and asked if the ACOE intends to re-survey the harbor. Mr. O'Donnell stated that the ACOE hopes to re-survey the harbor by the end of the year.

Susan Reynolds, Town of Rye, stated that the shoaling of the harbor is causing boats to run aground at low tide. The shoaling is also causing commercial boats to enter the mooring field to exit the harbor. Cheri Patterson, NHF&G, stated that commercial fishermen have to time their trips into and out of the harbor around the tides.

Don Blouin, Town of Rye, estimates that commercial activity in the harbor generates approximately \$5 million in revenue for the Town of Rye. Mr. O'Donnell requested that any information regarding how the shoaling is impacting commercial users, as well as any economic information about the harbor, be provided to the ACOE.

### **Main Pier Reconstruction, Market Street Marine Terminal, Portsmouth:**

Noah Elwood of Appledore Marine Engineering gave a presentation about the proposed reconstruction of the main pier at the Market Street Marine Terminal in Portsmouth. As part of the construction of the new Sarah Mildred Long Bridge, the barge dock at the Market Street Marine Terminal was removed. To compensate the PDA-DPH for the loss of the barge dock, improvements to the main pier are being proposed. The improvements include a 60-foot long extension of the pier to the south and a 145-foot long extension to the north, as well as dredging approximately 16,000 cubic yards of material from an area adjacent to the pier. Appledore Marine Engineering anticipates having preliminary design plans completed by early next year. Discussion followed to include the potential need for blasting to remove bedrock from the dredge area as well as time of year restrictions for the proposed dredging.

### **Hampton-Seabrook Harbor Hydrodynamic and Sediment Transport Modeling:**

Dr. Tom Lippmann, UNH Center for Coastal and Ocean Mapping, gave a presentation about current hydrodynamic and sediment transport modeling taking place in Hampton-Seabrook Harbor. The modeling efforts are being funded by the National Oceanic and Atmospheric Administration (NOAA), which is responsible for maintaining navigational charts, to identify changes in bathymetry that may impact navigation. Modeling sediment transport can help determine how frequently navigation charts need to be updated.

The models used by UNH simulate flows in 3-dimensions. The flow results can be used to predict sediment transport patterns. The hydrodynamic component of the models is based, in part, on 2017 field observations of water velocities and water levels. The Sediment transport component is based on a 2011 LiDAR survey of the harbor and a 2016 bathymetric survey of the harbor conducted by UNH. The accuracy of the sediment transport component of the model is determined by comparing model results to the change in bathymetry between the 2011 and 2016 surveys. Results of the model depict areas of erosion and accretion that are similar to the erosion and accretion patterns identified by the surveys. Although additional work is needed, the model may prove to be an effective tool for predicting future accretion and erosion areas within the harbor. Dr. Lippmann then discussed proposed improvements to the model and next steps. Discussion followed.

### **Hampton-Seabrook Harbor Maintenance Dredging:**

Carol Siligato, ACOE Project Manager, stated the ACOE has received funds to conduct environmental coordination with state and federal resource agencies and to develop project plans and specifications. She stated that the ACOE currently estimates that a total of approximately 150,000 cubic yards of sand needs to be dredged from the federal navigation project. This includes approximately 35,000 cubic yards of material located in Hampton and approximately 115,000 cubic yards of material located in Seabrook. She also stated that approximately 2,500 cubic yards of sand needs to be dredged from the state recreational anchorage in Hampton. She then gave a presentation summarizing the preliminary dredged material disposal options that the Towns of Hampton and Seabrook and the ACOE have identified. The presentation depicted several beach disposal locations in Hampton and Seabrook as well as five potential nearshore disposal areas that the ACOE has used in the past. Ms. Siligato stated that the ACOE has performed side-scan sonar and benthic analysis at three of the nearshore areas. The ACOE is also in the process of conducting grain size analysis at proposed beach nourishment sites and at all of the potential nearshore placement areas. Ms. Siligato then stressed the importance of identifying practicable dredge material placement locations as soon as possible so that the ACOE can proceed with environmental coordination, secure necessary real estate agreements, and begin developing plans and specifications. Discussion of the merits of the potential beach disposal locations in Hampton and Seabrook followed.

Brendan Clifford, NHF&G, identified areas of the beach south of the Hampton Harbor inlet channel, in both Hampton and Seabrook, where federally-threatened/state-endangered piping plovers have recently and historically nested. He stated that because dredged material attracts piping plovers, areas of the beach nourished with dredged material would be subject to management measures, including fencing and other potential restrictions, during the breeding season to prevent the plovers and their breeding areas from being disturbed. Mr. Clifford suggested that beach nourishment considerations focus on those areas of the beach that are currently managed for piping plovers.

Seth Prescott, NH Dept. of Natural & Cultural Resources, Division of Parks & Recreation, stated that State Parks could use approximately 10,000 cubic yards of sand to fill a large hole at the southern end of the beach near the Hampton Harbor inlet jetty and another  $\pm 10,000$  cubic yards of sand to fill an area behind the rip-rap wall near the RV park that has eroded.

Matt Tessier, ACOE, reiterated the urgency in identifying practicable dredge material placement locations so that the ACOE has all necessary requirements in place to dredge the Harbor next fall should construction money become available.

Chairman recommended that the Hampton-Seabrook Harbor Working Group reconvene in the next 1-2 weeks to continue the discussion regarding dredge material disposal locations. Prior to the Working Group meeting the Towns of Hampton and Seabrook will continue working with the ACOE to identify practicable locations for disposal of the dredged material. At the Working Group meeting the Towns will present their disposal alternatives to the ACOE and state resource agency staff and disposal sites will be selected. All agreed.

# **New Hampshire Dredge Management Task Force Meeting Minutes – October 9, 2019**

**The meeting was held on Wednesday, October 9, 2019 at 10:00 AM at the New Hampshire Department of Environmental Services, 222 International Drive, Suite 175, Pease Tradeport, Portsmouth, NH 03801.**

## **Attending members in alphabetical order:**

Bob Boeri, Massachusetts Office of Coastal Zone Management  
Noah Elwood, Appledore Marine Engineering  
Stefanie Giallongo, NH Department of Environmental Services (NHDES) Wetlands Bureau  
Olga Guza-Pabst, Environmental Protection Agency (EPA) (via call-in)  
Mark Habel, Army Corps of Engineers (ACOE)  
Carol Henderson, New Hampshire Fish & Game Department (NHF&G)  
Chris Holt, Portsmouth Pilots  
Richard Kristoff, ACOE  
Eric Nestler, Normandeau Associates  
Cheri Patterson, NHF&G  
Todd Randall, ACOE  
Coral Siligato, ACOE  
Tracy Shattuck, Pease Development Authority – Division of Ports and Harbors (PDA-DPH)  
David Trubey, NH Division of Historical Resources  
Mike Walsh, ACOE  
Chris Williams, Chair, NHDES Coastal Program  
Cara Wry, Senator Shaheen

## **Guests:**

Leo Axtin, PDA-DPH  
Don Blouin, Town of Rye  
John Brosnihan, Kittery Harbormaster  
Wendy Gendron, ACOE (via call-in)  
Kate Hill, Senator Shaheen (via call-in)  
Vincent Iacozzi, Hampton River Marina  
Aboul Khan, Town of Seabrook Board of Selectmen  
Theresa Kyle, Town of Seabrook Board of Selectmen  
Reid Lichwell, ACOE  
Dot Lundberg, ACOE  
Regina Lyons, EPA  
Nick Malatesta, Senator Hassan (via call-in)  
Dorothy Parsons, Senator Hassan  
Alex Pelczar, Senator Collins  
Bonita Pothier, Senator King  
Susan Reynolds, Town of Rye  
Chris Veinotte, ACOE  
Phil Winslow, Town of Rye Board of Selectmen

### **Approve Minutes from May 22<sup>nd</sup> Meeting:**

Minutes from the May 22, 2019 Dredge Management Task Force meeting were approved and will be posted on the Task Force web page at

<https://www.des.nh.gov/organization/divisions/water/wmb/coastal/dmtf/index.htm>.

### **Legislative Update:**

Kate Hill of Senator Shaheen's Office in Washington stated that the Senator visited Rye Harbor in August to witness the shoaling and is working with key leadership at the Army Corps of Engineers (ACOE) to ensure that the ACOE has the resources it needs to complete projects like Rye Harbor. She stated that the Senate Appropriations Committee, on which Senator Shaheen is a member, recently passed an Energy and Water Appropriations Bill for the upcoming fiscal year. The bill proposes \$7.75 billion for the ACOE, which is approximately \$750 million above last year's funding level. The bill provides \$200,000 for the maintenance dredging of Rye Harbor and includes two construction new start allocations for navigation projects for which the Piscataqua River Turning Basin Improvement Project can compete. The bill also includes language offered by Senator Shaheen to encourage the ACOE to expedite scheduled maintenance at small harbors. The bill must still be passed by the full Senate and conferenced with the House of Representatives before it can be signed into law. Once the bill becomes law, the funding for Rye Harbor and the new start allocation for the Piscataqua River Turning Basin project will have to be designated in the ACOE's Work Plan.

Dorothy Parsons of Senator Hassan's Office stated that the Senator continues to advocate for New Hampshire's priorities in Washington and asked that members reach out directly to her or Kerry Holmes of the Senator's Office with questions or concerns.

Mark Habel stated that the 2020 Water Resources Development Act (WRDA) bill is currently being debated in the Senate. Kate Hill of Senator Shaheen's Office stated that the Senate Environment and Public Works Committee is currently working on the WRDA bill and Senators have been asked to submit their state's priorities before the end of October. She encouraged members to reach out to their Congressional delegation with priority projects.

### **Hampton-Seabrook Harbor Maintenance Dredging:**

Coral Siligato, ACOE Project Manager, gave a brief summary of the proposed project. Approximately 150,000 cubic yards of sand will be dredged from the federal navigation project, including approximately 115,000 cubic yards of material located in Seabrook and approximately 35,000 cubic yards of material located in Hampton. An additional  $\pm 2,500$  cubic yards of sand will be dredged from the state recreational anchorage in Hampton. The dredged material will be used beneficially as follows: a) approximately 105,000 cubic yards of sand will be placed on Seabrook Beach; b) approximately 25,000 cubic yards of sand will be placed on the beach at Hampton Beach State Park; c) approximately 10,000 cubic yards of sand will be placed adjacent to the southwest corner of the Route 1A bridge in Hampton; and d) approximately 10,000 cubic yards of sand will be placed behind an existing sheet pile wall built in 2005 to protect the middle ground sand flat in Seabrook.

The ACOE awarded a contract, in the amount of approximately \$4.4 million, to H&L Contracting of New York on September 12<sup>th</sup>. The ACOE gave the contractor notice to proceed on September 26<sup>th</sup> and the contractor is now completing safety plans and inspecting equipment. Dredging is scheduled to begin on October 18<sup>th</sup>. The contractor

plans to work 24 hours a day, seven days a week. Dredging of the inner harbor can begin October 15<sup>th</sup> and must be completed by February 1, 2020, while dredging of the entrance channel can begin October 15<sup>th</sup> and must be completed by March 15, 2020. All work on the receiving beaches must be complete by March 15, 2020.

Mark Habel, ACOE, reminded members that the ACOE has received a request from the Pease Development Authority – Division of Ports and Harbors to determine the feasibility of initiating a study, funded partially by the ACOE, to help identify long-term solutions to the shoaling issues in the harbor. The ACOE New England District has ranked the request highly and is awaiting funding. Mr. Habel stated that while a feasibility study of this nature typically costs approximately \$50,000 the ACOE would have up to \$100,000 available. If the ACOE were to proceed based on recommendations in the study, costs would be split 50/50 between the ACOE and the state.

Vinny Iacozzi, Hampton River Marina, requested a schedule of dredging activity. Ms. Siligato stated that the contractor would be required to provide daily updates of dredging activity and that she'd make sure that Mr. Iacozzi received such updates.

Aboul Khan, Town of Seabrook, thanked the Congressional Delegation for their efforts and requested an update on the project at the next Task Force meeting.

### **Rye Harbor Maintenance Dredging:**

Mike Walsh, ACOE Project Manager, reminded members that approximately 50,000 cubic yards of fine-grained material needs to be removed from the federal channels and anchorages and approximately 8,000 cubic yards of material needs to be removed from the state anchorage. Total construction costs are estimated at \$3.5 million, which include approximately \$500,000 to dredge the state anchorage.

Mr. Walsh stated he anticipates completing the Environmental Assessment and all necessary environmental coordination by the end of the calendar year. He reminded members that the ACOE does not have money for project construction. If construction funds are made available, he anticipates putting a contract out to bid in June 2020 with construction anticipated to begin in November 2020.

Phil Winslow, Town of Rye, asked where the ACOE anticipated placing the dredged material from the project. Mr. Walsh stated that the ACOE is pursuing two disposal options, the Cape Arundel Disposal Site (CADS) and the proposed Isles of Shoals North Disposal Site (IOSN). The IOSN is the ACOE's preferred disposal location because it is closer to Rye Harbor. However, because the IOSN has not yet been designated to receive dredged material, the Environmental Assessment includes both sites as potential alternatives. Mr. Walsh stated that current project cost estimates are based on hauling the dredged material to CADS. Mr. Walsh then stated that the ACOE has identified one structure that's currently encroaching into the federal anchorage. The ACOE is working with the owner to ensure that it's removed prior to construction.

Richard Kristoff, ACOE, reminded members that the proposed dredging of the state anchorage will require an Individual Permit (IP) from the ACOE. Before the ACOE can issue the IP, the state must obtain Coastal Zone Management Act federal consistency decisions from both New Hampshire and Maine. The state must also obtain a 401 Water Quality Certificate from the state of Maine in case the dredged material is placed at CADS.

### **Portsmouth Harbor/Piscataqua River Navigation Improvement Project:**

Wendy Gendron stated that the ACOE is still awaiting federal construction funds and a new start authorization. She is hopeful that both will be authorized in the ACOE's workplan.

The ACOE also continues to work with communities in Massachusetts that have expressed interest in using the sand for beach nourishment. She believes the communities of Salisbury and Newbury have permits and funds in hand to receive the sand and are working on where the sand will be placed and in what quantities.

Bob Boeri, Massachusetts CZM, confirmed that the Towns of Newbury and Salisbury have permits in hand and that the beaches there can handle a total of approximately 300,000 cubic yards of sand. He stated permits are also in hand for the placement of sand approximately 300,000 cubic yards of sand directly on Nantasket Beach in Hull. It is estimated that this project would cost \$13-\$15 million. The Massachusetts Department of Conservation and Recreation (DCR) has requested an ACOE Section 204 study start to help reduce project costs. The Town of Scituate has also received the necessary permits to place material directly on the beach at an estimated cost of \$12-\$15 million. Due to the estimated project cost, the Town has determined not to pursue the project.

Mr. Habel, ACOE, stated that if construction funding for the Turning Basin project is made available in the ACOE's FY20 workplan, construction would begin before the Section 204 Study for Nantasket Beach would be initiated. As a result, the ACOE would not likely enter into a Section 204 study agreement with Mass DCR. Mr. Boeri stated that he is uncertain whether Mass DCR would proceed with the project without ACOE funding.

Given that the Turning Basin project is estimated to generate approximately 680,000 cubic yards of sand, and only the Towns of Newbury and Salisbury have secured permits and funds to accept approximately 300,000 cubic yards of that material, there will be nearly 380,000 cubic yards of sand available for use beneficially. If the material cannot be used beneficially, it will be placed at an offshore disposal site. Discussion followed.

### **Isles of Shoals North Dredged Material Disposal Site Designation:**

Regina Lyons, EPA, gave a presentation summarizing that status of the proposal by EPA and the ACOE to designate a new ocean dredged material disposal to serve southern Maine, New Hampshire and northern Massachusetts. She discussed the difference between site designation and site selection and reviewed the criteria that EPA must consider when proposing a site for designation. She also reviewed site alternatives which included the no action alternative, the historic Isles of Shoals Disposal Site, the Cape Arundel Disposal Site and the Isles of Shoals North Disposal Site. She stated that based on a number of factors, EPA's and the ACOE's preferred alternative is the Isles of Shoals North Disposal Site (IOSN). She then discussed next steps in the site designation process and encouraged Task Force members review and provide comments on EPA's proposed rule to designate IOSN, which was published in the Federal Register on September 18, 2019, and the draft environmental assessment developed by EPA and the ACOE. Finally, Ms. Lyons informed members that EPA and the ACOE are holding a public meeting on October 9, 2019 at 6pm at the Kittery Community Center to discuss the proposed designation of IOSN.



### **Main Wharf Reconstruction, Market Street Terminal, Portsmouth:**

Noah Elwood of Appledore Marine Engineering gave a presentation summarizing the proposal to reconstruct the main wharf at the Market Street Marine Terminal in Portsmouth. He stated that when the Sarah Mildred Long Bridge was replaced the new bridge alignment resulted in removal of a portion of the Pease Development Authority – Division of Ports and Harbors (PDA-DPH) barge wharf. To compensate PDA-DPH for the loss of the barge wharf, an agreement was reached to improve the main wharf at the Market Street Terminal. The proposed improvements include extending the wharf to the north and south and dredging the north end of the wharf to provide sufficient water depths for the commercial vessels. The proposed dredging will remove approximately 18,000 cubic yards of sand and gravel and approximately 1,000 yards of ledge that will require blasting. The preferred alternative is to place the dredged material at an offshore disposal site. The ACOE and EPA are currently working to determine if the material would be suitable for offshore disposal. Mr. Elwood stated that he anticipates that applications for both state and federal permits will be submitted in the next couple of months. When asked about the timing of construction, Mr. Elwood stated that the timing is uncertain due to funding issues.

### **Other Business:**

Wendy Gendron, ACOE, stated that a Supplemental Appropriations Act was recently passed that provides additional funding for ACOE projects that have been damaged by natural disasters. One of the projects that has been authorized is the repair to the three breakwaters at the Isles of Shoals. The ACOE is not anticipating and changes to the footprint of the breakwaters at this time, but the extent of the repairs will be based on the results of future site inspections. Once the ACOE receives funding, it will begin project design and environmental coordination with the states of New Hampshire and Maine. The timing for the repair work is dependent on funding but the ACOE is hopeful that work could begin in the next 2-3 years.

Next meeting date: December 18, 2019 @ 10am

Meeting adjourned @ 11:15

## **Draft Dredging Specifications**

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## SECTION 35 20 23

DREDGING  
08/20

## PART 1 GENERAL

## 1.1 GENERAL INFORMATION

The work under this section includes Contractor's operations for dredging at the Market Street Marine Terminal and offshore disposal at Isles of Shoals Dredge Disposal Site. Work under this section also includes quality control of dredging operations through pre, post, and periodic check hydrographic surveys.

The Contractor is responsible for making their own investigation of submerged, surface, and overhead structures in the work areas and other locations they find necessary to traverse. The exact location, depths, and heights of various structures including, but not limited to submarine cables, pipes, highlines, docks, piers, bulkheads, and bridges (as applicable), are not known and it will be necessary for the Contractor to ascertain interference problems and notify the respective owners in advance of dredging operations. The Contractor is responsible for making necessary arrangements with the respective owners of the structure(s) to assure satisfactory completion of dredging in the vicinity with a minimum interruption of service, and shall perform their operations in such a manner as will avoid damage to these facilities.

Dredging must occur between November 15 and March 15.

## 1.2 DEFINITIONS

## 1.2.1 Maintenance Material

Maintenance material is defined as that comprising shoaling which has occurred since the channel areas were last dredged.

## 1.2.2 New Work Material

New work material is defined as previously undredged material.

## 1.2.3 Hard Material

Hard material is defined as material requiring blasting or the use of special equipment for economical removal, and includes boulders or fragments too large to be removed in one piece by the dredge.

## 1.2.4 Specified Limits

Specified limit is defined as the dredge depth, including side slopes.

## 1.2.5 Overdredge Depth

Overdredge depth is that depth that may be necessary in order to achieve the specified limit. It is dependent on the contractors, means, methods, equipment, and operator experience.

### 1.3 REFERENCES

The publications listed below form a part of this section to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety -- Safety and Health Requirements Manual

EM 1110-2-1003 (2013) Hydrographic Surveying

### 1.4 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-01 Preconstruction Submittals

Letter Of Acceptance Of Owner's Pre-Dredge Hydrographic Survey And Associated Dredge Volumes

Pre-Dredge Hydrographic Survey

Method For Computing Dredge Quantities

Dredging Operations Plan

Schedule Of Plant And Equipment

Contractor Quality Control Survey Plan

Charts

Survey Personnel

Scow Cards

#### SD-05 Design Data

Contractor Quality Control Surveys

#### SD-07 Certificates

USACE Notification

#### SD-11 Closeout Submittals

Post-Dredge Hydrographic Survey

Approved Manifest

### 1.5 MATERIAL TO BE REMOVED

The material to be removed is silt, sand, gravel, and debris that may be present from historical operations at the facility.

### 1.5.1 Debris

It is anticipated that debris of various size/composition will be encountered and may include items such as rocks and construction debris.

### 1.5.2 Submerged Cables

There are six known steel cables located within the dredge area that require removal. Approximate location is shown on the Contract Drawings.

### 1.5.3 Hard Material

Removal of hard material must be in accordance with Section 31 23 01 UNDERWATER BLASTING.

## 1.6 ARTIFICIAL OBSTRUCTIONS

The Owner has knowledge of debris of various size/composition such as, but not limited to, rocks and construction debris. The Owner has no knowledge of existing wrecks, wreckage, or other material of such size or character as to require the use of explosives or special or additional equipment for its economical removal.

Prior to dredging, rake the dredge areas and remove debris encountered. Debris removed from the dredged area must be removed from the water and placed in the dewatering area separate from the dredge material, and must be rinsed for review by the Owner. All artificial obstructions shall become the property of the Contractor unless otherwise directed or indicated, and must be properly disposed of off the Owner's property at the end of the project, at no additional cost to the Owner.

## 1.7 QUANTITY OF MATERIAL

The total estimated amount of material to be removed from within the specified limits, including side slopes, but excluding overdepths, is shown on the Contract Drawings. The dredge slope shown is the maximum permissible slope and basis for permitted sediment removal quantity. Complete the work specified whether the quantities involved are greater or less than those estimated.

## 1.8 OVERDEPTH DREDGING

To cover unavoidable inaccuracies of dredging processes, material removed to a depth of one foot below the depth specified and within the dredging limits will be measured and paid for at full contract price. The one foot overdepth is the maximum permitted. The Contractor is not required to utilize the full permitted overdepth volume and shall only over dredge the minimum required to ensure the contracted dredge depths are achieved.

## 1.9 SIDE SLOPES

Dredging on side slopes shall follow, as closely as practicable, the lines indicated or specified. Side slopes depicted on the Contract Drawings are maximum permissible slope and are the basis of the permitted sediment removal quantity. Contractor is not required to dredge the slope limits depicted as long as the design dredge depth elevations can be achieved and the slopes remain stable.

Dredging is not permitted under marine structures.

#### 1.10 EXCESSIVE DREDGING

Material removed beyond the limits stated in paragraph entitled OVERDEPTH DREDGING and SIDE SLOPES and on the Contract Drawings will be deducted from the total amount dredged as excessive overdepth dredging, and payment will not be made for this additional quantity.

#### 1.11 USACE NOTIFICATION

Notify the USACE of dredge operations and disposal plan. Notification must include confirmation of disposal site location. Do not proceed with disposal operations until USACE issues a letter of authorizing disposal.

#### 1.12 ENVIRONMENTAL COMPLIANCE AND PROTECTION

Comply with conditions and requirements of State or Federal permits. The Owner will secure the permit for dredging and placement of material as indicated. Permits are included in Appendix D.

During the life of the contract, provide and maintain environmental protective measures. Also, environmental protective measures required to correct conditions, such as oil spills or debris, that occur during the dredging operations, must be provided. Comply with Federal, State, and local regulations pertaining to water, air, and noise pollution.

#### 1.13 CHARGES

The Contractor must pay all costs associated with dredging, transportation, and disposal of the dredge materials.

#### 1.14 BASIS FOR BIDS

Base bids on the quantity of dredging indicated. Should the total quantity of dredging vary from that specified as the basis for bidding, the contract price will be adjusted. The dredging conditions specified and indicated describe conditions which are known. However, the Contractor is responsible for other conditions encountered which are not unusual when compared to the conditions recognized in the dredging business as usual in dredging activities such as those required under this contract.

#### 1.15 SCHEDULE OF PLANT AND EQUIPMENT

Submit a schedule of the plant and equipment the Contractor will employ in the performance of the work on this contract. Submit copies of all applicable inspections and certifications for all floating plant and equipment.

#### 1.16 DREDGING OPERATIONS PLAN

Submit a Dredging Operations Plan indicating the proposed method by which the dredge work will be conducted. Describe in detail the operations, equipment, personnel, and processes to complete the work. The plan must include discussion of the following items:

- a. Implementation and compliance with State and Federal Permit requirements
- b. Type of dredge equipment to be used throughout the project

- c. Coordination and communication efforts between site personnel to minimize impact to facility operations
- d. Horizontal and vertical survey control
- e. Means to avoid damage to adjacent structures, vessels, and moorings
- f. Means to avoid dredging beyond the limits
- g. Methods to dispose of all dredge materials
- h. Methods to prevent spillage from barges when transporting, loading, and unloading material
- i. Provide name and resume of contractor's third party hydrographic surveyor as well as details explaining how survey will be incorporated into dredge quality control

#### 1.17 LAYOUT WORK AND SURVEYS

Employ a licensed surveyor to layout the limits of the work, establish vertical control, and perform surveys. Provide all buoys, ranges, and other controls necessary to accomplish the work and facilitate inspection.

Hydrographic surveys must use multi-beam sonar transducers and must provide 100 percent bottom coverage including a method to correct for side slope and beam angle error. Survey methodology must conform to the US Army Corps of Engineers specification EM 1110-2-1003. Survey accuracy shall be as follows: horizontal positioning: less than 1 meter; NADIR (vertical): plus or minus 0.15 feet.

The surveys must be corrected to Mean Lower Low Water (MLLW) and must be in an Owner approved format. Submit the hydrographic surveys to the Owner within five days after completion. Survey plans must be stamped by a licensed surveyor.

Submit the information electronically, together with hard copies of the information. Drawings shall be accessible with AutoCAD 2015 by AutoDesk, Inc. Software.

##### 1.17.1 Contractor Quality Control Survey Plan

Submit a detailed plan describing the survey methods to be used during the work. Include the equipment to be utilized, tidal data, general site plan map, line designation map, any corrections to the MLLW datum used, calibration procedures to be used, expected horizontal and vertical accuracies, and pertinent information to describe the methods, and results to be obtained. Do not begin field surveys until these plans are approved.

##### 1.17.2 Charts

Submit current and tide charts to be used for the areas being dredged.

##### 1.17.3 Survey Personnel

Furnish a listing of the personnel who will perform the survey work required by this contract.

#### 1.17.4 Horizontal Positioning Procedures and Accuracies

Vessel positioning systems utilized on this contract must conform to the allowable horizontal positioning criteria in EM 1110-2-1003. The positioning system used shall be capable of meeting or exceeding the accuracy requirements and must not exceed the allowable ranges where indicated. The Contractor may be required to demonstrate to the Owner's Representative that its positioning system is capable of meeting or exceeding the accuracy requirements in EM 1110-2-1003.

#### 1.17.5 Vertical Reference Datums

Depth measurements must be reduced to the specified datum using RTK GPS or staff/gage readings, as described in EM 1110-2-1003. Recording tides using RTK GPS is recommended and can be used in lieu of tide staffs/gages. RTK tide data must be referenced and documented to an existing tide gage daily. When needed, tide staffs/gages must be constructed, referenced, maintained, stilled, and read in accordance with the criteria in EM 1110-2-1003.

#### 1.17.6 Field Data Recording, Reductions, and Plotting Requirements

The data format fields for submitting reduced hydrographic data to the Owner is x y (+)z. Digital data must be emailed, unless the data set is too large for email. In such cases, data must be sent via CD-ROM or file transfer site as established by the Owner.

#### 1.17.7 Volume Computations by the Contractor

The Contractor must have the capability to compute excavation quantities from work performed under this contract. Compute volumes using any of the techniques given in Chapter 15 of EM 1110-2-1003. Section drawings must be made at the horizontal and vertical scales given in EM 1110-2-1003.

#### 1.17.8 Automated System Synchronization Checks

The Owner's Representative reserves the right to check each automated hydrographic survey system to insure adequacy of correlation between position and depth. Methods for performing this check are given in EM 1110-2-1003.

#### 1.17.9 Contractor Quality Control Surveys

Examine the dredge work by conducting hydrographic surveys at the following interval: monthly. Additionally, conduct a hydrographic survey prior to any request for a Owner survey for final acceptance. Submit Contractor Quality Control Surveys to the Owner and when a progress payment request is submitted.

#### 1.17.10 Pre-Dredge Hydrographic Survey

Prior to commencing work, complete a Pre-Dredge Hydrographic Survey to confirm that the Owner's pre-dredge Hydrographic Survey and associated dredge volumes accurately reflect conditions prior to dredging. Submit a Pre-Dredge Hydrographic Survey indicating the original depth of the river bottom prior to dredging. Survey must be conducted by a Licensed Professional Land Surveyor.

Submit a Letter of Acceptance of Owner's Pre-Dredge Hydrographic Survey and associated dredge volumes shown in the Contract Drawings.



## 1.17.11 Post-Dredge Hydrographic Survey

After completion of all work, perform a post-dredge hydrographic survey throughout the dredge area. The survey must be taken within five days after completion of the dredging. Notify the Owner seven days in advance of the scheduled survey. The submitted survey must clearly depict any areas that are within the specified limits that are shallower than the designed dredge elevation depicted.

## 1.17.12 Data Submission Requirements for All Contractor Surveys

All Contractor Quality Control Surveys submissions shall include the following:

## a. Field Data

- (1) Raw multibeam data zipped by day
- (2) Sound velocity casts zipped by day
- (3) Daily tide tables and/or files
- (4) Depth sounder rolls (if used) corrected for tide and corresponding boat plot
- (5) Reduced hydrographic 3x3 average and 3x3 minimum XY(+)Z files. The 3x3 average file shall have the average sounding in the center of the cell and the 3x3 minimum file shall have the minimum sounding in its actual location
- (6) Field notes, daily logs, and quantity computations

## b. 3x3 Minimum Plot

- (1) Noted Information
  - (a) Name of project
  - (b) Name of surveying/contract company
  - (c) Date(s) of survey
  - (d) Horizontal Datum
  - (e) Distance units
  - (f) Vertical Datum
  - (g) Sonar system
  - (h) Sounding frequency
  - (i) GPS System
  - (j) Software used
  - (k) Sounding sort distance and confirmation that soundings shown

- (l) represent shoalest values
- (m) V-Datum version used (if applicable)
- (2) Plotted Information
  - (a) dredge area
  - (b) Minimum sorted soundings
  - (c) 3x3 minimum contour at design depth
  - (d) 3x3 minimum contour at design depth
  - (e) Scale bar
  - (f) North arrow
  - (g) Grid
  - (h) Stationing
  - (i) Navigation aids
  - (j) Sheet setup
  - (k) The scale of the plot shall match that of the contract drawings and the soundings shall be sorted as appropriate (e.g., 20 feet for 100 scale plot, 40 feet for 200 scale plot, etc). The font size shall be the appropriate size to prevent soundings from being overwritten on the plot

The above data will be used by the Owner's Representative to verify achievement of contract depth, and compare actual progress and in-place quantities dredged with scheduled progress.

#### 1.17.13 Contractor Progress Payment

Submit Contractor Quality Control Survey data for any periods for which progress payments are requested. Furnish the data listed above in subpart "Data Submission Requirements for Contractor Surveys", to the Owner, who will use the data as necessary to determine the amount of progress payments. The owner does not conduct progress surveys.

#### 1.18 METHOD FOR COMPUTING DREDGE QUANTITIES

Submit Method for Computing Dredge Quantities. Method must be a generally recognized technique using TIN subtraction or average end area method of calculation and must be compatible with AutoCAD Civil 3D 2010 software.

#### 1.19 MATERIALS TRANSPORTATION

Contractor must transport materials to disposal site and submit Approved Manifest.

## 1.20 WORK AREA

### 1.20.1 Protection of Existing Waterways

Conduct operations in such a manner that the material or other debris are not pushed outside of dredging limits or otherwise deposited in existing side channels, basins, docking areas, or other areas being utilized by vessels or moored boats. The Contractor will be required to change his method of operations to comply with the above requirements. Should any bottom material or other debris be pushed into areas described above as a result of the Contractor's operations, the material must be promptly removed.

### 1.20.2 Adjacent Property and Structures

Conduct dredging operations such that it does not undermine, weaken, or otherwise impair existing structures located in or near the areas to be dredged.

Damage to private or public property or structures resulting from disposal or dredging operations must be repaired promptly by the Contractor at his expense. Damage to structures resulting from the Contractor's negligence will require prompt repair at the Contractor's expense.

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

### 3.1 INSPECTION

Inspect the work, keep records of work performed, and ensure that gages, targets, ranges, and other markers are in place and usable for the intended purpose. Provide, at the request of the Owner, boats, boatmen, laborers, and materials necessary for inspecting, supervising, and surveying the work. When required, provide transportation for the Owner and inspectors to and from the placement area and between the dredging plant and adjacent points on shore.

Before any machinery or mechanized equipment is placed in service, it must be inspected and tested by the Contractor and certified to be in safe operating condition.

### 3.2 DREDGING

#### 3.2.1 Order of Work

The Owner will direct the Contractor on the order of work. The Owner reserves the right to change the order of work at any time.

#### 3.2.2 Interference with Navigation

Coordinate all marine vessel movements with the Owner. Submit a weekly updated schedule showing proposed dredge locations and vessel movements.

Minimize interference with facility operations and the use of channels and passages. The Contractor is responsible for shifting or moving of dredges or the interruption of dredging operations to accommodate the movement of

vessels and floating equipment, if necessary. Adhere to Coast Guard Regulations for passing vessels.

### 3.2.3 Lights

Each night, between sunset and sunrise and during periods of restricted visibility, provide lights for floating plants, pipelines, ranges, and markers. Also, provide lights for buoys that could endanger or obstruct navigation. When night work is in progress, maintain lights from sunset to sunrise for the observation of dredging operations. Lighting must conform to United States Coast Guard requirements for visibility and color.

### 3.2.4 Ranges, Gages, and Lines

Provide, set, and maintain ranges, buoys, and markers needed to define the work and to facilitate inspection. Establish and maintain gages in locations observable from each part of the work so that the depth may be determined. Suspend dredging when the gages or ranges cannot be seen or followed.

### 3.2.5 Dredge Plant and Equipment

Maintain all dredge plant and associated equipment such as, but not limited to, scows, coamings, barges, and pipelines, to meet the requirements of the work.

#### 3.2.5.1 Location Data Collection for Dredge Bucket

The dredge plant must be equipped to record real time location data for the position of the bucket, to include horizontal and vertical positioning (xyz data). This data must be available on a continuous basis.

#### 3.2.5.2 Sufficient Capacity

Keep on the job sufficient plant and equipment to meet the requirements of the work. The plant and equipment must be in satisfactory operating condition and be capable of safely and efficiently performing the work.

#### 3.2.5.3 Reduction in Capacity

No reduction in the capacity of the plant and equipment employed on the work shall be made except by written permission of the Owner. The measure of the capacity of the plant and equipment must be its actual performance on the work covered by this contract.

#### 3.2.5.4 Inspections and Certifications

Prior to commencement of work at the site provide copies of all applicable inspections and certifications of floating plant and equipment as required by Federal, State and local laws and regulations. See also EM 385-1-1, Sections 16, 18, 19, and 20. Such inspections and certifications must be current and maintained in force for the duration of this contract. Each item of floating plant and equipment must have on board a waste oil management plan which details the intended disposal method for waste oil.

Each vessel exceeding twenty-six feet in length, excluding sheer, which is used for pushing, hauling alongside, or any other method of towing must adhere to the requirements set forth in 46 CFR Subchapter M.

The plant and equipment shall be subject to the inspection of the Owner at all times. The responsibility for actual supervision and direction of dredging operations including the safe and efficient operation of dredge plant and equipment lies with the Contractor.

#### 3.2.5.5 License Requirements

Each vessel exceeding twenty-six feet in length, excluding sheer, which is used for pushing, hauling alongside, or any other method of towing, and not required by law to have a valid Certificate of Inspection by the U.S. Coast Guard, must be under the actual direction and control of a person licensed for towing in the geographic area of the work by the U.S. Coast Guard. Licensed persons shall not perform command or other duties in excess of twelve hours in any consecutive twenty-four hour period except in an emergency.

#### 3.2.5.6 Automatic Identification System Requirements

All dredge and plant equipment, including scows, must be registered with the AUTOMATIC IDENTIFICATION SYSTEM (AIS) in order to ensure that the entire footprint of the Contract's working vessels and scows are available on marine trafficker's electronic chart displays.

#### 3.2.5.7 Tow Boats

All tow boats used for towing to disposal areas must be equipped with DGPS navigational equipment, radar, corrected compass, marine radio, and depth sounding equipment which is to be maintained in operating condition during each tow. The tow boats utilized by the Contractor for this purpose must be a size adequate for towing in heavy seas and must have necessary reserve power for maneuvering with scows in rough seas and under emergency conditions as well as for control of scows at the disposal site.

#### 3.2.5.8 Scows

Provide and maintain markings on all scows clearly indicating the draft of the scow and provide scow cards for each scow used on the contract work. Submit scow cards for each scow to be used for contract work. The scow cards must show dimensions and volumes of individual pockets of scows and total volumes for varying depths below coaming or top of pockets. This is to enable the Owner to make a determination of scow volume and corresponding drafts under partial and full load conditions. These measurements are to be made at the time of initial use of each scow. This information will then be furnished to disposal inspectors to enable them to estimate scow volume from draft of scows for each scow being towed to the disposal area. The scow volume estimates are for use in connection with disposal area monitoring studies and are not intended to be used in determining quantities dredged. At the beginning of the work and as additional scows arrive on the project, sufficient time shall be allowed by the Contractor and assistance of Contractor personnel shall be made available by the Contractor for the purpose of obtaining the measurements of each scow under various partial and full load conditions's. During the entire period of contract work, the Contractor must provide and maintain sufficient spot of floodlights to permit the reading of the draft on the sides of scows at bow and stern from the tow boat at night and when visibility is impaired. The draft readings and each pocket/compartments measurement are required for each scow towed to the disposal area and will be made by the disposal inspector. Measurements are to be taken and recorded prior to departure from the dredge site and upon arrival at the

immediate disposal location. Ensure that adequate time is allowed by the tow boat captain for these readings to be obtained.

#### 3.2.5.9 Scow Pocket Doors

Due to the fine nature of some of the dredged material, the Contractor must achieve proper closure and watertightness of the bottom-dumping scow pocket doors to eliminate seepage or leakage of material. The use of plastic material to cover cracks in scow pockets is not be allowed.

#### 3.2.6 Dredging

Dredging is limited to mechanical methods.

#### 3.2.7 Disposal of Excavated Material

Provide for safe transportation of dredged materials to the designated disposal site. Transportation must include measures to prevent loss of material during movement. Contractor is responsible to follow all haul restrictions and requirements imposed by the permits. The deposit of dredged materials in unauthorized places is forbidden. Comply with rules and regulations of local port and harbor governing authorities.

#### 3.2.8 Dredging Requirements

Dredge area and depth is shown on the Contract Drawings.

#### 3.2.9 Method Of Communication

Provide a system of communication between the dredge crew and the crew at the disposal area. A portable two-way radio is acceptable.

#### 3.2.10 Quality Control

Establish and maintain quality control for operations to assure compliance with contractual requirements and maintain records of this quality control for dredging operations.

While performing all dredging work control the horizontal positioning of the dredge with electronic positioning.

#### 3.2.11 Salvaged Material

Anchors, chains, firearms, and other articles of value, which are brought to the surface during dredging operations, must remain or become the property of the Owner and will be placed on shore at a convenient location near the site of the work, as directed by the Owner.

#### 3.2.12 Safety of Structures

The prosecution of work must ensure the stability of piers, bulkheads, and other structures lying on or adjacent to the site of the work, insofar as structures may be jeopardized by dredging operations. Repair damage resulting from dredging operations is the responsibility of the Contractor, insofar as such damage may be caused by variation in locations or depth of dredging, or both, from that indicated or permitted under the contract. The Contractor is responsible for coordinating with the owner of the structure for any necessary repairs.

### 3.2.13 Plant Storage

When not in use, plant equipment must be stored at an approved location. Stored plant equipment must not interfere with Facility operations.

### 3.2.14 Plant Removal

Upon completion of the work, promptly remove plant, including ranges, buoys, piles, and other markers or obstructions.

### 3.2.15 Blasting

Hard material is expected. Blasting must be completed in accordance with Section 31 23 01 UNDERWATER BLASTING.

## 3.3 PLACEMENT OPERATIONS

### 3.3.1 Misplaced Dredged Material

Any dredged materials deposited at locations other than in areas designated or approved by the Owner's Representative will be considered misplaced material and will not be paid for until the Contractor, at his own expense, removes and deposits such misplaced material where directed. This required removal and redeposit of the misplaced material and any necessary placement site restoration work is not the basis for a time extension or additional compensation under this contract.

## 3.4 MEASUREMENT

Complete a pre-dredge hydrographic survey before dredging and a post-dredge hydrographic survey after dredging and submit a plan showing the results of each survey(s) to the Owner for review. Total dredge volume measurement shall be determined based on the differences between the pre and post dredge survey.

### 3.4.1 Method of Measurement

The material removed will be measured by cubic yard in place, by means of surveys taken before and after dredging. The drawings represent existing conditions based on current available information, but will be verified and corrected, if necessary, by surveys taken before dredging. Surveys must be taken by multibeam sonar methods, as determined by the Owner; results of survey will be the basis for payment. Areas surveyed more than 30 days prior to dredging will be re-surveyed when requested by the Owner.

### 3.4.2 Periodic Estimates

Periodic estimates of work completed will be based on the result of soundings taken during the progress of the work. Deductions will be made for dredging and placement not in accordance with the specifications.

## 3.5 FINAL EXAMINATION AND ACCEPTANCE

As soon as practicable after the completion of areas, which in the opinion of the Owner, will not be affected by further dredging operations, each area will be examined by the Owner by sounding or sweeping, or both. Remove shoals and lumps as required by methods approved by the Owner. Notify the Owner when soundings or sweepings are to be made and will be

permitted to accompany the sounding or sweeping party and to inspect the data and methods used in preparing the final estimate. When areas are found to be in a satisfactory condition, the work therein will be accepted as complete. Final estimates will be subject to deductions or correction of deductions previously made because of excessive overdepth, dredging outside or authorized areas, or disposal of material in an unauthorized manner.

-- End of Section --

DRAFT



## **Draft Blasting Specifications**

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## SECTION 31 23 01

UNDERWATER BLASTING  
02/21; CHG 1: 11/21

## PART 1 GENERAL

Work under this section covers the removal of underwater bedrock. Blasting operations outlined in this specification are only intended for removal of bedrock as depicted in the drawings and not general overburden excavation.

Blasting must occur between November 15 and March 15.

## 1.1 SCOPE

The breakage of rock and hard/unyielding materials may be conducted by any means, unless otherwise stated herein. If the contractor elects to use drilling and blasting for breakage or displacement of any units, this entire section is applicable and covers activities associated with drilling and blasting for rock excavation at the surface. Contained herein are procedures for all activities relating to drilling; blasting and the transportation, storage and use of explosives; breakage and displacement of rock. The Contractor's blasting program and methods are those necessary to accomplish the excavation shown on the Contract drawings in accordance with the provisions specified herein. Control the quantity of explosives fired in all blasting to prevent injuries to persons and to avoid damage to all structures, properties, governmental and nonprofit entities, commerce and businesses, and natural resources and their habitat.

## 1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

## ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA S1.13 (2005; R 2010) Methods for the Measurement of Sound Pressure Levels in Air (ASA 118)

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASSE A10.12 (1998; R 2005) Safety Requirements for Excavation

ANSI/ASSE A10.7 (1997; R 2005) Commercial Explosives and Blasting Agents - Safety Requirements for Transportation, Storage, Handling and Use

ANSI S2.2 (1959; R 2006) American National Standard Methods for the Calibration of Shock and Vibration Pickups

## AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

## BUREAU OF ALCOHOL, TOBACCO, FIREARMS AND EXPLOSIVES (ATF)

ATF P 5400.7 Federal Explosives Law and Regulations (ACC).

## INTERNATIONAL SOCIETY OF EXPLOSIVE ENGINEERS (ISEE)

Blaster's Handbook 18th Edition, 2014. Hardcover, 742pp., 7th Printing, 2014.

EE Handbook 4 (1989) Explosives Eng. Handbook Paper #4 - Blasting for Underwater Rock Excavation. IEE, by R.D.G Roberts, Summer

## INTERNATIONAL SOCIETY OF AUTOMATION (ISA)

ISEE PSBS (2017) ISEE Performance Specification for Blasting Seismographs

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 495 (2018) Explosives Materials Code

## U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2014) Safety -- Safety and Health Requirements Manual

EM 1110-2-3800 (2018) Engineering and Design -- Blasting for Rock Excavations

ER 385-1-95 (2014) Safety -- Safety and Health Requirements for Operations and Activities Involving Munitions and Explosives of Concern

ETL 1110-1-142 (1989) Blasting Vibration Damage and Noise Prediction and Control

### 1.3 DEFINITIONS

#### 1.3.1 Controlled Blasting

Controlled blasting refers to blasting techniques used to better distribute the explosive charge to minimize adverse impacts. For underwater blasting, adverse impacts may be cited for the public's and contracted personnel's safety, lessening the fracturing of the rock being blasted, surrounding facilities' protection, and the avoidance of impacting natural resources or their habitats. Controlled blasting techniques must be deployed, such as careful loading to the pattern's design using the drilling log for each shot hole, stemming effectively the top of firm rock and any soft zones or voids, carefully observing maximum charge weight per delay, using delays between holes and rows of 25 milliseconds or greater, and avoiding rifling plumes by proper blasting techniques.

#### 1.3.2 Flyrock

Flyrock is one of the three primary adverse impacts from blasting. Flyrock

is defined as any airborne projectile flying the lesser distance of either 200 ft horizontally from the shot pattern or one-half the distance between the shot pattern and the Contractor work limits, whichever distance is the lesser.

#### 1.3.3 Green Concrete

Green concrete is recently placed concrete that has initiated setting but may have substantial strength reduction from strong vibrations before the concrete has fully cured. Green concrete also includes the materials of shotcrete or cementitious grouts. Each Individual Shot Plan is required to consider vibrations emanating from its blast pattern reaching the location of the reported newly placed concrete to remain below allowable vibration levels depending upon the age of the concrete. Note the paragraph GREEN CONCRETE.

#### 1.3.4 Pressure Waves

Pressure Waves, both Airblast (or noise) and Underwater Pressure Waves, are one of the three, primary adverse impacts from blasting. Airblast and Underwater Pressure Waves are solely compression waves passing through the air or water, respectively. Their units of measure may be in terms of pressure, Pascals (Pa) or pounds per square inch (psi), or in terms of the logarithmic scale, Decibels (dB). Note that pressures in dB have different reference values for Airblast and Underwater Pressure Waves, so the pressure waves through air are of a lower magnitude than pressure waves through water with the same numeric dB value.

#### 1.3.5 Rock, Hard/Unyielding Material, Weathered Rock, Voids (Bit Drops), Sediment

##### 1.3.5.1 Rock

Rock is natural solid, interlocking material with firmly cemented, laminated, and crystalline fabric, foliated masses or conglomerate deposits, none of which can be removed without systematic drilling and blasting, drilling and the use of expansion jacks or feather wedges, or the use of high-energy mechanical devices; and, so classified for this project as submerged large boulders, which may be the minimum volume of 0.50 cubic yard.

##### 1.3.5.2 Hard/Unyielding Material

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 1.0 inch in any dimension. These materials usually require the use of heavy excavation equipment or high-energy mechanical devices for breakage or displacement to remove the materials .

##### 1.3.5.3 Weathered Rock

Weathered rock, for underwater percussion-drilling logging, is any original rock unit that has been altered to a weaker state that will not retain stemming when explosives are loaded into that material.

##### 1.3.5.4 Voids

Voids, for underwater percussion-drilling logging, is any rapid bit drop

with little or no resistance to the downward drilling pressure. Voids may be water or sediment filled, which may possibly determine that the original rock unit has been altered to a weaker state that will not retain the gaseous detonation products when the explosives are shot.

#### 1.3.5.5 Sediment

Sediment is both: the loose to firm material that may be dredged above the surface of weathered or firm rock, which cannot be easily dredged; and the infill of voids as solid particles.

#### 1.3.6 Unstable Material

Unstable materials are loose, submerged sediment that are easily displaced by water flow or turbulence and by vibrations or incidental impact.

#### 1.3.7 Vibrations

Vibrations are one of the three, primary adverse impacts from blasting. Vibrations are the result of various wave forms emanating from the detonation or deflagration of ignited materials from a shot pattern. Peak particle velocity (PPV) is defined as the maximum absolute value among the three ground vibration velocities measured in the vertical, longitudinal, and transverse directions over a time of a record. Peak, total vector-sum particle velocity is the peak value over the full, time history of each time-unit's value of the square-root sum of the squared, component velocities. Velocity units are expressed in centimeters per second (cps) or inches per second (ips).

### 1.4 SYSTEM DESCRIPTION

Boring logs are shown on the Contract Drawings.

#### 1.4.1 Blasting

Perform blasting in accordance with EM 385-1-1 and in conformance with all Federal, State, and local laws, regulations, and ordinances. Submit notice 30 days prior to starting work. Submit a Master Blasting Plan for approval, prepared and signed by the Blasting Specialist that includes: a listing of all federal, state and local regulations and ordinances to conduct blasting at the project; the support documentation and certifications for all proposed blasting personnel; information and data sheets for all the explosives to be used at the project; the design approach to blasting; outlines of all required reports and formats for all the forms of the respective reports; and, the procedures to control all the adverse effects of blasting. Use the non-electric blasting caps for all underwater blasting. Obtain written approval prior to performing any blasting and notify the Owner 24 hours prior to blasting. Include provisions for storing, handling, and transporting explosives as well as for the blasting operations in the plan.

### 1.5 QUALITY ASSURANCE

When the nature of the material to be dredged requires blasting, the Contractor's blasting processes and methods shall be in accordance with the applicable rules, regulations and standards established by the Regulatory Agencies, codes and professional societies listed herein, including rules and regulations for storage, transportation, and use of explosives. In case of conflict between codes and regulations, the more stringent shall apply.

Comply with ASA S1.13, ANSI/ASSE A10.12, ANSI/ASSE A10.7, ANSI S2.2, ASSE/SAFE A10.6, ATF P 5400.7, Blaster's Handbook, EE Handbook 3, EE Handbook 4, EM 385-1-1, ER 385-1-95, ETL 1110-1-142, EM 1110-2-3800 and local regulations.

Regulatory Agencies: All operations with explosives shall be conducted in accordance with controlling transportation, storage, and use are listed below:

a. U.S. Code of Federal Regulations (CFR)

(1) TITLE 27 CFR, PART 555, subparts D, G, and K - Commerce in Explosives, Bureau of Alcohol, Tobacco, and Firearms (ATF), U.S. Government Printing Office, Washington, D.C. 20402

(2) TITLE 29 CFR, SUBPARTS H 1910.109 AND 1926.900 - Occupational Health and Safety Organization (OSHA) U.S. Government Printing Office, Washington, D.C. 20402.

(3) TITLE 30 CFR, PART 55 - Mine Safety and Health Administration (MSHA), U.S. Department of Labor, Washington, D.C., 20402.

(4) TITLE 33 CFR, PART 126 - Handling of Dangerous Cargo at Waterfront Facilities, United States Coast Guard, Washington, D.C. 20593.

(5) TITLE 49, CFR, Chapter 1, PARTS 106, 107, 171-77 AND Chapter III, PARTS 383 and 390-394 - Transportation of Explosives on Highways, Rail, Air, or Water, Department of Transportation, (DOT), U.S. Government Printing Office, Wilmington, Delaware, 19899.

(6) TITLE 27, CFR, PART 55 Internal Revenue Service regulations Commerce in Explosives.

b. State Statute and Administrative Code

c. Non-regulating Industry Support Organizations:

(1) Vibration Subcommittee of the International Society of Explosive Engineers (ISEE), blast monitoring equipment operation standards (1999).

(2) IME (Institute of Makers of Explosives) Safety Library Publications (SLPs).

Legal Requirements: Comply with all applicable federal, state, and local laws pertaining to the purchase, transportation, storage, handling, and use of explosives. Obtain all required permits and licenses.

## 1.6 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Master Blasting Plan

Blasting Safety Plan  
Navigation Control Plan  
Test-Blast Plan  
Certified Marine Survey  
Pre-Blast Surveys  
Blasting Consultant's Qualifications  
Blasting Specialist's Qualifications  
Blaster-In-Charge Qualifications  
Blaster Qualifications  
Blasting Administrator's Qualifications  
Vibration Monitoring Specialty Firm  
Public Notice Of Blasting Operations  
Structural Inspection/Evaluation Specialist  
Fisheries Observer  
Marine Mammal Observer  
SD-03 Product Data  
Explosives and Blasting Equipment  
Lightning Detection Device  
Seismographs  
Explosives, Boosters And Initiation System  
Blast Initiators  
Explosives And Blasting Agents  
Delay Device  
SD-05 Design Data  
Individual Shot Plan  
SD-06 Test Reports  
Test-Blast Evaluation Report  
Individual Shot Reports  
Drilling Logs

Individual Shot Vibration Monitoring Report

Individual Shot Videos

Daily Blasting And Removal Log

Blasting Consultant's Report

Post-Blast Surveys

Reports of Required Safety, Protective, and Natural Resource Programs

Post-Test Blast Evaluation Report

#### SD-07 Certificates

Blasting Licenses and Credentials

Seismic Specialist

Seismograph Technicians

Magazine Keeper

#### SD-11 Closeout Submittals

Summary Report

### 1.7 COORDINATION

A coordination plan, with the appropriate authorities that mitigates navigation and traffic delays must be included in the Master Blasting Plan.

Coordinate, through the Owner, with other Contractors working onsite to minimize work stoppages during blasting.

### 1.8 LIABILITY

Compliance with provisions in the contract will not relieve the Contractor of their responsibility for any damages or injuries caused by, related to, or arising out of blasting or associated blasting activities. Notwithstanding federal, state, and local laws, regulations and ordinances, the Contractor assumes all liability and hold and save the Owner, its agents, officers, and employees harmless for any and all claims for personal injuries, property damage, or other claims arising out of or in connection with the handling of explosives or blasting under this contract.

### 1.9 CLOSEOUT SUBMITTALS

On completion of the work, furnish a Summary Report, countersigned by the Blasting Specialist, certifying that:

- a. All blasting is complete and all explosives materials, including detonators, detonating cord, explosives, and any unmixed components of a two-component explosive system, have been removed from the PNSY project limits.
- b. All boreholes loaded with explosives and any other sets of



explosive charges have either been detonated or unloaded and explosives have been properly disposed.

## PART 2 PRODUCTS

### 2.1 MATERIALS

All project blasting will take place underwater. Only water-resistant explosives, boosters and initiation system are to be used. Furnished materials and equipment required for underwater blasting operations, monitoring, protection to structures and the environment, material usage, including transportation and storage, shall conform to all applicable regulatory agency and permit requirements.

A. Blast Initiators: Non-electric (NONEL) or electronic blast initiators shall be used. Cap and fuse method and electric detonators shall not be used.

B. Explosives and Blasting Agents: Type recommended by Blasting Consultant and explosive manufacturer, and as allowed by authorities having jurisdiction. All explosives must be contained in cartridges or other manufacturer's semi-rigid container and/or loose granular, free flowing, pourable or pumpable explosives.

C. Delay Device and Timing: As recommended by Contractor. Delay timing shall be no less than 17 ms.

### 2.2 TRANSPORTATION, STORAGE AND USE OF EXPLOSIVES

#### 2.2.1 General

Store, transport, handle, use, and otherwise secure explosives in accordance with best practices as approved by the Owner and in accordance with all Federal, State and Local laws and regulations. Comply with all special rules and regulations that may be made by the authorities having jurisdiction, or by the Owner, regarding construction of, and storage in magazines and precautions in blasting. Times and imposed restrictions concerning the use of explosives must be conducted in accordance with local, State, and Federal regulations. The Owner reserves the right to establish restrictions or time windows when blasting will not be allowed.

#### 2.2.2 Blasting Products

##### 2.2.2.1 Requirements

All explosive materials to be used on site must be proposed for approval in the Master Blasting Plan. Cartridged and bulk explosives may be used in different sections of the project. All explosive materials used on the project must be six months or less of age or no older than one half the shelf life shown on the explosives manufacturer's technical data sheet for that product. Millisecond delay, shock-tube initiators, must be used as the initiation system. To ensure the accuracy of firing times of blasting caps, it is required that each cap period come from one lot number. Mixing of lot numbers for any single cap delay period within a shot pattern is strictly prohibited. For underwater blasting's ability to displace rock against the water load, the minimum delay both between shot holes and shot rows will be 25 milliseconds.

#### 2.2.2.2 Prohibited Explosive Materials

Explosives that do not meet the manufacturer's specifications must not be used. Blasting products without date batch codes will not be permitted on site.

Bulk explosives, which are water sensitive, are strictly prohibited.

Detonation Cord is strictly prohibited for initiation transmission through the air and water to the shot holes. An approved non-electric shock tubing, proposed in the Master Blasting Plan, must be used to transmit the firing initiation to each shot hole. Detonation cord may be used within the shot hole by proper connection to the shock tubing beneath the highest elevation of firm-rock stemming.

#### 2.2.3 Magazines

No explosives will be stored onsite. There must be no permanent explosive storage or overnight explosive storage onsite. The Contractor will either obtain daily deliveries of the explosives to the site from a manufacturer or supplier or secure offsite explosive magazines.

The Contractor must have two temporary magazines on board the drilling and loading barge of sufficient volume to hold the largest day's use of explosives and initiators separately. These temporary magazines must meet all ATF requirements and all regulations and ordinances of state and local government. No explosives may remain overnight in the temporary magazines. A daily-use log of explosives delivered, loaded by shot hole through the day, and removed at the last shift must account for the use of all explosives.

#### 2.2.4 Magazine Keeper

Each magazine keeper must be experienced and familiar with the laws and general practices concerning the handling, care, use, and storage of explosives and detonators. The magazine keeper is responsible for maintaining a cleared area around each magazine. The magazine keeper will not be required to perform any duties that will in any way interfere with their duties as magazine keeper and being physically present at the magazines for every entry to the magazines for delivery, disbursement, and review of explosives at the magazines.

If explosives are delivered and returned daily from the manufacturer or supplier to the project, the driver of the truck will serve as the magazine keeper.

### PART 3 EXECUTION

#### 3.1 GENERAL EXCAVATION AND REMOVAL

Perform the excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Dredging, breakage, displacement, and excavation of all the materials will be accomplished by appropriate techniques and with special care, such that no individuals, cited natural resources, structures, navigation and other sensitive features, and activities suffer any adverse effects from blasting. Perform the submerged removal in accordance with the typical sections shown and the tolerances specified in paragraph SUBMERGED MATERIAL DISPOSAL.

The Contractor's blasting program and methods will be those controlled blasting techniques necessary to accomplish the excavation shown on the contract drawings in accordance with the procedures specified in this section. Make necessary plans, examinations, surveys, and test blasts to determine the quantity of explosives that can be fired to accomplish the breakage (or displacement) and removal of materials without injuries to persons, and aquatic wildlife (or other natural resources), or damage to personal or public property. Test blasts will be performed to slowly build to acceptable loading and timing of production shot patterns, to verify that the monitoring network performs as designed, to begin to assemble monitoring data collection, and to resolve that the submerged material is adequately broken or displaced for removal. Use the test blasting results to optimize remainder of work. The blasting program must abide by all applicable Federal, state, and local laws, regulations, and ordinances established for the project's location.

Process any and all claims of public entities, companies and private citizens arising from the transportation, storage, and use of explosives promptly in an acceptable time period set by the Owner; in particular, all injury and property damage claims must be acknowledged by the Contractor, or their representative, and be submitted immediately as directed by the Owner providing name of claimant, location, time and description of alleged injury, and damage, and estimated value. The claimed injury or damage will be evaluated and inspected by an appropriate specialist within 48 hours following initial notification, and processed to a conclusion (honored, denied, or compromised) within 90 days after cessation of all blasting on the contract; but, in no case will the claims remain unresolved for a period exceeding 6 months (180 calendar days). Submit evaluation and inspection results and actions taken to the Owner on a weekly basis.

### 3.1.1 Removal of Submerged Materials

#### 3.1.1.1 Sediment Within the Project Limits for Removal Displacement

Sediment vertically above the project rock limits must be removed by dredging, prior to action upon deeper materials.

#### 3.1.1.2 Breakage of Rock and Hard/Unyielding Materials for Excavation and Disposal

Blasting may be conducted to break or displace the rock and hard/underlying materials into sizes that may be removed by dredging or excavation equipment. Test blasting will be conducted to determine the parameters for the following production blasting. Care must be taken to prevent damage to any of the remaining specified materials, features or structures noted in the drawings; and avoid adverse effects from blasting to personnel, the public, natural resources, structures, and features. The Contractor must curtail blasting activities in designated areas when, in the opinion of the Owner, damage to in-place units or adverse impacts may have occurred. Blasting will be curtailed in these designated areas until both remediation, as directed by the Owner, has been completed, and the Contractor has resolved a means to conduct the blasting without the damage or adverse impacts.

#### 3.1.2 Disposal of Materials Within the Project Limits

Transport and place all dredged, displaced, or excavated materials within the limits of the disposal zones below the specified elevations, according

to the requirements specified in paragraph SUBMERGED MATERIAL DISPOSAL.

### 3.2 SAFETY PROCEDURES

#### 3.2.1 General

Ensure all work completed under this Contract is executed safely. Follow the safety procedures outlined in EM 385-1-1. EM 385-1-1 will govern all activity unless more stringent safety requirements are specified in other applicable Federal, State, and local laws, regulations, and ordinances.

#### 3.2.2 Weekly Coordination Meeting

Coordinate all blasting schedules with the Owner at least one week in advance and hold a weekly blasting coordination meeting with the Owner. Provide an agenda for the blasting coordination meeting that lists project's prior week's shots, the forecasted shot schedule, and displays a scale site plan showing the locations of the schedule shots. The Blasting Specialist, Blaster in Charge, and Seismic Specialist are required to participate in discussion of agenda items and lessons learned.

#### 3.2.3 Public Notice of Blasting Operations

Thirty days, prior to any blasting operations, prepare and submit to the Owner a public notification letter of the proposed blasting activities. The Owner will distribute copies of this notification letter by certified mail to local governments, law enforcement, public utilities, public users of project recreational facilities, and residents and commercial interests located within one half mile of the blast site. This notification letter must contain at minimum:

- a. Name, address, telephone number and e-mail address of the Contractor;
- b. Plan maps identifying the specific areas in which blasting will take place, and major and secondary roads, geographic features and auxiliary features;
- c. Duration of blasting activities, and on which days of the week and hours of the day that blasts can be expected to occur;
- d. Vehicular and pedestrian traffic control measures to be taken;
- e. Methods to limit access to the blasting area; and,
- f. Types, patterns and duration of audible warning and all-clear signals to be used before and after blasting.

#### 3.2.4 Public Meetings

Fifteen calendar days prior to any blasting operations, provide the approved Blasting Specialist, Blasting Consultant, and Seismic Specialist to attend a public-relations meeting to be conducted on an evening to be determined by the Owner. This meeting will inform the public about the anticipated blasting operations. The Blasting Specialist, Blasting Consultant, and Seismic Specialist must each make a short presentation of blasting operations and answer any questions pertaining to public concerns dealing with the blasting operations, the magnitude of vibrations, airblast and potential for flyrock that may impact the public, and the project's required natural resource activities. Distribute points of contact should

the public and local entities have an event of concern related to the blasting program.

### 3.2.5 Warnings and Signals

Establish a method of warning all employees on the job site of an impending blast following the guidance of EM 385-1-1. The signals must consist of a five-minute warning signal to notify all in the area that a blast will be initiated in five minutes. A second warning signal must be sounded one-minute before the blast. After the blast is over, sound an all-clear signal, once the blast site has been inspected for misfires by the Blaster in Charge to notify all in the area that the blasting operation is finished. No personnel other than the Blaster in Charge must enter the blast area, until it has been determined to be all clear.

### 3.2.6 Notification to Navigation

Notify the NHDOT a minimum of 14 calendar days prior to the commencement of blasting operations to allow for sufficient time to send out navigation notices. The information to be supplied will include the dates and time window of blasting operations.

### 3.2.7 Navigation Control During Drilling, Loading, and Blasting Operations

Notify the Coast Guard 24 hours prior to a scheduled blast and 2 hours prior to the actual blast's initiation. Contact should be made with: US Coast Guard's contact, whose name and an alternate's name will be provided at time of contract award.

Provide the number of patrol vessels as required by the U.S. Coast Guard and local harbormaster. Operate patrol vessel during blasting operations equipped with a visible yellow flashing light, audible horn, and radio with a hailer, whose sole function will be to monitor and maintain security in the blast area. Use patrol vessels during all blasting operations. Inspect and insure there is no vessel traffic within the work area prior to the firing of the blasting caps and until such time as the Contractor has sounded the "All-Clear Signal".

Establish and maintain a warning system as required by EM 385-1-1 and as stated in paragraph WARNINGS AND SIGNALS. Equip and maintain the floating plant with radio equipment capable of communications with the Coast Guard. The Contractor, after each blast, upon inspecting the area, notify the Coast Guard and the Owner if all clear or misfire is noted. Buoy the area with warning signs. The warning signs are to be legible at a distance required by the U.S. Coast Guard and local harbormaster and contain the message "DANGER - EXPLOSIVES IN USE" visible on either side of the sign. Station patrol vessels at the drill barge and remain in the blasting area during all blasting operations.

### 3.2.8 Lightning Detection Device

Furnish, maintain, and operate lightning detection equipment during the entire period of blasting operations and during the periods that explosives are used at the site. Equipment must provide real time audio and visual alarm/signal and detection based on combined detection of electromagnetic, electrostatic, light wave spectral and audio disturbances, or a commercial service based on these, as a minimum for approved. Equipment must be capable of detecting lightning within 25 miles as a minimum of the blast area. Provide the equipment after approval. When and where the lightning

detection device indicates a blasting hazard potential, immediately evacuate personnel from all areas where drilling is being conducted or explosives are present. When a lightning detector indicates a blasting hazard, perform the following actions.

- a. Clear the blasting area of all personnel. Place guards at all access points to the blast area.
- b. Immediately notify the Owner of the potential hazards and precautions being taken.
- c. Terminate the loading of holes and secure the unused explosives to an approved location.
- d. When the hazard dissipates, inform the Owner that the drilling and loading of holes will continue.

### 3.2.9 Drill-Boat or Barge Safety

All onboard day magazines must be permanently secured to the deck as required by the Coast Guard. No high explosives will be stored on the boat or barge deck in the open except for the one case that is to be loaded immediately into the shot holes. Any explosives remaining on deck must be returned to the day magazine prior to the firing of any blast. The firing line reel or spool will be mounted on the rig in a manner that it cannot be lost overboard. An approved blasting machine will be used for detonation regardless of the number of caps used. No electric blasting system can be used. The amount of explosives permitted aboard the drill boat or barge at any one time will be subject to the approval of the Owner, but in no case will such amount exceed the amount permitted by appropriate codes and regulations.

Make necessary arrangements to prevent damage to any vessel, moored or underway, building or structure and to preserve the crew or occupants thereon from exposure to injury because of the Contractor's operations. Automatic fire extinguishers of an appropriate type must be installed on air compressors and in all engine compartments aboard vessels (drill boats, barges) where explosives are stored, handled, and used. The Owner may require additional arrangements. Have a Certified Marine Survey of all floating plant proposed for underwater blasting work on this contract performed prior to starting any work and provide the results to the Owner. Remote fuel shut-offs and fire-signaling devices must be provided aboard the drill boat.

### 3.2.10 Inspection for the All-Clear Signal

The Blaster in Charge must thoroughly inspect the entire blast area for a minimum of five minutes following a blast. The five-minute delay between blasting and commencing work is needed to ensure that no misfires have occurred. Details of the misfire procedures were provided in the Blasting Safety Plan, including the distance of the restricted area when a misfire is discovered.

#### 3.2.10.1 Check for Misfires

During the five-minute delay, it is the responsibility of the Blaster in Charge to enter and inspect the shot-pattern area and verify for all loaded shot holes that all explosives have been detonated.

### 3.2.10.2 Misfire-Handling Procedures

Should an inspection indicate that complete detonation of all charges did not occur, only critical personnel involved in the blasting operation or excavation of the unexploded material are allowed within the established shot-pattern area. Restrict the site until the Blaster in Charge or the Blasting Specialist indicate the site is safe. If the misfire poses problems that cannot be safely corrected by the Blaster in Charge or the Blasting Specialist, a consultant, or an explosives company representative skilled in correcting misfires must be called to resolve the problem. Provide within 60 minutes of the recognition of a misfire, a notice to the Owner and all applicable agencies and offices for public safety. Compliance with this or any other provision in the Contract will not relieve the Contractor of responsibility for any damages or injuries caused by, related to, or arising out of blasting or associated blasting activities.

Provide the details of the misfire and the correction measures in the Individual Shot Report for shot with the misfire to the Owner and the emailed addressees the next business day.

### 3.2.11 Natural Resource Protection (Environmental Resource Protection)

The Contractor is required to utilize the following to avoid and minimize techniques designed to mitigate the impacts of underwater blasting that have been developed, in coordination with other Federal agencies, in compliance with the federal, state, and local environmental laws and regulations and with applicable regulations and requirements of Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS. All activities requiring the Contractors' action or coordination are included in paragraph NATURAL RESOURCE ASSESSMENTS, Mitigation and Monitoring. The Contractor has full responsibility for not violating all the mitigation requirements. Associated fines for violations will be borne by the Contractor.

## 3.3 OPERATIONAL REQUIREMENTS

### 3.3.1 Coordination

#### 3.3.1.1 Schedules

Coordinate schedules for blasting with the proper authorities, federal, state, local. No blasting will be conducted unless the Contractor is notified by the appropriate parties that blasting may proceed. In addition, if channel restrictions of navigable waters are required for drilling and blasting, the Contractor must coordinate with the U.S. Coast Guard.

#### 3.3.1.2 Permits

Obtain all necessary permits from the state and local authorities to transport explosives and all blasting agents necessary. The Owner will be notified in writing that all permits have been obtained and will be furnished copies of all permits. All work must be in accordance with the issued permits.

### 3.3.2 Work Restrictions

#### 3.3.2.1 Confined Detonations

The rock excavation after blasting will be more effective if each loaded drill hole is well confined by stemming within sound rock. The intent is to confine the gaseous detonation products of each shot hole, such that no rifling plumes, the visual result, are produced in any shot patterns. The premature release of the gaseous products reduces or eliminates effective fracturing and displacement and causes large water-borne pressures potentially damaging to natural resources. Drill-hole logging is required to recognize the depth of firm rock and voids, and to adjust the designed Individual Shot Plan loading of each shot hole with explosives and stemming according to the position of sound rock relative to the paid elevation of removal. Video recording of each blast will detail the effectiveness of avoiding rifling plumes.

#### 3.3.2.2 Temporal, Weekly and Seasonal Restrictions for Blasting

Blasting must occur between November 15 and March 15. Blast initiation is only permitted, during the period from one-hour after sunrise to one-hour before sunset. The Contractor will not be constrained by weather conditions, except for lightning, for underwater blasting in depths of water greater than 3.0 ft for which airblast is often negligible. Drilling and blasting must take place between November 15 and March 15.

#### 3.3.2.3 Allowable Vibration

Conduct all the required monitoring as noted in paragraph IMPACT MONITORING. Conduct all blasting by controlled blasting methods to avoid exceeding the allowable vibration in applicable federal, state, and local laws, regulations and ordinances at all structures and facilities, as monitored by blast seismographs.

The allowable vibration at any structure or facility must not exceed the maximum PPV of 2.0 inches/second (ips), nor exceed the PPV amplitude in the Frequency versus Particle Velocity Graph Figure in NFPA 495 (Figure 11.2.1) for the frequency of the half-cycle amplitude.

#### 3.3.2.4 Limiting Blast-Induced Vibrations at Green Concrete

During the performance period, other construction activities may be placing concrete at varied locations on or near the project. Coordinate with other project contractors.

- a. Assuree that a seismograph is monitoring vibrations from blasting at a location, which is closer to the blast pattern than the Green Concrete. Seismic monitoring must be conducted near the concrete placement from prior to placement until 72 hours after placement.
- b. The table below indicates that maximum allowable peak particle velocity (PPV) permitted, relative to the age of the recently-place concrete, as measured at an acceptable location or within 50 ft of the most recently placed concrete on the side of closest approach to the blast.



Age of Concrete (hours)	less than 12	12 to 24	24 to 72
PPV (inch/second)	0.1	1.0	2.0

- c. Adjust all blasting to conform to the table's maximum allowable PPV at the seismograph near the Green Concrete. See paragraph BLAST-EFFECTS MONITORING.

### 3.3.2.5 Allowable Airblast

Conduct all the required monitoring as noted in paragraph IMPACT MONITORING. Conduct all blasting by controlled blasting methods to avoid exceeding the allowable airblast in applicable federal, state, and local laws, regulations and ordinances at all structures and facilities, as monitored by blast seismographs. Peak airblast overpressure must be held below 133 dB (linear peak scale), 0.015 pounds/square inch (psi) at the nearest residential or inhabited structure or other designated location.

## 3.4 BLASTING PERSONNEL

### 3.4.1 Blasting Consultant

The Blasting Consultant, Blasting Specialist, Blasting Administrator, Blaster in Charge, and Vibration Specialist cannot be the same person. Retain a recognized Blasting Consultant to assist both with the project's blast design and with the resolution of any blasting issues for the project. Submit the Blasting Consultant's expertise submission within 15 days of the Notice to Proceed. The Blasting Consultant must be approved by the Owner two weeks prior to the submission of the Master Blasting Plan.

#### 3.4.1.1 Blasting Consultant's Responsibilities

The Contractor's Blasting Consultant must be available to review the Master Blasting Plan, assist with controlled blasting techniques, and resolve difficult or complex issues with blasting for the project. The Blasting Consultant will recommend controlled blasting methods, as necessary, to meet safety and natural resource requirements, retain airblast and vibration within the allowable limits, and protect the rock foundation. Proposed controlled blasting methods must be submitted in the Master Blasting Plan.

The Blasting Consultant must provide advice for, and review, the Master Blasting Plan, attend the public meeting(s), and be available for consultation on an "as needed" basis, as determined separately by the Contractor or by the Owner. The Blasting Consultant is not required to be at the project site for review of the Master Blasting Plan or of any specific shot plans or records. The Blasting Consultant must be present at the project site for any required shot issue or, if requested, for the subsequent shot following a misfire or significant exceedance of any onsite blasting issues.

The Blasting Consultant must provide a written summary of all site visits and special assignments within 2 business days of performing such actions to both the Contractor and the Owner.

The Blasting Consultant must submit a short, signed Blasting Consultant's Report each month stating that he/she has briefly reviewed the individual shot documents, including blast videos, and has collaborated with the

Contractor on all issues, concerns, or errors in the individual shot documents. This report is due within 3 business days after the end of the month.

If problems with vibration, airblast, rifling of a shot hole producing a water column plume, or production blasting occur, the Owner will require the Contractor to immediately summon the approved Blasting Consultant and have their presence on site within 10 days after the problem develops to:

- a. Approve each Individual Shot Plan;
- b. Observe in person shot-hole drilling, logging, revision to that hole's plan, and loading with the full authority to stop or delay any blast he/she considers unsafe;
- c. Review and sign each Individual Shot Record at no additional cost to the Owner; and,
- d. Submit and sign a written checklist that all necessary precautions were reviewed and followed by the drilling and blasting crews.

The checklist must be as defined under the section on Individual Shot Reports. The signed checklist must be attached to each Individual Shot Report.

#### 3.4.1.2 Blasting Consultant's Expertise

The consultant must be able to demonstrate involvement in at least 15 projects with controlled blasting. The consultant must provide, as a minimum, the credentials and experience for each outlined following items:

- a. The consultant must have at least 10 years of experience in construction blasting within 250 ft of protected structures, and had consultation on three underwater blasting programs;
- b. The consultant must be able to demonstrate that he has attended at least 15 short courses, seminars, or conferences on blasting technology, or university engineering class studies on blast design during the past 20 years, including a complete understanding of blasting seismology with emphasis on vibration frequency, acceleration, and displacement (ground strain);
- c. For the past 10 years the consultant must have derived their primary source of income from providing specialized blasting consulting services;
- d. A list of recent projects containing a description of the projects' details, summarize the blasting plans, and any modifications made during the projects from your consulting;
- e. Provide the names and telephone numbers of contacts, who have sufficient stature with, and knowledge of, their individual project to verify the submitted information in competency and ability, for at least three recent projects;
- f. Hands-on experience as a blaster for at least 3 years; and,
- g. The Blasting Consultant, Blasting Specialist, Blaster in Charge, and Seismic Specialist cannot be the same person.

### 3.4.1.3 Blasting Consultant's Qualifications Submissions

Submit the resume, education, experience, current blasting licenses and credentials, and training of the proposed Blasting Consultant, and a formal letter of commitment from the consultant verifying their availability on an "as needed" basis for the duration of the Contract. The consultant must be a drilling and blasting expert, who has derived their primary source of income by providing specialized blasting and blasting consulting services. The provided consultation must have included at least three, large underwater blasting projects. The consultant must not be an employee of the Contractor, an explosives manufacturer, an explosives distributor, or any other sub-contractor. There must be no additional cost to the Owner for the Blasting Consultant's duties, even when required by the Owner.

### 3.4.2 Blasting Specialist

The Blasting Specialist is the Contractor's employee most responsible for the project's blasting and conducting all coordination and providing all documentation for the underwater blasting. The Blasting Specialist must coordinate with the Owner on all issues dealing with blasting. The Blasting Specialist must be on the job site each day. The Contractor must submit the Blasting Specialist's expertise submission within 15 days of the Notice to Proceed. The Blasting Specialist must be approved by the Owner two weeks prior to the submission of the Master Blasting Plan.

#### 3.4.2.1 Blasting Specialist's Responsibilities

The Blasting Specialist is responsible for the project's blast design, preparing and submitting all necessary blasting documentation, and conducting quality control. The Contractor may employ a documentation assistant to aid the Blasting Specialist with all the blasting documentation creation and submissions. The Blasting Specialist is solely responsible for the accuracy and timely submission of all blast documentation.

#### 3.4.2.2 Blasting Specialist's Expertise

The Blasting Specialist must be able to demonstrate involvement in at least three projects with underwater blasting. The Blasting Specialist must provide, as a minimum, the credentials and experience for each outlined following items:

- a. The proposed individual must have at least 10 years of verifiable experience utilizing controlled blasting techniques and have had conducted controlled blasting on three underwater projects;
- b. Within the last five years, the proposed individual must have completed at least five days of classroom training that has familiarized the person with the most current drilling and controlled blasting methods;
- c. The proposed individual must be a licensed blaster in the State of New Hampshire and hold all credentials that may be required by local jurisdictions;
- d. In the last five years the proposed individual must have been responsible for the blast design or execution of underwater rock excavation projects, similar in scope and complexity as this project;

- e. The names and telephone numbers of contacts, who have sufficient stature with, and knowledge of, their individual project to verify the submitted information in competency and ability, for at least three underwater blasting projects; and,
- f. The Blasting Consultant, Blasting Specialist, Blaster in Charge, and Seismic Specialist cannot be the same person.

#### 3.4.2.3 Blasting Specialist's Qualifications Submission

Submit the resume, education, experience, current blasting licenses and credentials, and training of the proposed Blasting Specialist. Their credentials must include a list of the projects, including the location, duration, scope, description, geologic conditions, and the challenges that developed through the course of the projects and how the challenges were resolved.

#### 3.4.3 Blaster in Charge

The Blaster in Charge may create the Individual Shot Plan for approval by the Blasting Specialist. The Blaster in Charge, in the absence of the Blasting Specialist, is the Contractor's employee responsible for on-deck supervision of all underwater blasting activities and its documentation. The Contractor must submit the Blaster-in-Charge's expertise submission within 15 days of the Notice to Proceed. The Blaster in Charge must be approved by the Owner two weeks prior to the submission of the Master Blasting Plan.

##### 3.4.3.1 Blaster-in-Charge's Responsibilities

The Blaster in Charge, in the absence of the Blasting Specialist, is responsible for on-deck supervision of the drilling, shot-hole logging, possible revisions of the Individual Shot Plan, loading or abandoning of individual shot holes, and firing the blast. The Blaster in Charge is responsible for: the accurate placement of the shot holes' locations for drilling; conducting the drilling and shot-hole logging accurately; accounting for the relevant geology within each shot-hole's log; assuring the careful recording of every shot-hole's log and their submission with the Individual Shot Report; loading the blastholes according to the Individual Shot Plan or the revision thereto based on the shot-hole's log; coordinating the likely time of the blast pattern's initiation; coordinating all notices of imminent blasting and providing the signaling before and after the shot; initiating the blast; performing the post-blast inspection; providing the All-Clear signal or instituting the notices and actions for a misfire; and, providing the documentation for, and signing, the Individual Shot Report.

##### 3.4.3.2 Blaster-in-Charge's Expertise

The Blaster in Charge must be able to demonstrate involvement in at least two projects with underwater blasting. The Blaster in Charge must provide, as a minimum, the credentials and experience for each outlined following items:

- a. The proposed individual must have verifiable experience in equivalently responsible roles for controlled blasting projects for at least 3 years and with underwater projects;
- b. Within the last 5 years, the proposed individual must have completed at

least five days of classroom training that has familiarized the person with the most current drilling and controlled blasting methods;

- c. The proposed individual must be a licensed blaster in the State of New Hampshire and hold all credentials that may be required by local jurisdictions; and,
- d. The Blasting Consultant, Blasting Specialist, Blaster-in-Charge, and Seismic Specialist cannot be the same person.

#### 3.4.3.3 Blaster-in-Charge Qualifications Submission

Submit the resume, experience, current blasting licenses and credentials, and training of the proposed Blaster-in-Charge. Their credentials must include a list of the projects, including the location, duration, scope, description, geologic conditions, and the challenges that developed though the course of the projects and how the challenges were resolved.

#### 3.4.4 Blasters

The Contractor may elect to employ multiple Blasters. Each Blaster is a Contractor's employee responsible for on-deck, underwater drilling and blasting activities under the supervision of the on-deck, Blasting Specialist or Blaster in Charge, whoever is present. The Blaster in Charge or a Blaster will log each shot hole, as the hole is being drilled. Each Blaster must be approved by the Owner after the submission of the Master Blasting Plan.

Blaster qualifications require each Blaster must be able to demonstrate prior experience with drilling and blasting. The proposed individuals must be a licensed or certified blaster in the State of New Hampshire and hold all credentials that may be required by local jurisdictions. Submit the resume, experience, current blasting licenses and credentials, and training of each proposed Blaster with the Master Blasting Plan.

#### 3.4.5 Blasting Administrator

The duties of the Blasting Administrator are to be the direct assistant of the Blasting Specialist in preparing all necessary paperwork, and in performing quality control on all issues dealing with blasting. The primary function is to assist the Blasting Specialist in the preparation and completion of submittals, prepare the detailed post blast report, and the individual shot videos for submittal to the Owner, and submit the drilling logs with the post blast report. The Blasting Administrator cannot sign any paperwork. The Blasting Administrator must be approved by the Owner.

Blasting Administrator's qualifications require the Blasting Administrator to possess the following minimum qualifications and experience:

- a. Holds a current Blaster's license;
- b. Have prior experience in underwater blasting;
- c. Must have completed at least five days of classroom training within the last five years that has equipped the person with the most current knowledge in blasting procedures; and the software to be used on the project; and,

- d. Have proven proficiency with blasting software and spreadsheets.

#### 3.4.6 Vibration Monitoring Specialty Firm

Retain the services of a vibration monitoring specialty firm that specializes in the prediction, monitoring, and control of ground vibration and airblasts. The firm must have experience conducting installation of seismographs for vibration monitoring, communicating vibration and airblast results, and developing and maintaining a site attenuation curve. The firm must have on staff at least two Seismic Specialists that specialize in vibration monitoring and analysis. The firm must have on staff at least four Seismograph Technicians that have five years or more experience with seismograph installation and vibration monitoring. Submit resumes for all personnel and for the firm for approval citing, in addition to other pertinent data, experience, training, and education, at least 60 days prior to the commencement of blasting. The Seismograph Technicians must be persons capable of setting up the seismographs at designated locations, effectively recording the blast, and appropriately interpreting results. The Seismic Specialists must interpret the seismograph records to ensure that the seismic data must be effectively utilized in the control of the blasting operations with respect to the existing structures. The Seismograph Technicians must supervise the placement, operation, and maintenance of the seismographs. The Seismic Specialists must conduct the airblast and particle velocity regression analysis as described in this Section. The Owner may require the Seismic Specialists and Seismograph Technicians to be present during the test blast program, production blasting, or both.

#### 3.4.7 Seismic Specialist

The Contractor will retain the services of an independent, seismic-monitoring firm with employees capable of monitoring, assessing, and predicting vibrations and airblast due to blasting. The Seismic Specialist must be an employee of the independent, seismic-monitoring firm, and must not be an employee of the Contractor. The Seismic Specialist will conduct, or assure the actions are being taken to obtain, the required blast seismograph monitoring for the project. The Seismic Specialist will supervise all Seismograph Technicians deployed to the project to deploy and maintain all the seismographs for recording vibrations and airblast, and to properly retain, store and submit all seismic records of the blasting. The Contractor must submit the independent, seismic-monitoring firm's, Seismic Specialist's expertise submission within 15 days of the Notice to Proceed. The firm and Seismic Specialist must be approved by the Owner two weeks prior to the submission of the Master Blasting Plan.

##### 3.4.7.1 Seismic Specialist's Responsibilities

The Seismic Specialist must be a person able to deploy blast seismographs, effectively record and transmit the seismic data, comprehensively assess, and interpret seismic data regarding the monitored blast's parameters, and remotely supervise the firm's Seismograph Technicians. The Seismic Specialist must also interpret the seismic records to ensure that the seismic data will be effectively utilized in the control of the blasting operations with respect to the existing structures and conduct of an optimized blasting program.

##### 3.4.7.2 Seismic Specialist's Expertise

The Seismic Specialist must be able to demonstrate monitoring deployment,

seismic data assessment and interpretation, prediction of vibration and airblast from blasting, and remote supervision of field personnel for five blasting projects. The Seismic Specialist must provide, as a minimum, the credentials and experience for each outlined following items:

- a. The proposed individual must have verifiable experience in equivalently responsible roles for controlled blasting projects for at least 3 years;
- b. Within the last five years, the proposed individual must have completed at least five days of classroom training concerning seismic monitoring equipment, data telemetry, and seismic data interpretation;
- c. The Blasting Consultant, Blasting Specialist, Blaster in Charge, and Seismic Specialist cannot be the same person. The proposed Seismic Specialist and Structural Inspection/Evaluation Specialist may be the same person.

#### 3.4.7.3 Seismic Specialist Qualifications' Submission

Submit the credentials of the proposed seismic-monitoring firm with documentation for the Seismic Specialist. Submit the firm's history for this office, if there are multiple offices, years under the present office's leadership, the regional extent of clients, the approximate number of projects in the past year, and the number of present employees at this office. Submit the resume, education, experience, credentials, and training of the proposed Seismic Specialist. Their credentials must include a list of the projects, including the location, duration, scope, description, and the monitoring challenges that developed through the course of the projects and how the challenges were resolved. The documentation must provide experience and capability for the proposed Seismic Specialist to provide remote blast monitoring and supervision of support personnel while the individual is not on site.

#### 3.4.8 Seismograph Technicians

The approved, independent, seismic-monitoring firm may provide Seismograph Technicians to assist the Seismic Specialist with the project's vibration and airblast monitoring. Each Seismograph Technician must be approved by the Owner after the submission of the Master Blasting Plan.

Each Seismograph Technician must be able to demonstrate prior experience with blast seismic monitoring on a prior project of equivalent size and similar telemetry requirements. The proposed individuals must have the required training and hold all credentials that may be required by local jurisdictions. Submit the resume, experience, credentials, and training of each proposed Seismograph Technician with the Master Blasting Plan.

#### 3.4.9 Structural Inspection/Evaluation Specialist

Pre- and Post-Blast structural inspections must be performed by specialists with at least five years' experience in pre-blast and post-blast surveys. Submit the resume, education, experience, credentials, and training of the proposed Structural Inspection/Evaluation Specialist to the Owner with the Master Blasting Plan. The proposed Seismic Specialist and Structural Inspection/Evaluation Specialist may be the same person.

#### 3.4.10 Magazine Keeper

The Magazine Keeper and an Alternate are the Contractor's employees

responsible for explosive magazines and its record keeping. The position of Magazine Keeper is required only if the Contractor elects to have explosives' magazines under his control. The Magazine Keeper must be approved by the Owner after the submission of the Master Blasting Plan.

The Magazine Keeper must be familiar with the laws and general practices concerning the handling, care, use, and storage of explosives and detonators. The Magazine Keeper must be responsible for maintaining a cleared area around each magazine, and accounting for by record the throughput of explosives and detonators. The Magazine Keeper must be present for any transfer of explosives and detonators into or out of the magazines. The Magazine Keeper must not be required to perform any duties that will in any way interfere with his or her duties as Magazine Keeper.

The Magazine Keeper must be able to demonstrate prior experience explosives' magazines. The proposed individual must hold all credentials that may be required by the State of New Hampshire and local jurisdictions. Submit the resume, experience, credentials, and training of the proposed Magazine Keeper with the Master Blasting Plan.

### 3.5 RECORD KEEPING

#### 3.5.1 Pre-Blast Surveys

Prior to the commencement of blasting, conduct a pre-blast survey of nearest buildings, structures, and utilities within 1,000 ft from the blast area by azimuth about the blasting zone to document pre-existing conditions. The pre-blast surveys will be conducted by, or under the supervision of, the Structural Inspection/Evaluation Specialist, who will also sign and date each survey. The survey extent and method used must be acceptable to both the Contractor's insurance company and the Owner. Submit a copy of all pre-blast surveys at least two weeks prior to the first Test Blast. Provide owners of surveyed structures a copy of their Pre-Blast Survey before, or with the notice of, blasting commencement. Notify owners and occupants of local buildings 10 days prior to the commencement of blasting.

Perform the following when conducting pre-blast survey.

- a. Provide methodology to be used in conducting the pre-blast survey and listing of structures, determined from the survey to be sensitive, with reasons for these structures being sensitive.
- b. Each structure must be documented (including photography and video recordings) as to its construction, foundation type, condition, and closest distance to excavation blasting. The general condition and all observable defects of each structure must be documented.
- c. The Commodity storage facilities that may be impacted by blasting must be addressed by the Contractor for safety and continued operation during the blasting program.
- d. Freestanding structures (such as retaining walls) must be inspected on the exterior and on the interior as a room. All concrete walks, driveways, etc. must be inspected for cracks, level condition, holes, and defects.
- e. Industrial structures, silo/elevators and special facilities, and office space must be described relative to their present conditions and



tolerance to vibration. Besides the inspection of walls, columns and stairwells, the Contractor must survey the work areas and structures for distress.

- f. An inspection of accessible structures must be made and a list of all structures, which could not be surveyed or refused to allow survey, must be completed. The dates of possible subsequent surveys and physical constraints prohibiting the survey must be documented.
- g. Certify that the survey was prepared prior to the start of any blasting under this Contract.

### 3.5.2 Post-Blast Surveys

Post-blast surveys must be conducted at any location, where a reasonable notice of damage from blasting has been provided. Post-blast surveys will be conducted by, or under the supervision of, the Structural Inspection/Evaluation Specialist, who will also sign and date each survey. The survey extent and method used must be acceptable to both the Contractor's insurance company and the Owner. The post-blast surveys must be conducted within a week of the notice of damage from blasting. Submit a copy of all post-blast surveys within two business days of the on-premises surveys to both the structure's owner and the Owner.

### 3.5.3 Daily Explosives' Magazine Inventory and Daily Explosives' Accounting

Accurate daily records must be kept by the Magazine Keeper, who must account for each piece of explosive, detonator, and equipment from the time of delivery at the magazine until its discharge in use or return to the magazine. If explosive products will be delivered and returned daily, the records of the driver must agree with the amount used in the day and a copy of each driver's record must be provided with the Daily Blasting and Removal Log submission. No explosive can be accepted until it has been plainly labeled and delivered as new stock in sound condition. Dates of manufacture and lot numbers will be recorded for all explosives delivered to the site. No explosive material older than 1 year will be used. Containers for explosives must be approved in advance by the Owner. Remaining inventory must be checked each day and any discrepancies must be immediately reported, regardless of the potential of accounting error, loss, or theft of explosive material.

Should a loss or theft of explosives occur, all circumstances and details of the loss or theft must be immediately reported to the nearest office of Alcohol, Tobacco and Firearms, as well as to the local law enforcement authorities and the Owner.

## 3.6 BLASTING DOCUMENTS

### 3.6.1 Master Blasting Plan

The Master Blasting Plan must be submitted for approval by the Owner and by the environmental agencies before the first anticipated Test Blast. No blasting may be conducted prior to the approval of the Master Blasting Plan. No deviation from the Master Blasting Plan will be conducted by the Contractor. Any request for change or revision to the Master Blasting Plan must be provided in writing and approved by the Owner and environmental agencies before such change or revision can be performed. The Owner's Representative will have a minimum of 30 calendar days to review prior to submitting to the environmental agencies. The agencies will have a minimum

of 21 calendar days to review.

Submit a Test Blasting Plan within the Master Blasting Plan that includes calculations for all noted adverse impacts. Non-electric blasting caps must be used for all underwater shots. The Master Blasting Plan must contain provisions for storing, handling, and transporting explosives, as well as for the blasting operations. The means of surveying and locating the shot-hole positions horizontally and vertically must be described in detail within the Master Blasting Plan. Provide a signed statement by the Blasting Consultant that the plan represents a safe and efficient set of means and methods with which to achieve the goals of the work. The Master Blasting Plan must be submitted with the signature and date of the Blasting Specialist.

#### 3.6.1.1 Proposed Blasting Personnel

Submit all the approved and proposed blasting personnel and their required information from paragraph BLASTING PERSONNEL. List and copies of licenses, permits, and clearances required, including permit numbers, when applied for, and date of approval or anticipated approval by Federal, State, and local concerns. Provide their police records for every approved and proposed blasting individual. Submit the complete Project Team Organization with duties, responsibilities and authorities clearly defined. Identify the on-site Safety Officer and include a listing of all personnel authorized to sign for, receive and use explosives on this contract.

#### 3.6.1.2 Explosives and Blasting Equipment

Submit all the explosives, their use, and their data sheets for the project. Data sheets, which include the products' specific gravity and water resistance, for all explosives and blasting agents that may be used.

#### 3.6.1.3 Blasting Safety Plan

Submit Blasting Safety Plan, that is in accordance with EM 385-1-1, Section 29, and all other Federal, state, and local regulations. Implement all other applicable safety requirements in addition to that required below. Include, as a minimum, the following items.

- a. Permanently secure all onboard magazines to the deck as required by all applicable Code of Federal Regulations.
- b. Do not store explosives on the boat or barge deck in the open except for the one case that is to be loaded immediately into the shot holes. Return explosives remaining on deck to the day magazine prior to the firing of any blast. Clearly identify the location of the day magazine in the 'Blasting Safety Plan'.
- c. Mount the non-electric, shock tubing spool on the rig in a manner that it cannot be lost overboard. Use an approved blasting machine for detonation regardless of the number of caps used. Do not use an electric blasting system.
- d. Limit the amount of explosives aboard the drill boat at any one time to be in accordance with the amount permitted by appropriate codes and regulations. Do not exceed the amount permitted.
- e. Make arrangements to prevent damage to any vessel, moored or underway,

building or structure and preserve the crew or occupants thereon from exposure to injury as a result of the Contractor's operations. The Owner may require additional arrangements.

- f. Perform a certified marine survey of all floating plant proposed for underwater blasting work on this contract prior to starting any work.
- g. Install automatic fire extinguishers of an appropriate type on air compressors and in all engine compartments aboard vessels including but not limited to (drill boats, barges) where explosives are stored, handled, and used.
- h. Provide remote fuel shut-offs and fire signaling devices aboard the drill boats.
- i. Coordination Plans with the local Coast Guard office to provide notice of blasting and for vessel traffic control.
- j. Alert sequence signals and public notice of blasting and all clear. See paragraph PUBLIC NOTICE OF BLASTING OPERATIONS in this section.

#### 3.6.1.4 Navigation Control Plan

Submit the Navigation Control Plan in accordance with EM 385-1-1, Section 29, and all other Federal, state, and local laws and regulations. Implement all other applicable safety requirements in addition to that are required below.

Develop a Navigation Control Plan, which is incorporated into the Master Blasting Plan, that will provide the procedures required to maintain safe passage of all vessels during the project.

The Contractor will buoy the area with floating warning signs. The warning signs will be legible from a distance of 200 ft and must contain the message "DANGER - EXPLOSIVES IN USE" visible on either side of the sign.

Operate two or more patrol vessels during blasting operations equipped with a visible yellow flashing light, audible horn, and radio with a hailer, whose sole function will be to monitor and maintain security in the blast area. A patrol vessel will be stationed at the drill barge and remain in the blasting area during all blasting operations. Land oriented access control and visual observation locations should be determined and approved by the Owner. Inspect and insure there is no vessel traffic within the buoyed work area prior to providing the Shot's Warning Signals and until such time as the "All Clear Signal" has sounded. Establish and maintain a warning system as required by the Corps of Engineers Safety Manual. Equip and maintain floating plant with radio equipment capable of communications with the Coast Guard. After each blast, upon inspecting the area, immediately notify the U.S. Coast Guard and the Owner of the all clear or of a misfire.

#### 3.6.1.5 Production Blasting Design

No blasting, including the Test Blasting, may differ from the approved Master Blasting Plan. Shot-hole drilling must not begin until the Master Blasting Plan is approved in writing. Reflect changes to the blasting or monitoring procedures, equipment, plant, products or personnel in a revised Master Blasting Plan or portion thereof. Obtain approval from the Owner, in writing, prior to implementation of any Master Blasting Plan changes or

revisions.

Confine the loaded charge with angular, granular stemming materials, placed within competent rock, to perform the most work and to avoid a rifling plume from occurring within any shot hole. See paragraph STEMMING. The shortest delay period both between two adjacent shot holes and between two adjacent shot rows in the shot pattern is 25 milliseconds (ms). The maximum charge weight per delay may not exceed (to be determined) pounds of all combined explosives and blasting agents in each 25-ms delay period.

Include in the Production Blasting Design Section, as a minimum, the following items.

- a. Proposed method of transportation, storage, and handling of explosives.
- b. Procedure for monitoring the blast operations and handling misfires.
- c. Plan showing the intended layout of the shot-hole patterns, timing and sequence, anticipated burden dimensions and depth of sub-drilling for a specified maximum charge weight per delay. Identify each drill hole by a unique, sequential identifier.
- d. Typical size, depth, and spacing of blast holes; methodology to assure loading of explosives is only within sound rock; the maximum load density (in pounds per foot of drill hole length) and the maximum powder factor (in pounds of explosive per cubic yard of rock shot); type of explosive and method of loading and detonating; procedure to confine the charge with stemming; and maximum number of holes to be detonated for a production shot pattern. Initiation system to be deployed and the means to assure each shot hole fires on its own delay.
- e. Sequencing of delays for each shot hole that will be employed during blasting and the maximum explosive loading in pounds of explosive per delay.
- f. Indication as to whether decking or boosters will be used.
- g. Type and number of drill frames, including drill hole diameter, and expected production rates/day.
- h. Type of blast seismographs to be used, manufacturer, and when last calibrated or certified, and types of video cameras.
- i. The formats of all logs and reports to be used throughout the life of the project designed to record pertinent data before, during, and after the blasting operation. Pertinent information includes, but not be limited to, those items specified in paragraphs detailing the submittals.
- j. Names, office mailing addresses and phone numbers of Contractor's representatives (Blasting Consultant, Blasting Specialist, Blaster in Charge, and Seismic Specialist) to which any informational inquiries may be addressed.
- k. Location plan, manufacturer's literature, and parameters to be used in site selection for the blast seismographs and video cameras. The location of any other monitoring equipment, when used.
- l. The methods that will be used to prevent all cited adverse impacts

during the blasting activities, including protection of natural resources.

- m. Complete list of floating plant involved in production blasting operations.
- n. Within the blasting plan consider the multiple types of commercial vessels that will be on the water over the period of the excavation and removal program. Notify the sail/yacht clubs, etc., of plans to blast in advance and what traffic control and proximity restrictions will be implemented.
- o. Cite the methods to be used to recover and dispose of all shock cord/tubing and initiation transmission-line debris immediately following each shot.

#### 3.6.1.6 Test-Blast Plan

In conjunction with the Master Blasting Plan, submit a copy of the Test Blast Plan for review. The Contractor may be required to revise and resubmit the plan. Concurrence with the revised plan will not relieve the Contractor of responsibility to produce safe and satisfactory results as set forth by these specifications.

The test blast program must be conducted by the Contractor consisting of at least 3 test blasts, consisting of 5 to 10 blast holes, for underwater excavation. Demonstrate that the test blasting program complies with all requirements described within the specifications and meets the needs of the Contractor in determining the amount of rock breakage for the equipment being used. If the results of the test blast are determined to be unsatisfactory by the Owner's Representative, revise methods as necessary to achieve required results. All costs incurred by the Contractor in adopting revised blasting methods necessary to produce an acceptable test shot shall be considered incidental to the contract unit prices for controlled blasting. The test blast plan shall be conducted and reported in strict accordance with procedures outlined in the sections of these specifications covering Vibration and Air Blast Control and the following:

- a. The Contractor will not be allowed to drill ahead of the test shot area until the test section has been evaluated and approved by the Owner's Representative.
- b. Notify the Owner's Representative sufficiently in advance of each test blast in order for Owner representatives to be present during the test blasts.
- c. Each test blast program shall involve all drill boats that will be used for any portion of the contract. No drill boat shall be used for the contract that has not participated in a test blast program.
- d. After the test blasts, the examine the representative structures of the pre-blast survey as previously specified. All new damage resulting from the test blasting shall be reported in detail to the Owner's Representative, including photographs.
- e. Upon evidence of any damage to test structures, test blasting shall cease until the Owner's Representative has been notified, and adjustments made.

f. The test events must begin with a small number of charges and extend upward to the maximum yield to be used. The final test event shall simulate as close as practicable to the explosive charge type, size, overlying water depth, charge configuration, charge separation, initiation methods, and emplacement conditions anticipated for the production blasting. One copy of the record for the test blasts shall be submitted in tabular form to the Owner's Representative daily.

g. At the conclusion of the test blast program, the Contractor shall produce a Post-Test Blast Evaluation Report which examines all reports, surveys, test data, and other pertinent information and conclusions reached to produce a complete Operational Blasting procedure. Submit a copy of the Post-Test Blast Evaluation Report for review. In no event shall operational blasting plan proceed until review of the report's proposed blasting procedure has been completed. If the report's proposed blasting procedure is not acceptable, revise and resubmit the report. The report shall include sketches showing blasting patterns, weights of explosives, wiring, charge emplacement, and determination of the safe peak particle velocity (PPV) for all structures identified in the pre-blasting surveys. Four copies of the Post-Test Blast Evaluation Report shall be submitted for review to the Owner's Representative and upon completion of the review and acceptance; it shall be appended to and become a part of the Operational Blasting Plan.

#### 3.6.1.7 Marine Species Minimization Measures

The following minimization measures are required to protect marine species and must be included in the Master Blasting Plan.

- a. Stemming and decking of individual charges;
- b. Staggered detonation of charges in a sequential blasting circuit;
- c. Blasting during periods of slack tide
- d. Use of a fish detecting and startle system to avoid blasting when fish are present or transiting through the area;
- e. Require the use of sonar and the presence of a fisheries and marine mammal observer;
- f. Prohibiting blasting during the passage of schools of fish, or in the presence of marine mammals, unless human safety is a concern.

#### 3.6.2 Individual Shot Plans

Submit an Individual Shot Plan 24 hours prior to any subsequent drilling and blasting for that shot pattern. The format may utilize a spreadsheet for ease data entry but requires an actual signature and handwritten date for its submission.

Prior to each blast, including Test Blasts, the Contractor must submit for the Owner's documentation a plan detailing all the data required in the Individual Shot Plan's format of the approved Master Blasting Plan. The plan will provide all the pertinent aspects of the blast design including, but not limited to, the loading, firing, delay sequence, and special considerations. The Individual Shot Plan will provide the location and depth of holes, inclination of all holes that will not be vertical, the proposed depth and the spacing of the blast holes, amount, and strength of

explosives per hole and per pattern, the proposed sequence of firing and time delays, and estimated time and day for the pattern's initiation. Each proposed shot pattern will be designed by the Contractor's Blasting Specialist with changes being determined by observation of the way the rock breaks as the operations progress. The Contractor must take such precautions as are necessary to prevent displacement, cracking or damaging the rock outside the prescribed limits of dredging or excavation. The rock outside the limits of the dredging must be left in as sound and undamaged a condition as possible.

- a. Submit an Individual Shot Plan to the Owner, with the anticipated plan for the next shot pattern prior to drilling the shot holes. Furnish each submitted Individual Shot Plan as a signed paper copy and in digital form to the e-mail listing required by the Owner. The Individual Shot Plan may be developed in a format that easily provides data that remains the same for the actual shot information in the Daily Blasting and Removal Log and the Individual Shot Report with its included reports.
- b. The Individual Shot Plan includes, as a minimum, the following items:
  - (1) The shot pattern's name/number, coordinate locations of the outermost holes of the shot pattern, any specific purpose for the shot, the anticipated time, date, weather conditions, and the water conditions and its elevation at the anticipated time of the shot;
  - (2) The total number of holes to be shot, the shot-hole diameter, the total weight of explosives, number of delays, load density and powder factor for the shot, the maximum charge weight per delay, the closest approach, scaled distance and estimated PPV and airblast overpressures at each monitoring location;
  - (3) A large-scale plan map depicting the proposed layout of shot hole pattern, timing and delay sequence;
  - (4) An elevation sketch showing a typical hole's loading from the water surface to the bottom of the drill hole with an elevation scale, including the elevation of the removal grade, the top of sound rock, the top and bottom elevation of stemming, the top and bottom position of explosive materials, and the position of all detonators, boosters and primers in the hole;
  - (5) A tabular listing, which may be a printed spreadsheet page, by hole in the ascending total delay time order by the describing: row and number within the row of the shot hole, total delay time, the total charge weight of explosive materials for the entire hole, the largest charge weight of any deck within a hole on a separate 25-ms delay if any, top of sound rock elevation, bottom hole elevation or the top of stemming elevation at the bottom of a shot hole that was over-drilled in depth and backfilled, stemming elevations, and detonator, primer and booster elevations in the hole;
  - (6) The estimated PPV and airblast overpressure at each seismograph location and the lateral close approach distance from the shot pattern to each seismograph;
  - (7) the means to remove and dispose of all shock cord/tubing and/or

initiation transmission-line debris immediately following the shot;

- (8) The name, title, and signature of the Blasting Specialist providing the form with the date of the signature.

### 3.6.3 Test-Blast Evaluation Report

Provide a report summarizing the Test Blasting and submit the report with the Individual Shot Report of the first apparently successful production shot.

### 3.6.4 Individual Shot Reports

Submit an Individual Shot Reports, both in writing to the Owner and by e-mail distribution to the required e-mail addresses, on the next business day and prior to any subsequent drilling and blasting for the next shot pattern. The supporting reports related to each shot pattern, which was not included with the Individual Shot Report, must be provided with their required data by the submission date of each supporting submission. The Individual Shot Report may utilize the spreadsheets, maps, and sketches of that shot's Individual Shot Plan, which have been corrected or revised for the actual shot-hole use, loading, timing firing, and observed or recorded impacts.

Submit for the Area Office's documentation a specific set of reports of all the actual information from an initiated shot pattern, including Test Blasts, required in the Individual Shot Report's format of the approved Master Blasting Plan. The record will provide all the pertinent aspects of the blast design including, but not limited to: the time, date and weather conditions at the blast's initiation; proposed shot holes that were abandoned; the actual shot holes' positions and elevations of stemming, loading, decking, its delay and firing sequence, and special considerations; the total weight of explosives and the maximum charge weight per delay for the pattern; all pertinent factors about signaling and providing the all-clear signal; the peak particle velocity of all seismographs; and, any delays to shot initiation and all blast impediments, including by not limited to, shot-hole rifling plumes, observed impacts from blasting, misfiring, and reports of damage from blasting. The Individual Shot Report will include or be followed with all the supporting reports from the shot pattern. Each Individual Shot Report will be signed by the Contractor's Blasting Specialist or Blaster in Charge, whoever initiated the shot pattern's firing. Take such precautions as are necessary to prevent displacement, cracking or damaging the rock outside the prescribed limits of dredging or excavation. The rock outside the limits of the dredging must be left in as sound and undamaged a condition as possible.

- a. The Individual Shot Report may be developed in a format that easily provides data that remains the same from the proposed design of the Individual Shot Plan and the actual shot information for the shot's supporting reports and in the Daily Blasting.
- b. The Individual Shot Record includes, as a minimum, the following items:
  - (1) The shot pattern's name/number, coordinate locations of the outermost holes of the shot pattern, any specific purpose for the shot, the anticipated time, date, weather conditions, water conditions and its elevation at the time of the shot;



- (2) The total number of holes to be shot, the shot-hole diameter, the total weight of explosives, number of delays, load density and powder factor for the shot, the maximum charge weight per delay, the closest approach, scaled distance and recorded PPV and airblast overpressures at each monitoring location;
- (3) A large-scale plan map depicting the layout of shot hole pattern, timing, and delay sequence;
- (4) A tabular listing, which may be a printed spreadsheet page, by the loaded shot hole in the ascending total delay time order by the describing: row and number within the row of the shot hole, total delay time, the total charge weight of explosive materials for the entire hole, the largest charge weight of any deck within a hole on a separate 25-ms delay if any, top of sound rock elevation, bottom hole elevation or the top of stemming elevation at the bottom of a shot hole that was over-drilled in depth and backfilled, stemming elevations, and detonator, primer and booster elevations in the hole;
- (5) The recorded PPV and airblast overpressure at each seismograph location and the lateral close approach distance from the shot pattern to each seismograph;
- (6) The removal and disposal of all shock cord/tubing and initiation transmission-line debris immediately following the shot;
- (7) A short narrative of any peculiarities or impediments or adverse impacts or accident/misfire with the shot, if any;
- (8) The name, title, and signature of the Blasting Specialist providing the form with the date of the signature.

#### 3.6.4.1 Drilling Logs

The Blaster in Charge or a Blaster with the assistance of the driller will log each shot hole, as the hole is being advanced. No drilling will be initiated without the Blaster in Charge or a Blaster to log the hole by a measurement means of drill bit's depth, the downward rig pressure, advancement rate of drilling, and air-water return of cutting with the driller's full assistance. The log must record the material encountered at the drill bit's depth to a precision of 0.1 ft. The drilling for each shot hole must be assessed to determine, and the log must record, the vertical depth/elevation of encountering sediment, weathered rock, the Top of Firm Rock, and voids to the total drilled depth. The shot-hole logs for all the shot holes in a shot pattern must be provided at the same time as the Individual Shot Report. An acceptable sample drilling log is provided in EM 1110-2-3800.

#### 3.6.4.2 Individual Shot Vibration Monitoring Report

After each shot, submit an Individual Shot Vibration Monitoring Report, which will require the use of blast seismographs, to measure the vibration created from the blasting activities. Submit the Individual Shot Vibration Report to the Owner by or before Noon of the second business day following the shot, which is being reported. Submit each Individual Shot Vibration Report as a signed paper copy and in digital form to the e-mail listing required by the Owner. This will be provided at the pre-construction meeting.

Direct the specialty firm providing the seismic specialist, with approval of the Owner, to place blast seismographs, consisting of three component seismographs, (1) at important structures, and (2) other locations designated by the Owner. At least three seismograph locations will be required for every blast during this project.

Samples of possible Individual Shot Vibration Report formats are in EM 1110-2-3800, pp B-9 and B-10. The minimum required information to be submitted in the Individual Shot Vibration Report includes:

- a. Date and time of recording from each seismograph;
- b. Type (brand and model) of three-component seismographs used, serial #, and position name;
- c. Who performed, and the date of, the most recent calibration of each seismograph, and its sensitivity;
- d. The firm and employee who placed the blast seismograph;
- e. Seismograph installation procedures to prevent disturbance during monitoring, vandalism, and damage, and whether the seismic data is being telemetered or downloaded individually;
- f. Set trigger levels;
- g. Maximum for each of the three, component PPV in units of pounds per square inch (psi), the maximum total vector-sum peak particle velocity in units of pounds per square inch (psi), and a log-log graph of all maximum total vector-sum peak particle velocity versus square-root scaled distance in units of sq ft/lb for all seismic records of all prior shots for this project;
- h. A graph of the PPV versus frequency for each seismograph location that triggered;
- i. The maximum airblast overpressures in units of pounds per square inch (psi) at any triggered monitoring location and the results from noise tests before blasting in the first report;
- j. A narrative description of any peculiarities or impediments or adverse impacts or accident/misfire for the shot; and,
- k. The name, title, and signature of the Seismic Specialist processing and interpreting the data and providing the report with the date of the signature.

#### 3.6.4.3 Individual Shot Videos

The Contractor will make a video recording of each shot pattern in a clear and consistent manner. Video recording must include date, time, and location. The digital video file must be furnished with the Individual Shot Report in a format noted within the Master Blasting Plan and approved by the Owner. The submission must be made to the Project Office and to all on the e-mail address listing. A library of blast videos will be maintained for all blasts and will be readily cross referenced with individual blast plans and post blast evaluations.

#### 3.6.4.4 Reports of Required Safety, Protective, and Natural Resource Programs

Specify the data submission for required safety, protective, and natural-resource actions. A summary report must be submitted by noon 2 business days after the shot of the special monitoring of a critical or essential facility or commercial structure, an avian or mammalian watch program for assurance that a shot is not initiated at a time when the cited species is present, underwater pressure wave monitoring, or other agreed/negotiated program.

#### 3.6.5 Daily Blasting and Removal Log

The Contractor must submit a Daily Blasting and Removal Log, both in writing to the Owner and by e-mail distribution to the required e-mail addresses, on the next business day. The Daily Blasting and Removal Log summaries all the drilling and blasting activities, surveying, dredging or removal of spoils, and disposal operations for any day that one or more of those operations were conducted. The Daily Blasting and Removal Log will be signed by the designated representative of the Contractor, approved in the Master Blasting Plan.

### 3.7 DRILLING AND BLASTING

#### 3.7.1 Underwater Shot Holes

No drilling will be initiated without the Blaster in Charge or a Blaster to log the hole and confirm the proper positioning of the shot hole. For underwater blasting, the Contractor must be prepared to: drill; log the hole; resolve the units encountered in drilling; reassess the Shot Plan's intent for that particular shot hole; load explosives, boosters, initiators and delays, place stemming in sound rock; and raise the firing line. If a shot hole cannot be drilled or cleaned out, the Contractor will be required to re-drill that shot hole or properly correct the shot design to delete that hole.

#### 3.7.2 Shot Hole Logging

The Blaster in Charge or a Blaster will log each drilled hole, as the hole is being drilled. The Blaster in Charge or a Blaster will log the shot hole by a measurement means of drill bit's elevation, the downward rig pressure, advancement rate of drilling, and air-water return of cutting with the driller's full assistance. The shot holes must be logged during drilling and measured upon completion with a weighted tape for its full depth before any explosives are loaded into any of the holes.

If any holes are too deep, then these holes will be filled to the proper depth with stemming. Repeated, significant voids, 0.5 ft or larger, must be reported to the Owner. The Blasting Consultant may need to assess the issue of voids. Should voids become confinement issue blasting will be delayed until the Contracting Office is satisfied that potential problems related to blasting around the void have been properly addressed.

#### 3.7.3 Stemming

All shot holes must have appropriately sized stemming material of the proper vertical placement length to optimize the blast design. Loss of explosive confinement can be due to improper stemming material type and poorly placed stemming. Tamped stemming must be placed from the top of

firm rock (or hard material), as determined from the drilling log, to the top of the explosive charge. Stemming must also be used to fill voids, if any, as noted on the drilling log of that shot hole.

#### 3.7.3.1 Stemming Material

Stemming must consist of well-graded, crushed, angular stone without fines. The gradation of the crushed, angular stone is between 1/8 inch and 3/8 inch in diameter. No soil or drill cuttings or rounded particles of the noted grading may be used as stemming material.

#### 3.7.3.2 Length of Stemming

The minimum vertical length of tamped stemming within rock, or hard materials, of a shot hole must be the greater of 2.0 ft or eight times the shot hole's diameter. This minimum length of stemming must be placed in firm rock, or hard materials, to contain the gaseous products of detonation both below the top of firm rock and on either side of (above or below) voids, if any, with an explosive charge.

#### 3.7.4 Loading Shot Holes

Stemming, decking, shot hole explosives' loading, and shot plan revisions for each shot hole must be made upon completion of drilling to the total depth from the logging of that underwater shot hole. Resolve whether to abandon the shot hole or load the hole from the Shot Plan's intent and the information resolved by the shot hole's log.

### 3.8 IMPACT MONITORING

Monitoring of the blasting may be required for public safety or natural-resource protection. The Contractor will be responsible for the payment and services of one or more, independent, third-party firms to conduct the required monitoring. The Contractor will make available the schedule and blasting documents to coordinate with other specialists monitoring issues for: the public's safety; environmental concerns for air, water, and property; natural resource protection; and the safety of structures and features.

#### 3.8.1 Public-Use Area Effects

The Contractor will provide personnel, patrolling vessels or vehicles, and the signage necessary to assure safe distances from all shot patterns are maintained and physically monitored at public-use areas on land or on water, and at occupied structures or highways or other features requiring control.

#### 3.8.2 Airblast and Seismic Monitoring

Airblast and vibration monitoring must conform to current industry standards and use equipment developed for blast monitoring. The Contractor will hire a subcontracted specialty firm, independent of the Contractor's firm and other sub-contractors to locate, maintain, and record the airblast and vibrations from every shot. The subcontracted seismic firm through their employee, the Seismic Specialist, will monitor the three seismic positions shown on the plans or accepted by the Owner. Additional seismographs may be required temporarily for (green) concrete placement or other temporary considerations or as required by the Owner for specific airblast or vibration issues due to blasting suspected at locations without

seismographs. The seismic records and the Individual Shot Vibration Monitoring Reports will inform the Contractor of the actual airblast and vibration parameters from every shot and assure the Owner that the blasting has remained within the allowable airblast and vibration levels.

Provide 3 blast Seismographs capable of sampling rates of 15,000 samples per second or higher that meets ISEE PSBS. The 15,000 samples per second accuracy is required to acquire reproducible vibration readings. Each seismograph provided to the project must have been calibrated by the manufacturer within six months of its installation. No seismograph may be used at the project may have manufacturer's calibration longer than eleven months prior to its date of use. The units must be self-contained except for external geophones and microphones. The seismographs without erasing the stored data must be capable of telemetering the digital data or downloading the digital data to a portable device. The units must be programmed with specific data for each site of seismograph placement, which includes seismograph location, geophone burial or mounting method, calibration signal, date, and time of the record. The seismographs must be housed in protective enclosures, if vandalism or high-traffic concerns or weather or other conditions could limit the continuous, proper recording by the seismographs.

The blast seismographs must not be placed inside of a structure, unless required for the designated purpose and authorized by the Owner. The seismographs should not be placed near a structure unless the intent is to measure that particular structure's specific response to the blast. The microphone must be positioned to avoid wave reflections of the airblast from the vertical, front or side of a structure, wall or rock face. The microphone should be placed at a height of 3.0 ft. The geophone for each seismograph must appropriate for buried in soil or for being physically secured to rock or sidewalk or pavement or a concrete foundation.

The seismographs must be operated continuously beginning seven days before the first anticipated Test Blast. All The airblast and vibration amplitudes' maximal, frequencies of those amplitudes, repeated occurrences, and other parameters for the first period of operation before the first Test Blast will be reported as the project's background conditions in the first Individual Shot Vibration Monitoring Report.

The seismographs must be operated continuously until the excavation has been approved by the Owner. The seismograph may be removed from the project and replaced after their initial deployment, if there will be no blasting for a period of seven days or longer and if there will be no explosives stored onsite during that period.

### 3.8.3 Individual Shot Videos

Record every shot pattern's blast with Full High Definition, 1080p, digital video recordings with a minimum of 30 frames per second from two designated locations, approximately perpendicular to one another, that provide side and front or rear views of the blast and area above it. The video images must not contain any other text than the shot number. Include metadata consisting of the blast ID, date, and time of the blast. Index the two video recordings to properly identify each blast. Submit the proposed locations of the two video recorders on a map with the Individual Shot Plan. Furnish electronic file copies of video recordings on the sFTP within 24 hours of a blast. If the Owner requests that a copy of the video be submitted earlier, then deliver a copy within one hour of the request. Maintain a digital video library of all blasts.

#### 3.8.4 Air, Water or Land Protections

Assure that all escaping or released gases, fluids, and solids are within applicable limits of all federal, state, and local laws, regulations, ordinances, and guidelines. Any releases of fluids or solids that are not such limits will be immediately reported, mitigated, retained, and removed from the project.

Remove all shock cord/tubing and initiation transmission-line debris immediately following each shot.

#### 3.8.5 Natural Resource Assessments, Mitigation and Monitoring

Conduct blasting during periods of slack tide. Blasting will be prohibited during the passage of schools of fish or in the presence of marine mammals. Include the following sections in the Master Blasting Plan.

##### 3.8.5.1 Fish-Repelling Noise

Use a fish detecting and startly system to avoid blasting when fish are present or transitioning through the area.

##### 3.8.5.2 Watch Program

A fisheries observer and marine mammal observer must be present during blasting operations. Sonar will be used to detect fish and mammals. Submit name and qualifications of the fisheries observer and marine mammal observer for approval by approved by the Owner. Qualifications acceptable to the National marine Fisheries services.

##### 3.8.5.3 Post-Blast Fish Surveys

Submit a plan to count, collect, ID, and report on any fish kills that occur during blasting. This report will be reviewed by National Marine Fisheries Services (NMFS) within seven days of blasting. If fish kills exceed 100, notify NMFS within 24 hours and before the next scheduled blast. Alternate measures may be required to reduce fish kills.

#### 3.8.6 Sub Title

Text

#### 3.9 SUBMERGED MATERIAL DISPOSAL

Transport and place all dredged, displaced, or excavated materials within the limits of the disposal zones below the specified elevations, as specified in Section 35 20 23 DREDGING.

-- End of Section --

## **NHDOT Natural Resource Agency Coordination Meeting Minutes (February 2023)**

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**BUREAU OF ENVIRONMENT  
CONFERENCE REPORT**

*Final*

**SUBJECT:** NHDOT Monthly Natural Resource Agency Coordination Meeting

**DATE OF CONFERENCE:** February 15, 2023

**LOCATION OF CONFERENCE:** Virtual meeting held via Zoom

**ATTENDED BY:**

**NHDOT**

Matt Urban  
Andrew O’Sullivan  
Jon Evans  
Marc Laurin  
Rebecca Martin  
Arin Mills  
Samantha Fifield  
Jennifer Reczek  
Meli Dube

**ACOE**

Mike Hicks

**USCG**

Gary Croot

**EPA**

Jean Brochi

**NHDES**

Karl Benedict  
Mary Ann Tilton  
Christian Williams

**NHB**

Ashley Litwinenko

**NH Fish & Game**

Mike Dionne

**Federal Highway**

Jamie Sikora

**US Fish & Wildlife**

Absent

**The Nature Conservancy**

Absent

**NH Transportation &  
Wildlife Workgroup**

Absent

**Consultants/ Public  
Participants**

Alanna Gerton  
Michael Leach  
Gerard Fortin  
Megan Ooms  
Bill McCloy  
A Hubbard  
Christine Perron  
Noah Elwood  
Geno Marconi  
Michael Riccardi

**PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:** *(minutes on subsequent pages)*

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## **Finalize Meeting Minutes**

Finalized and approved the January 18, 2023 meeting minutes.

### **Meredith Culvert Replacement, #44048**

Arin introduced the project for replacement of a stone box culvert which carries Meredith Neck Road (MNR) over and un-named tributary to Lake Winnepesaukee. This is a state funded betterment project which is designed in-house and will be contracted for construction. The existing crossing is a 2.5' span by 5' rise stone box constructed about 1833 by local residents. The un-named stream is a Tier 2, 1<sup>st</sup> Order stream crossing, draining primarily undeveloped forestland. From the crossing the stream flows approx. 1,400 feet where it enters Lake Winnepesaukee. There is one additional town owned culvert downstream of the crossing. The structure has had limited work since construction, although it has been looked at multiple times to address safety concerns due to the drop hazard and the narrow width of the crossing as it does not meet modern transportation needs. The area surrounding the crossing is mainly forested with residential development. Conservation lands are in the vicinity, although none immediately adjacent to the project. Photos were shown of the crossing and surrounding landscape.

The purpose and need of the project are to address safety concerns and structural deficiencies of the crossing, propose a design that meets both current safety and design standards, and meets current environmental requirements. Project design coordination to date has included the Town of Meredith, the Division of Historic Resources, US Army Corp of Engineers, and Lakes Region Conservation Trust. The structure is eligible for the National Historic Register and much of the coordination and alternatives analysis that have resulted in the proposed design presented are a result of comments and concerns received over the last few months.

Sam presented the considerations for the design include: MNR is a Tier 4 (low-traffic volume), Class II roadway that is non-eligible for Federal Transportation Funding (ie: state funded), no impact to adjacent Smith Cemetery, minimize impacts to the rock wall located perpendicular to the culvert inlet, minimize impacts to rock walls located parallel to Meredith Neck Road, protect the traveling public from drop hazards (18' at the outlet and 12.5' at the inlet) and upgrading existing closed drainage to improve stormwater management. Design constraints include improved stormwater treatment, meet current stream crossing rules, address downstream perch of 7' total from outlet invert to the bottom of the scour hole, alternative chosen should match, as much as practicable, existing aesthetics, constructability and Traffic Control of the proposed alternative, environmental permitting and agency approval, long term maintenance and cost (100% state funded project).

Sam further presented alternatives considered. No build, which would not address the structural deficiencies and current safety hazards. Borings determined there is little structural material below the roadway with 20" pavement. Repair to existing crossing with use of a moment slab design was reviewed and determined to result in a narrowing of the roadway. Replacement options include relocation of the walls 25' from centerline and install guardrail, which was not accepted through coordination with both the town or DHR due to the adverse effects to the historic elements of the crossing. Construction of a 4:1 slope without walls or guardrail was reviewed and determined to have an increase natural and cultural resource impact. The preferred alternative, presented today, is rebuild walls 35' from centerline and outside of the clear zone to eliminate guardrail.

The proposed project is to replace a 3.5'W (varies throughout) x 5'H x 34.5'L stone box with a 5'W x 4'H x 75.4'L concrete box with scour countermeasures at the outlet. DOT will construct upstream and downstream granite block retaining walls incorporating existing stones. The existing closed drainage running along Smith cemetery will be upgraded to improve draining and water quality. Preliminary wetland impact plans were shown to depict the proposed concrete box and scour countermeasures. Both temp and permanent impacts to the stream (R3RB12) and Palustrine forest (PFO1E) are anticipated for construction and installation of erosion control measures. A profile was shown to depict the existing and proposed structure and removal of the downstream perch and scour hole. A drawing of the scour countermeasures proposed at the outlet was shown, to include placement of streambed material layered within and over Class B stone.

Sam provided a construction sequence as follows: Full closure of Meredith Neck Road for an anticipated 2-week time; installation of Erosion controls (EC), and a Clean water bypass (CWB); removal of the existing stone culvert, headwall, and retaining wall; installation of the proposed concrete box culvert and downstream scour protection at which time the CWB can be removed. The culvert will be filled over, roadway granular materials will be placed, and temporary steep roadway slopes will be constructed. This will allow for single lane alternating two-way traffic to resume on MNR. The upstream and downstream stone block retaining walls and 4:1 roadway slopes will then be constructed. Once 4:1 roadway slopes are constructed, two-way traffic may be allowed on MNR during non-work hours. Next, the site will be revegetated, pavement will be placed, and pavement markings will be installed,. Finally, the site will be cleaned, and EC measures will be removed once site is permanently stabilized. MNR will be fully returned to 2-way traffic once all tasks are completed.

Hydraulic calculations were provided to show both the existing and proposed design will pass the 100-year storm with a reduction in velocities with the widened crossing.

Arin provided an overview of the environmental review for the project. The stream is a first order stream from headwater to lake, a Tier 2 crossing with watershed of 312 acres. The project is not located within ¼ mile of a Designated River and does not fall under Shoreland jurisdiction. A previous permit was identified (1996-00337), although work was not completed. The existing outlet has a 7.2' cascade with a 4.3' perch resulting in a 9.5'W x 10'L x 1.9' deep scour pool. Upstream of the stream crossing, a reference reach with 8% slope was identified; the proposed crossing's slope is 6.9% ; the existing crossing is 3.5' wide (the proposed crossing 5' wide), and a perch of 4.3' is proposed to be eliminated. NHB review NHB22-1888 had no known occurrence or rare species; the NH online fish survey mapper showed no recorded E. brook trout or protected species in stream. Results of the Wetland Permit Planning Tool (WWPT) show no predicted PRA; Fish and Games habitat ranking showed supporting landscape nearby, and showed no prioritized habitat. The Aquatic Restoration Mapper identified Page Pond Forest nearby, which is not hydrologically connected to this stream. Low Meadow Farm is near the outlet and the project is located outside of the limits of the Conservation Easement held by Lakes Region Conservation Trust (LRCT). The LRCT have been involved in alternatives analysis and proposed design. No impacts to conservation lands anticipated.

Arin provided an overview of applicable wetland rules and classified the project as a minor impact under Env-Wt 903.01(f)(1)(e) with no waivers. No mitigation is anticipated as the design meets Env-Wt 904.08 with PE certification that the proposed crossing :maintains hydraulic capacity; enhances aquatic organism passage; enhances connectivity by eliminating perch; does not promote degradation by installing scour protection (incorporating streambed material) at outlet; enhances the crossing's ability to handle flooding events. A review of Env-Wt 904.01

determined that the proposed design meets all general design considerations. The project timeline is to present to the residents of Meredith on March 1, 2023 under Section 106 of Historic Preservation Act, submit wetland permit application to DES in late March, received construction approval and permit by August 2023 (Advertise on September 12<sup>th</sup>) and construct late summer/fall 2024.

Karl B said we were on track with 904.08 with addressing perch and appreciated the additional coordination required for cultural concerns. He questioned the possible need for mitigation as the increased length of the box results in >200 lf of channel and bank impacts. Karl also asked if the topography change for grading of slopes could be reduced. Sam stated that the fill required in front of the downstream dry laid stone wall is necessary for global stability of the wall and Karl asked a narrative be included in the application. Karl B questioned the no required mitigation for permanent impacts to the bank and channel from the increased length and grading. Andy O stated the project qualified for a Project Type Exception (PTE) under the stream crossing rules (900). Andy further clarified that the increase in length is required to eliminate the perch and scour hole. Karl asked that justification be provided for the impacts that are required to eliminate the perch, allowing the project to fully be classified under the stream crossing (900) rules. Additional communication and information within the permit will be conducted and provided. Karl asked for native planting along the stream banks and Sam said that would be incorporated into the design. Karl lastly asked about the outlet of the closed drainage and Sam described new catch basins will be installed and outlet outside wetland resources.

Mike D (F&G) had no comments. Mike H had no comments and stated ACOE would be the lead federal agency. Jeanie B (EPA) had no comments. Gary C (CG) said the water is non-navigable and had no comment.

### **Portsmouth, 15731 (A000(909))**

Christine Perron introduced the project, which involves the functional replacement of the barge wharf at the NH Port Authority Market Street Marine Terminal in Portsmouth to compensate for impacts caused by the new alignment of the Sarah Mildred Long Bridge carrying US Route 1 Bypass over the Piscataqua River. The project has been discussed at several monthly meetings and the purpose of today's discussion is to provide an update on the status of the permitting effort, proposed impacts, and mitigation.

An aerial view of existing conditions at the project site was reviewed to show the locations of the former and current bridge alignment, barge wharf, floating dock, and main pier. A separate project entails the rehabilitation of the main pier and infill of the open area of the main wharf. This project was previously permitted (NHDES Permit 2021-02950) and is currently under construction.

A plan view of the proposed improvements was reviewed. The key components of the project have not changed from when the project was last discussed:

- Construction of a new dock structure approximately 60 x 120 feet to extend the south end of the existing wharf.
- Construction of a new dock structure approximately 145 x 80 feet to extend the north end of the existing wharf.
- Dredging of approximately 55,000 square feet of the riverbed adjacent to the north end of the extended wharf.
- Relocation of the floating dock currently located off the north end of the wharf.
- Shoreside alterations, including soil and rock removal, grading, drainage, and paving within an 80,000-square foot area.

As the project progresses through final design, there have been a few design changes identified from what was previously discussed during preliminary design. These changes will be included in the upcoming permit applications:

- The Cape Arundel disposal site noted in preliminary design has closed. The alternative disposal site will be the Isle of Shoals North Disposal Site. The Corps requires a Sampling and Analysis Plan for the dredged material before it can be approved for off-shore disposal.
- The dredging depth will increase from -35' mllw to -36' mllw, which will slightly expand the footprint.
- The south wharf extension may not have a steel sheet pile wall along the shoreline as originally proposed, but instead have a grade beam with additional riprap. New riprap is anticipated to be added to existing riprap without expanding footprint.
- The proposed 40" steel piles for the north and south wharf extensions will be rock socketed into bedrock. Casing will be spun to the top of bedrock and the bedrock drilled to create the socket. The rock socket method reduces the amount of pile driving required and reduces underwater noise impacts. es require some pile driving that was not clearly defined in the original consultation.
- Removal of buried steel obstructions in locations of new piles (as needed to allow for pile driving).

The proposed dredging will require removing approximately 450 CY of bedrock and just over 18,000 CY of sediment. The dredge area is located at the former bridge alignment so it has never been dredged. A pier from the bridge is still in place and will be removed as part of this project. The south extension of the wharf will require a total of 30 piles, with a 40" diameter socket, and the north extension will require a total of 44 piles of the same diameter. The estimated area of direct impacts from the piles is approximately 600 square feet.

Environmental consultation and reviews were completed in 2019 during preliminary design in compliance with Section 7 (Endangered Species), Essential Fish Habitat, Section 106 (Historic Resources), and NEPA. Consultation under Section 7 and Essential Fish Habitat will be reinitiated to address the design changes noted above.

Now that the project is in final design, permit applications are being prepared and are expected to be submitted in March. The NHDES Dredge & Fill application was submitted last year to meet requirements for being reviewed under the old DES wetland rules. NHDES issued a Request for More Information (RFMI), and a response to the RFMI will be submitted concurrently with a request for an application amendment to address design changes. Required permits consist of the following:

- NHDES Dredge & Fill (Major impact)
- Army Corps Individual Permit
- Army Corps Section 408
- Section 401 Water Quality Certificate
- Coastal Zone Management Act Federal Consistency Finding
- NHDES Shoreland
- NHDES Alteration of Terrain

Minimization measures related to dredging and blasting are as follows:

- Dredging, blasting, and concrete demolition will occur between November 15 and March 15.
- A blasting plan will be submitted by the Contractor for approval prior to detonation of explosives.
- The following mitigation techniques will be implemented to reduce the sound pressure resulting from blasting:
  - Stemming and decking of individual charges;

- Staggered detonation of charges in a sequential blasting circuit;
- Blasting during periods of slack tide;
- Use of a fish detecting and startle system to avoid blasting when fish are present or transiting through the area;
- Require the use of sonar and the presence of a fisheries and marine mammal observer;
- Prohibiting blasting during the passage of schools of fish, or in the presence of marine mammals, unless human safety is a concern.

Turbidity considerations were reviewed. A sediment boom could be used for the water surface during construction; however, the currents make full turbidity curtains ineffective at this location. Cofferdams are not practicable given the depth of water, cost, and presence of the navigation channel. The Army Corps Piscataqua River turning basin project upstream of this project assumed that the majority of the sand and gravel to be dredged for that project would settle out within 1,000 feet of dredging. This assumption was based on prior monitoring conducted during Boston Harbor and other dredging operations while dredging silty material, which showed that the majority of resuspended material settled within 1,000 feet from the dredge. Given the coarse substrate at the SML and the high velocities, it is reasonable to assume that any turbidity plume would be less than 1,000 ft. Based on the strong currents (1.7 to 2 feet per second on average) and what has been observed during past construction projects in this area of the river, any turbidity is expected to dissipate sooner than 1,000 feet and would not extend across the river, which is approximately 1,600 feet wide.

Minimization measures related to pile driving are as follows:

- In-water pile driving will be completed outside of the window of anadromous fish spawning (April through June).
- A 'startle noise' will be implemented each day before any pile driving. This will consist of hitting the piles a couple times and then waiting 5-10 minutes prior to production driving.
- Piles will be installed using a vibratory hammer as much as possible and then impact driven using a cushion block.
- A safe unimpacted zone of passage of approx. 1,000 feet in width will be available for any sensitive species that may be foraging or migrating in the river during construction.

Jurisdictional impacts have not yet been finalized but are expected to consist of the following approximate totals:

IMPACT LOCATION	JURISDICTIONAL AREA	PROPOSED IMPACT	PERMANENT IMPACT (SQUARE FEET)	PERMANENT IMPACT (LINEAR FEET)
A	PISCATAQUA RIVER (E1UBL)	DREDGING	55,000	280
B	PISCATAQUA RIVER (E1UBL)	NORTH PIER EXTENSION	15,135	149
C	PISCATAQUA RIVER (E1UBL)	SOUTH PIER EXTENSION	10,370	90
D	PISCATAQUA RIVER (E1UBL)	FLOATING DOCK	1,363	136
E	TIDAL BUFFER ZONE (DEVELOPED)	GRADING	46,500	N/A
F	TIDAL BUFFER ZONE (DEVELOPED)	GRADING	4,100	N/A

The impacts shown for the wharf extensions account for the entire footprint of each extension. The actual direct impacts to the river bottom will be the piles only, which is approx. 600 SF.

When coordinating on mitigation during preliminary design, there was agreement on providing funding for the completion of the Cutts Cove living shoreline. However, in the last year or so, there have been concerns with the condition of what has been completed so far at Cutts Cove and, in talking with Lori Sommer last year, there seemed to be consensus that funding the completion of Cutts Cove no longer made sense. For this reason, mitigation will instead be via an in-lieu fee.

Input was requested on the most appropriate way to calculate an in-lieu fee. When originally discussed, mitigation was based on the 55,000 SF of dredge area, plus the 375 linear feet of impact to the river from the wharf extensions and floating dock. This approach results in a payment of more than \$800,000. This approach results in an overlap in the dredge and linear feet of impacts from the north extension, which is seemingly double counting impacts for mitigation. This approach also doesn't account for the fact that, once the project is completed, there will still be riverine habitat in the dredge area and under the wharf. An alternative approach to calculating the in-lieu fee should be considered that is based on linear feet of impact alone, which would be consistent with how mitigation is typically calculated for stream and river impacts. This alternative approach would be based on 506 linear feet of impact, resulting in a payment of approximately \$154,000.

The following is a summary of questions and comments from attendees:

Karl Benedict:

- Noted that he is taking a high-level approach in his comments given that there are other permit reviewers involved already.
- Should confirm that the amendment doesn't exceed 20% of additional impacts.
  - C. Perron noted that it would not exceed this threshold.
- The application should address dredge rules, PRA, TBZ, and account for TBZ mitigation.
  - C. Perron noted that the tidal buffer zone is developed and no mitigation is required.
- He will discuss the mitigation calculation internally and follow up.

Mike Dionne:

- Stated that he had previously coordinated with C. Perron on this project and NH Fish & Game's concerns are addressed in the minimization measures that were reviewed.

Mike Hicks:

- Was the need for an Individual Permit already confirmed?
  - C. Perron said that it was previously confirmed.
- Where would dredge spoils be taken?
  - C. Perron noted that spoils would be disposed of offshore, pending the results of the required sediment testing.
- The application will need to address Appendix B Section 6.
- Have historic resource concerns been addressed?
  - C. Perron stated that the project has a signed No Adverse Effect memo for Section 106 and there will be an archaeological monitor during construction in the location of archaeological sensitivity.
- Noted that the project has been reviewed at several meetings, including on site, and seems to be on track.

Jean Brochi (Due to technical issues, these comments were provided via email following the meeting):

- There was consensus that this project required an Individual Permit
- Recommend a separate mitigation meeting to discuss mitigation that includes DES, Corps, and EPA.

- Since the next submittal in March is an amendment, the Corps and DES may want to discuss what will need to be involved and included in the submittal.

Gary Croot:

- No bridge impacts involved so no Coast Guard permitting is required.
- If construction involved barges adjacent to/in channel, the Coast Guard will coordinate with the Port to issue notice to mariners.

Jamie Sikora:

- Noted that FHWA is the lead federal agency and approved the NEPA Categorical Exclusion document. Design changes will be reevaluated, which includes reinitiating consultation on EFH and ESA.

Chris Williams:

- Notification to mariners and the fishing industry will be required due to the dredging and increase in vessel traffic during construction.

### **Fremont #23793**

This is the second presentation to the Natural Resources meeting. Alanna Gerton introduced the Stantec project team to the meeting attendees, and stated this project is being presented on behalf of the Town of Fremont. She then began the presentation regarding Fremont 23793 – Culvert Replacement Project at Martin Road over Brown Brook, and noted the primary focus is project mitigation. She reviewed the existing condition of the site:

- Located at the Eastern side of Fremont
- Brown Brook (Tier 3 Stream) crosses under existing bridge
- Existing bridge is a 1930 cast in place concrete deck on steel beams
- 10' w x 4.5' h x 18' l
- Brown Brook is backwatered thru culvert to depth approximately 2 feet
- 9-10' travel lanes along Martin Road
- 520 AADT (2020)
- The project is adjacent to Prime Wetland

Photos of the inlet and outlet were presented along with photos of the existing bridge. Alanna noted the existing bridge has been on the State's Municipal Red List since 1992. The abutments are poorly aligned with the channel and the recent bridge inspection report dated December 21, 2021, notes the abutments are undermined and the north abutment has settled about 3 inches. The preferred alternative cross section was presented of a 22' span x 7' rise x 30' long precast concrete box with simulated channel bottom. Alanna noted the gravel fill material beneath the culvert to address the unsuitable material found during the geotechnical survey conducted for the project. A profile of the preferred alternative along the stream channel was presented showing the limits of work. Per comments received at the January 18th meeting, Alanna indicated the limits of riprap had been reduced by about 15 LF on the downstream side. A typical channel cross section and plan view of the preferred alternative was presented on the next slides. Alanna noted the extent of the simulated streambed material was clarified on the plan view. A color plan was presented of the entire work area that provided a visualization of the stream limits, wetland limits, roadway improvement limits, proposed riprap, and the 100' prime wetland buffer line.

A construction phase plan view for the bridge replacement was presented. It showed a temporary 48" diversion pipe and temporary upstream and downstream coffer dams to be used during the removal of the existing structure, installation of the box culvert, and grading and installation of the stream channel material. Martin Road would be closed temporarily during the 2-3 weeks needed to complete the installation of the new box culvert.

Alanna turned the presentation over to Mike Leach to discuss the project wetland impacts. He noted the summation of temporary and permanent impacts to the stream, wetlands, prime wetlands, and 100' prime wetland buffer was reduced to 10,478 SF. A separate plan was presented showing the temporary and permanent impacts to the 100' prime wetland buffer. Mike noted the permanent impacts to the downstream area was reduced as was requested at the January 18th meeting. In addition, he presented and noted the permanent impacts associated with the 100-ft Prime Wetland buffer are for the roadway widening and approach for the new bridge. Mitigation for the project was presented and notes as:

- The culvert sizing is based on  $1.2 \times \text{bank full width} + 2'$  equal to 22 feet which is an increase in width of greater than 200%.
- The preferred alternative preserves the natural alignment of the stream channel.
- The proposed opening is 2.1 times greater than existing, which benefits aquatic passage, enhances stream conductivity and sediment transport, and minimizes the potential for inlet obstructions.
- A simulated stream bottom material will be provided as part of the preferred alternative.
- The design does not restrict high flows and maintains low flows.
- The preferred alternative will pass the 100-year storm for Brown Brook with more than 1' of freeboard.
- The project reduces the upstream 100-year floodplain elevation by approximately 1.5'.
- The project increases the 100-year flood volume storage by approximately 200 CF.
- The preferred alternative maintains approximately 2' of water through opening under normal flow conditions to promote aquatic passage.
- The design intent is to not cause erosion, aggregation, or scouring upstream or downstream of the crossing or water quality degradation.
- An alternative design report will be provided for the project.
- A waiver will be requested for the impacts to the Prime Wetland and 100-foot buffer.

Mike stated that for these reasons, he believes the project to be self-mitigating. At this point, the presentation was opened to questions.

Karl Benedict of NHDES stated this project overlaps two priority resource areas (PRA's) – the wetlands associated with the Tier 3 stream, and the 100' prime wetland buffer. He noted mitigation will be required for the permanent impacts associated with these PRA's. Mike said he would follow-up separately with Karl; Stantec will provide a color plan highlighting the permanent impacts within the PRA's for discussion regarding the mitigation fees.

Karl indicated the specification for the simulated streambed material should define a material similar to the existing reach streambed material; Mike acknowledged.

For the surface restoration identified as item 583.32 – Riprap, Class III Intermixed with Humus, Karl asked that Stantec consider using a native plantings for the banks; Mike acknowledged.

Andy O'Sullivan acknowledged the PRA areas require mitigation and noted impact areas D and E upstream and areas F, G, and H downstream will require mitigation.

Mike Leach noted the permanent 100-ft wetland buffer area impact for the roadways widening would also be included in the mitigation.



Michael Dionne of NH F&G had no comment on the presentation.

Michael Hicks of USACE asked if a historical assessment had been conducted for the project.

Mike responded Stantec had completed the historical evaluation process in 2014; the bridge was determined to be not eligible and the NHDHR information would be included in the permit application.

Jean Brochi of the EPA had no comments on the presentation.

Gary Croot of the USCG had no comments on the presentation since Brown Brook is not a navigable waterway so the USCG has no jurisdiction.

Jamie Sikora of FHWA had no comment on the presentation.

### **Littleton-Waterford, #27711 (A003(594))**

Today's NRACM meeting was a virtual meeting over Zoom. Megan Ooms (Dubois & King) and Bill McCloy (Normandeau) were present. Megan introduced the project team and summarized the existing bridge including its general location, surrounding landmarks and reviewed some photos of the site. Megan then summarized the details of the existing bridge, its deficiencies, and the project's purpose and need. The purpose of the project is to provide a safe and efficient highway crossing of the Connecticut River and to rehabilitate or replace the structurally deficient bridge thereby removing it from the State Bridge Red List and optimizing its remaining service life. The existing bridge exhibits substructure and steel superstructure deterioration and does not meet current width or railing standards. The bridge is a vital crossing for community. Megan discussed seven (7) alternatives currently under consideration in high-level detail: 1) Do Nothing (Does Not Meet Purpose & Need), 2) Deck Replacement, 3) Full Superstructure Replacement, 4) Full Superstructure Replacement & Widening, 5) Convert to Multi-Use Path (Does Not Meet Purpose & Need), 6) Full Replacement and 7) Demolition and Addition of New Ramps. A summary table of the alternatives was presented including the relative degree of impact to various factors including environmental impacts, traffic, historical resources, and others such as cost and service life.

Bill McCloy (Normandeau) summarized known natural resources and other related findings about the project site based on initial desktop due diligence and field investigations. Coordination with NHNHBB indicated four known plant species, one wildlife species and no natural communities in the bridge vicinity. Follow up coordination with NHNHBB and NHFG indicated that it was unlikely that the nearby rare plants would be present at the project site due to lack of appropriate habitat and that the wildlife species of concern was not utilizing the Route 18 bridge for nesting. Coordination with VTFW indicated three wildlife and one plant species of concern in the area of the bridge. VTFW is recommending a mussel survey in the river and review of the bank of the river on the VT shore for the rare plant known upstream of the site. Scattered invasive species were noted during the wetland delineation. VTANR reviewed the delineation boundaries and wetland classification pursuant to the VT Wetland Rules in 2022 and concurred. Coordination with USFWS IPaC indicated that the project falls within the range of the northern long-eared bat (NLEB), Canada lynx and monarch butterfly. A visual inspection of the bridge structure in Nov 2020 did not reveal any signs of bat utilization or roosting per the USFWS guidance and methodology at the time. An Essential Fish Habitat (EFH) study is not required at this time.

FEMA floodplains are present within the project area, and Normandeau has coordinated with the Floodplain Management Program. The hydraulics of the crossing are not anticipated to be altered. The Connecticut River is a 6<sup>th</sup> Order, designated waterway with a contributing watershed of 1,598 square miles (1,002,720 acres) which places the crossing squarely within Tier 3 criteria. Coordination with LCHIP/LCIP/LWCF was negative. Supporting habitat mapped by the NH Wildlife Action Plan is near the project area. Great River Hydro provided feedback during outreach efforts indicating that Much of land on NH and VT sides owned in fee and Rt 18/Bridge are within the FERC Hydroelectric Project Boundary of Fifteen Mile Falls Hydro Project (No 2077) and coordination may be needed with FERC if there would be impacts to those lands, or if easements were required to support the project.

The following questions and comments were made by participants in the meeting:

Karl Benedict (NHDES):

- Noted that wetlands in floodplains are Priority Resource Areas (PRA) along with Tier 3 river wetlands
- He acknowledged that coordination will likely be needed with the dam operators/owners and potentially with FERC
- He inquired about use of barge or trestle and it was discussed that barges have a few issues including required depth of water that may not work so trestle may be needed for at least a portion of work.

Mike Dionne (NHFG):

- Encouraged a mussel survey to determine if any protected species are present in the project area; this aligns with VTFW recommendations.

Ashley Litwinenko (NHNHB):

- Acknowledged prior coordination and indicated that if no work proposed in NH wetlands there should not be any concerns. There are very small wetlands present adjacent to a stream on the NH side of the river – those should be able to be avoided but will follow up as needed.

Mike Hicks (USACE):

- Mike H. asked if we had coordinated with Mike Adams of the Corps VT Project Office; Bill indicated limited coordination to date.
- Mike H. indicated he would reach out to Mike A. in VT
- Mike H. indicated he anticipated this would qualify for a General Permit
- Subsequent coordination with Mike A. and Mike H. indicate that the project will probably be evaluated under 2 GP's and that a site visit may be needed to review wetland delineations.

Jean Brochi (US EPA):

- Jean indicated she would reach out to Beth Alafat who is the US EPA representative covering VT

Jamie Sikora (FHWA)

- Indicated that two SHPO and FHWA offices would be involved and NH likely to lead the environmental studies/reviews

Gary Croot (USCG):

- Noted that the CT River is navigable and he assumed that the current bridge was permitted although the precise status of a USCG bridge permit is uncertain.
- Gary indicated that if the chosen alternative was repair or in-kind than it would be a simple process related to a repair and would not need much additional permitting or coordination effort with USCG; if the chosen alternative would alter the bridge more substantially, a CG Permit amendment would be needed AND in the case it was never permitted in the first place, it may still be able to be exempted based on the type of vessels using the river in that location (between two dams) and based on other existing bridges in that section of the river; a little more review needed here to determine the permit status of the current bridge.

## Mitigation

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**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**MITIGATION NARRATIVE**

Impacts to jurisdictional areas have been minimized to the extent practicable while still accomplishing the purpose and need of the project. The project requires compensatory mitigation for unavoidable permanent impacts to the Piscataqua River associated with replacing the lost functionality of the barge wharf at the Port of NH.

Proposed impacts and mitigation have been discussed with State and Federal resource agencies at three NHDOT Natural Resource Agency Coordination Meetings (June 20, 2018, September 19, 2018, August 21, 2019, and February 15, 2023), as well as at a field review on April 2, 2019, at a virtual meeting on March 20, 2023, and via email correspondence.

Based on coordination noted above, impacts that will require mitigation are as follows:

Dredging (325 linear feet) – required by the Army Corps and NHDES

North Extension, South Extension, Floating Dock (289 linear feet) – required by NHDES

When coordinating on mitigation during preliminary design, there was agreement on providing funding for the completion of the Cutts Cove living shoreline restoration project. However, over the last two years, there have been concerns raised about the condition of what has been completed to date at Cutts Cove. For this reason, mitigation for the functional replacement project will instead be via an in-lieu fee.

The Army Corps confirmed that mitigation for the proposed dredging should be calculated based on linear feet of impact to the channel. NHDES previously confirmed that mitigation for the wharf extensions and floating dock should also be based on linear feet of impact. The NHDES Aquatic Resource Mitigation Fund Stream Payment Calculator was utilized to calculate the in-lieu fee payment as follows:

Dredging (325 linear feet) – \$99,017.10

North Extension, South Extension, Floating Dock (289 linear feet) – \$88,049.05

Based on the above calculations, the total in-lieu fee that will be provided for impacts associated with the functional replacement project will be **\$187,066.15**.

**NHDES AQUATIC RESOURCE MITIGATION FUND  
STREAM PAYMENT CALCULATION**

<b>INSERT LINEAR FEET OF IMPACT on BOTH BANKS AND CHANNEL</b>	<b>Right Bank</b>	
	<b>Left Bank</b>	
	<b>Channel</b>	325.0000
	<b>TOTAL IMPACT</b>	325.0000
	<b>Stream Impact Cost:</b>	\$82,514.25
	<b>NHDES Administrative cost:</b>	
		\$16,502.85
<b>***** TOTAL ARM FUND STREAM PAYMENT*****</b>		
		\$99,017.10



**NHDES AQUATIC RESOURCE MITIGATION FUND  
STREAM PAYMENT CALCULATION**

<b>INSERT LINEAR FEET OF IMPACT on BOTH BANKS AND CHANNEL</b>	<b>Right Bank</b>	
	<b>Left Bank</b>	
	<b>Channel</b>	289.0000
	<b>TOTAL IMPACT</b>	289.0000
	<b>Stream Impact Cost:</b>	\$73,374.21
	<b>NHDES Administrative cost:</b>	
		\$14,674.84
<b>***** TOTAL ARM FUND STREAM PAYMENT*****</b>		
		\$88,049.05



## Christine J. Perron

---

**From:** Bell, Taylor M CIV USARMY CENAE (USA) <Taylor.M.Bell@usace.army.mil>  
**Sent:** Monday, April 10, 2023 8:04 AM  
**To:** Christine J. Perron; Lefebvre, Lindsey E CIV USARMY CENAE (USA)  
**Cc:** Farris, Charles N CIV USARMY CENAE (USA); Hicks, Michael C CIV USARMY CENAE (USA)  
**Subject:** RE: Portsmouth 15731, DES File 2022-00429 - Market St Marine Terminal Functional Replacement Project

Hi Christine,

Mitigation for streams(Bed/Bank/OHWM) is measured in linear feet. All other resources are measured in square feet.

Thanks,

Taylor

---

**From:** Christine J. Perron <CPerron@mjinc.com>  
**Sent:** Friday, April 7, 2023 11:33 AM  
**To:** Lefebvre, Lindsey E CIV USARMY CENAE (USA) <Lindsey.E.Lefebvre@usace.army.mil>; Bell, Taylor M CIV USARMY CENAE (USA) <Taylor.M.Bell@usace.army.mil>  
**Cc:** Farris, Charles N CIV USARMY CENAE (USA) <Charles.N.Farris@usace.army.mil>; Hicks, Michael C CIV USARMY CENAE (USA) <Michael.C.Hicks@usace.army.mil>  
**Subject:** [URL Verdict: Neutral][Non-DoD Source] RE: Portsmouth 15731, DES File 2022-00429 - Market St Marine Terminal Functional Replacement Project

Good morning,

Permit applications for the subject project will be submitted by Monday and we are still looking for input on mitigation. Mitigation will be via an in lieu fee. An updated impact plan is attached. Based on prior coordination with the Corps, mitigation will not be required for the proposed wharf extensions or for riprap added within the footprint of existing riprap. The area of proposed dredging in the Piscataqua River is 61,450 sq ft (325 linear feet of channel).

Mitigation for impacts to a watercourse are typically based on linear feet of impact in accordance with NHDES rules. Prior coordination with the Corps seemed to indicate that mitigation should be based on square feet of impact from dredging. Table C3 of the Corps' mitigation SOP indicates that the impact should be based on linear feet. Could we get confirmation on which approach will be required?

Also, dredging will not permanently eliminate the resource. The work is in Section 10 waters adjacent to an industrial docking facility and the federal navigation channel. Could a multiplier of 0.5 be used to calculate the in lieu fee?

Please let me know if any additional information is needed.

Thanks,  
Christine



Christine J. Perron, CWS | Regional Environmental Manager



603-931-3327

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---

**From:** Lefebvre, Lindsey E CIV USARMY CENAE (USA) <[Lindsey.E.Lefebvre@usace.army.mil](mailto:Lindsey.E.Lefebvre@usace.army.mil)>  
**Sent:** Thursday, March 23, 2023 9:32 AM  
**To:** Christine J. Perron <[CPerron@mjinc.com](mailto:CPerron@mjinc.com)>  
**Cc:** Farris, Charles N CIV USARMY CENAE (USA) <[Charles.N.Farris@usace.army.mil](mailto:Charles.N.Farris@usace.army.mil)>; Hicks, Michael C CIV USARMY CENAE (USA) <[Michael.C.Hicks@usace.army.mil](mailto:Michael.C.Hicks@usace.army.mil)>  
**Subject:** RE: Portsmouth 15731, DES File 2022-00429 - Market St Marine Terminal Functional Replacement Project

Hi Christine,

Thank you for sending this information. Unfortunately Taylor is out until early next week.

Lindsey Lefebvre  
US Army Corps of Engineers  
New England District  
Regulatory Division  
696 Virginia Rd  
Concord, MA 01742  
(o) (978)-318-8295  
(c) (978)-471-0741

---

**From:** Christine J. Perron <[CPerron@mjinc.com](mailto:CPerron@mjinc.com)>  
**Sent:** Thursday, March 23, 2023 9:18 AM  
**To:** Lefebvre, Lindsey E CIV USARMY CENAE (USA) <[Lindsey.E.Lefebvre@usace.army.mil](mailto:Lindsey.E.Lefebvre@usace.army.mil)>  
**Cc:** Farris, Charles N CIV USARMY CENAE (USA) <[Charles.N.Farris@usace.army.mil](mailto:Charles.N.Farris@usace.army.mil)>; Hicks, Michael C CIV USARMY CENAE (USA) <[Michael.C.Hicks@usace.army.mil](mailto:Michael.C.Hicks@usace.army.mil)>  
**Subject:** [URL Verdict: Neutral][Non-DoD Source] RE: Portsmouth 15731, DES File 2022-00429 - Market St Marine Terminal Functional Replacement Project

Good morning Lindsey,  
I am attached the updated wetland impact plan with the final impact totals. Will it be possible to get Taylor's input on mitigation by tomorrow morning?  
Thanks,  
Christine



Christine J. Perron, CWS | Regional Environmental Manager



## **NH NHB DataCheck Results Letter (Updated)**

---

# Memo

## NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

**To:** Stephen Hoffmann  
53 Regional Drive  
Concord, NH 03301

**From:** NHB Review, NH Natural Heritage Bureau

**Date:** 2/7/2023 (valid until 02/07/2024)

**Re:** Review by NH Natural Heritage Bureau

**Permits:** NHDES - Alteration of Terrain Permit, NHDES - Shoreland Standard Permit, NHDES - Wetland Standard Dredge & Fill - Major, USACE - General Permit, USCEQ - Federal: NEPA Review, USEPA - Stormwater Pollution Prevention

**NHB ID:** NHB23-0281

Town: Portsmouth

Location: 555 Market Street

**Description:** This DataCheck request is to update NHB21-3815. This project will consist of the following components: 1) Construction of a new dock structure approximately 60 x 120 feet to extend the south end of the existing wharf; 2) Construction of a new dock structure approximately 145 x 80 feet to extend the north end of the existing wharf; 3) Installation of a new fender system along the length of the main wharf; 4) Dredging of approximately 55,000 square feet of the river bed adjacent to the north end of the extended wharf; 4) Shoreside alterations, including soil and rock removal, grading, drainage, and paving within a 80,000-square foot area. Dredging, blasting, and the majority of concrete demolition will occur between November 15 and March 15. A blasting plan will be prepared by the contractor.

**cc:** NHFG Review

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

**Comments** NHB: No comments at this time.

**F&G:** Please continue coordination with Mike Dionne NHFG Environmental Review Coordinator.

### Vertebrate species

	State <sup>1</sup>	Federal	Notes
Atlantic Sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	T	T	Contact the NH Fish & Game Dept and the US Fish & Wildlife Service (see below).
Shortnose Sturgeon ( <i>Acipenser brevirostrum</i> )	E	E	Contact the NH Fish & Game Dept and the US Fish & Wildlife Service (see below).

<sup>1</sup>Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (\*) indicates that the most recent report for that occurrence was more than 20 years ago.

## Memo

## NH Natural Heritage Bureau NHB DataCheck Results Letter

Please note: portions of this document are confidential.

Maps and NHB record pages are confidential and should be redacted from public documents.

*For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section below.*

---

Disclaimer: A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

---

### **IMPORTANT: NHFG Consultation**

If this NHB Datacheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB Datacheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to <https://wildlife.state.nh.us/wildlife/environmental-review.html>. All requests for consultation and submittals should be sent via email to [NHFGreview@wildlife.nh.gov](mailto:NHFGreview@wildlife.nh.gov) or can be sent by mail, and **must include the NHB Datacheck results letter number and “Fis 1004 consultation request” in the subject line.**

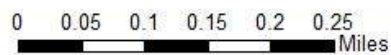
If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email: Kim Tuttle [kim.tuttle@wildlife.nh.gov](mailto:kim.tuttle@wildlife.nh.gov) with a copy to [NHFGreview@wildlife.nh.gov](mailto:NHFGreview@wildlife.nh.gov), and include the NHB Datacheck results letter number and “review request” in the email subject line.

Contact NH Fish & Game at (603) 271-0467 with questions.

**CONFIDENTIAL – NH Dept. of Environmental Services review**

**NHB23-0281**

**REDACTED**



## New Hampshire Natural Heritage Bureau - Animal Record

### Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

**Legal Status**

Federal: Listed Threatened  
 State: Listed Threatened

**Conservation Status**

Global: Rare or uncommon  
 State: Critically imperiled due to rarity or vulnerability

**Description at this Location**

Conservation Rank: Not ranked  
 Comments on Rank: --

Detailed Description: 2016: 1 individual, sex unknown, detected in the lower Piscataqua River. 2015: 1 individual, sex unknown, detected in Portsmouth Harbor. 2012: 1 individual, sex unknown, detected in Little Bay.

General Area: 2016: Tidal waters in Portsmouth Harbor, Little Bay, and the Piscataqua River.

General Comments: --

Management: --

Comments:

**Location**

Survey Site Name: Piscataqua River

Managed By:

County:

Town(s): Out-Of-State

Size: 7749.3 acres

Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 2016: Tidal waters of Portsmouth Harbor, Little Bay, and the Piscataqua River.

**Dates documented**

First reported: 2012-06-02

Last reported: 2016-05-27

The U.S. Fish & Wildlife Service has jurisdiction over Federally listed species. Please contact them at 70 Commercial Street, Suite 300, Concord NH 03301 or at (603) 223-2541.

## New Hampshire Natural Heritage Bureau - Animal Record

### Shortnose Sturgeon (*Acipenser brevirostrum*)

#### Legal Status

Federal: Listed Endangered  
State: Listed Endangered

#### Conservation Status

Global: Rare or uncommon  
State: Critically imperiled due to rarity or vulnerability

#### Description at this Location

Conservation Rank: Not ranked  
Comments on Rank: --

Detailed Description: 2016: 2 individuals, 1 female and 1 sex unknown, detected in Portsmouth Harbor and the lower Piscataqua River. 2015: 3 females and 2 other individuals, sex unknown detected in Portsmouth Harbor. 2014: 1 female detected moving from Portsmouth Harbor up the Piscataqua River to the mouth of the Cocheco River. 2012: 1 female detected in Little Bay. 2011: 1 female detected in Little Bay. 2010: 1 female detected in Little Bay.

General Area: 2016: Tidal waters in Portsmouth Harbor, Little Bay, and the Piscataqua River.

General Comments: --

Management: --

Comments:

#### Location

Survey Site Name: Piscataqua River

Managed By:

County:

Town(s): Out-Of-State

Size: 7749.3 acres

Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 2016: Tidal waters of Portsmouth Harbor, Little Bay, and the Piscataqua River.

#### Dates documented

First reported: 2010-11-03

Last reported: 2016-10-20

The U.S. Fish & Wildlife Service has jurisdiction over Federally listed species. Please contact them at 70 Commercial Street, Suite 300, Concord NH 03301 or at (603) 223-2541.



## **NHFG Coordination**

---

## Stephen Hoffmann

---

**From:** Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>  
**Sent:** Wednesday, February 8, 2023 11:10 AM  
**To:** Christine J. Perron  
**Cc:** Tuttle, Kim; Stephen Hoffmann; Patterson, Cheri  
**Subject:** Re: NH Port Authority, Functional Replacement Project - updated NHB memo (NHB23-0281)

Hi Christine,  
Yes I can confirm the comments submitted on 12/20/22 are still applicable to the NH Port Authority, Functional Replacement Project (NHB23-0281).

Thank you.

Mike Dionne  
Environmental Review Coordinator  
NH Fish & Game Department  
11 Hazen Drive  
Concord, NH 03301  
(603) 271-1136, michael.dionne@wildlife.nh.gov  
NH Fish and Game...*connecting you to life outdoors*  
[www.wildnh.com](http://www.wildnh.com), [www.facebook.com/nhfishandgame](https://www.facebook.com/nhfishandgame)

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---

**From:** Christine J. Perron <CPerron@mjinc.com>  
**Sent:** Wednesday, February 8, 2023 8:25 AM  
**To:** Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>  
**Cc:** Tuttle, Kim <Kim.A.Tuttle@wildlife.nh.gov>; Stephen Hoffmann <SHoffmann@mjinc.com>; Patterson, Cheri <Cheri.A.Patterson@wildlife.nh.gov>  
**Subject:** NH Port Authority, Functional Replacement Project - updated NHB memo (NHB23-0281)

**EXTERNAL:** Do not open attachments or click on links unless you recognize and trust the sender.

Good morning Mike,

The previous NHB review memo (NHB21-3815) for the subject project expired and we requested an updated memo in anticipation of submitting permit applications next month. The updated memo (NHB23-0281) is attached. There are no changes in species of concern.

The NHDES reviewer has requested that comments from NHFG should reference the current NHB memo. Could you please confirm that the comments you provided below in December are still applicable to the project?

Thank you,  
Christine



Christine J. Perron, CWS | Regional Environmental Manager

603-931-3327

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---

**From:** Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>  
**Sent:** Tuesday, December 20, 2022 9:55 AM  
**To:** Christine J. Perron <CPerron@mjinc.com>; Patterson, Cheri <Cheri.A.Patterson@wildlife.nh.gov>  
**Cc:** Tuttle, Kim <Kim.A.Tuttle@wildlife.nh.gov>  
**Subject:** Re: NH Port Authority, Functional Replacement Project (NHB21-3815)

Hi Christine,

We have reviewed the minimal design changes to the NH Port Authority, Functional Replacement Project (NHB21-3815) and have no new comments and will not require further consultation prior to submitting permit applications. The following avoidance and minimization measures should be followed during any pile driving:

- In-water pile driving will be completed outside of the window of anadromous fish spawning (April through June).
- A 'startle noise' will be implemented each day before any pile driving. This will consist of hitting the piles a couple times and then waiting 5-10 minutes prior to production driving.
- Piles will be installed using a vibratory hammer as much as possible and then impact driven using a cushion block.
- A safe unimpacted zone of passage of approximately 1,000 feet in width will be available for any sensitive species that may be foraging or migrating in the river during construction.

If you have any further questions or concerns please reach out.

Thanks

Mike Dionne

Environmental Review Coordinator

NH Fish & Game Department

11 Hazen Drive

Concord, NH 03301

(603) 271-1136, [michael.dionne@wildlife.nh.gov](mailto:michael.dionne@wildlife.nh.gov)

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---

**From:** Christine J. Perron <CPerron@mjinc.com>  
**Sent:** Thursday, December 8, 2022 10:52 AM  
**To:** Patterson, Cheri <Cheri.A.Patterson@wildlife.nh.gov>  
**Cc:** Tuttle, Kim <Kim.A.Tuttle@wildlife.nh.gov>; Dionne, Michael <Michael.A.Dionne@wildlife.nh.gov>  
**Subject:** RE: NH Port Authority, Functional Replacement Project (NHB21-3815)

**EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.**

---

Good morning,

Just checking in to see if you've had a chance to discuss this project.

Thanks,

Christine



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---

**From:** Patterson, Cheri <[Cheri.A.Patterson@wildlife.nh.gov](mailto:Cheri.A.Patterson@wildlife.nh.gov)>  
**Sent:** Wednesday, November 23, 2022 12:01 PM  
**To:** Christine J. Perron <[CPerron@mjinc.com](mailto:CPerron@mjinc.com)>  
**Cc:** Tuttle, Kim <[Kim.A.Tuttle@wildlife.nh.gov](mailto:Kim.A.Tuttle@wildlife.nh.gov)>; Dionne, Michael <[Michael.A.Dionne@wildlife.nh.gov](mailto:Michael.A.Dionne@wildlife.nh.gov)>  
**Subject:** RE: NH Port Authority, Functional Replacement Project (NHB21-3815)

Good morning, Christine.

Mike and I will confer on Monday morning and one of us will get back to you. Thank you for checking back in.

Happy Thanksgiving.

Cheri Patterson

Chief, Marine Division

NH Fish and Game Department

225 Main Street

Durham, NH 03824

(603)868-1095 – office

(603)868-3305 – fax

*Did you know? New Hampshire Fish and Game is the steward for New Hampshire's marine resources, from lobsters and clams to stripers and bluefish, and also manages the Great Bay National Estuarine Research Reserve.*

---

**From:** Christine J. Perron <[CPerron@mjinc.com](mailto:CPerron@mjinc.com)>  
**Sent:** Wednesday, November 23, 2022 9:55 AM  
**To:** Patterson, Cheri <[Cheri.A.Patterson@wildlife.nh.gov](mailto:Cheri.A.Patterson@wildlife.nh.gov)>  
**Cc:** Tuttle, Kim <[Kim.A.Tuttle@wildlife.nh.gov](mailto:Kim.A.Tuttle@wildlife.nh.gov)>; Dionne, Michael <[michael.dionne@wildlife.nh.gov](mailto:michael.dionne@wildlife.nh.gov)>  
**Subject:** RE: NH Port Authority, Functional Replacement Project (NHB21-3815)

**EXTERNAL:** Do not open attachments or click on links unless you recognize and trust the sender.

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Good morning Cheri,

Have you had a chance to consider the email below? I have attached responses from NOAA on EFH and Section 7. We will likely be reinitiating consultation under Section 7 though don't expect any concerns with the avoidance and minimization measures listed below. I will keep you in the loop as that reinitiation is carried out; however, it would be helpful to have your comments at this stage so that we can start finalizing permit applications.

Thanks Cheri. Happy Thanksgiving.

Christine



Christine J. Perron, CWS | Regional Environmental Manager

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---

**From:** Christine J. Perron

**Sent:** Wednesday, October 19, 2022 4:14 PM

**To:** Patterson, Cheri <[Cheri.A.Patterson@wildlife.nh.gov](mailto:Cheri.A.Patterson@wildlife.nh.gov)>; Michael R. Johnson <[mike.r.johnson@noaa.gov](mailto:mike.r.johnson@noaa.gov)>; 'zachary.jylkka@noaa.gov' <[zachary.jylkka@noaa.gov](mailto:zachary.jylkka@noaa.gov)>

**Cc:** Dionne, Michael <[Michael.A.Dionne@wildlife.nh.gov](mailto:Michael.A.Dionne@wildlife.nh.gov)>; 'Tuttle, Kim' <[Kim.A.Tuttle@wildlife.nh.gov](mailto:Kim.A.Tuttle@wildlife.nh.gov)>; Stephanie Desing <[sdesing@appledoremarine.com](mailto:sdesing@appledoremarine.com)>

**Subject:** NH Port Authority, Functional Replacement Project (NHB21-3815)

Good afternoon,

The subject project was originally reviewed back in 2019 but stalled for a few years due to funding issues. Final design and permitting is now getting underway again. This is a FHWA funded project that has gone through NEPA, EFH, and ESA review. The following OneDrive folder includes copies of the original BA and EFHA:

[Consultation](#)

The project requires wetland, shoreland, and alteration of terrain permits from NHDES. It will also require an Individual Permit from the Corps and Water Quality Certification.

The key components of the project have not changed:

- Construction of a new dock structure approximately 60 x 120 feet to extend the south end of the existing wharf.
- Construction of a new dock structure approximately 145 x 80 feet to extend the north end of the existing wharf.
- Dredging of approximately 55,000 square feet of the river bed adjacent to the north end of the extended wharf.

- Relocation of the floating dock currently located off the north end of the wharf.
- Shoreside alterations, including soil and rock removal, grading, drainage, and paving within a 80,000-square foot area.

A few design changes are anticipated to be finalized over the next few months prior to permitting. These changes were not included in original consultation with NH Fish & Game and NOAA:

- A Sampling and Analysis Plan will be implemented for the dredged material and it is still assumed that material will be approved for off-shore disposal. The Cape Arundel disposal site noted in consultation has since closed. The alternative disposal site will be the Isle of Shoals North Disposal Site.
- The dredging depth may change from -35' mllw to -36' mllw, which would slightly expand the footprint. The avoidance and minimization measures outlined in the original consultation have not changed.
- The south wharf extension may not have a steel sheet pile wall along the shoreline, but instead have a grade beam with additional riprap. New riprap is anticipated to be under the extension footprint or added to existing riprap.
- The proposed 40" steel piles for the north and south wharf extensions will be rock socketed into bedrock. Casing will be spun to the top of bedrock and the bedrock drilled to create the socket. The rock socket method reduces the amount of pile driving required and reduces underwater noise impacts. However, this method does require some pile driving that was not clearly defined in the original consultation. The following avoidance and minimization measures are proposed for pile driving:
  - In-water pile driving will be completed outside of the window of anadromous fish spawning (April through June).
  - A 'startle noise' will be implemented each day before any pile driving. This will consist of hitting the piles a couple times and then waiting 5-10 minutes prior to production driving.
  - Piles will be installed using a vibratory hammer as much as possible and then impact driven using a cushion block.
  - A safe unimpacted zone of passage of approximately 1,000 feet in width will be available for any sensitive species that may be foraging or migrating in the river during construction.

We are reaching out now to determine if additional consultation is required prior to submitting permit applications. Please let me know if a Teams meeting would be helpful.

Thanks,  
Christine



Christine J. Perron, CWS | Regional Environmental Manager

603-931-3327

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## **NHDES Wetland Rule Waiver Requests (Env-Wt 402.21; 6066.03(c))**

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**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**REQUEST FOR WAIVER**

Rule for which a waiver is sought: Env-Wt 402.21

Project Location

Market Street Marine Terminal, 555 Market Street  
Portsmouth, NH 03801  
Tax Map 119/Lot Number 5

Waiver Requester\*

Christine Perron, McFarland-Johnson, Inc.  
53 Regional Drive, Concord, NH 03301  
cperron@mjinc.com  
(603) 931-3327

\*Requester is not the applicant

Applicant Information

Geno Marconi, Director of Ports and Harbors  
NH Division of Ports and Harbors  
555 Market Street, Portsmouth, NH 03801  
g.marconi@peasedev.org  
(603) 436-8500

The Pease Development Authority (PDA) Division of Ports and Harbors (DPH) oversees the management, maintenance, operation, and maritime security of the ports, harbors, and navigable tidal rivers of the State of New Hampshire. Included in this charge is the Market Street Marine Terminal located on the Piscataqua River. The site is also known as the Port of New Hampshire and is the state's only deep water, public access, general cargo marine terminal.

The proposed project is part of, and necessitated by, the replacement of the Sarah Mildred Long (SML) Bridge carrying US Route 1 Bypass over the Piscataqua River. The Market Street Marine Terminal is adjacent to the SML Bridge. Until recently, the bridge divided the port between the main wharf and the barge wharf. The bridge was recently replaced and a new alignment was selected to better accommodate current and future marine navigation. The new bridge now passes through the western end of the barge wharf. The new alignment required partial demolition of the wharf, blocked access to the boat ramp, and substantially reduced the berthing length along the barge wharf. The Federal Highway Administration (FHWA) through NHDOT is funding the functional replacement of the barge wharf to compensate for impacts caused by the new alignment of the SML Bridge. Functional replacement is a federally authorized method of right of way compensation for public facilities (23 CFR 710.509).

The purpose of this project is to replace the lost functionality of the barge wharf by incorporating that functionality into the main wharf. With the new bridge alignment, the barge wharf can no longer be used to moor barges and the available laydown area has been reduced.



**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

Chapter Env-Wt 400 addresses shoreline structures and Part Env-Wt 402 addresses design and construction criteria for shoreline structures. Env-Wt 402.21 states the following:

*Modification of Existing Structures. The department shall not approve any change in size, location, or configuration of an existing structure unless the applicant demonstrates, and the department finds, that the modification is less environmentally-impacting or provides for fewer boat slips and less construction surface area over public submerged lands than the current configuration.*

Strict adherence to Env-Wt 402.21 would not be in the best interest of the public or the environment. Therefore, a waiver of this rule is requested per Env-Wt 204.

**Env-Wt 204.03 (f): A complete explanation of why a waiver is being requested, including an explanation of the operational and economic costs of complying with the rule.**

The purpose of the proposed project is to address a loss in functionality at the Port caused by the relocation of public infrastructure that necessitated the removal of a portion of the barge wharf. The need for this project is evidenced by the following factors that prevent the main wharf in its current configuration from fully replacing the lost operational capacity of the barge wharf:

- The new bridge alignment required the partial demolition of the barge wharf, which reduced the berthing length along the barge wharf. This, combined with the proximity of the new bridge structure, prevents the use of the barge wharf for mooring barges.
- A 75-foot section of the north end of the main wharf is too shallow for some vessels since it has never been dredged to the necessary -36 foot Mean Lower Low Water (MLLW) dredge depth due to its proximity to the former bridge.
- The existing fender system is not designed to accommodate barges through all tidal ranges. Due to the loss of space at the barge wharf, barges must now use the main wharf and they cannot safely do so during all tide ranges with the current fender system.
- The new bridge alignment reduced the available laydown area at the barge wharf.

The proposed project is meeting the Env-Wt rules to the greatest extent practical. However, strict adherence to Env-Wt 402.21 would not allow for the proposed project to be constructed and would require the Market Street Marine Terminal to continue to operate under reduced capacity. The Market Street Marine Terminal is the state's only deep water, public access, general cargo marine terminal. The Terminal also handles special cargo, thus providing a unique service for the region. Continuing to operate under reduced capacity would lead to substantial economic costs to the State of New Hampshire and beyond. With a regional economic impact of approximately \$275 million in 2012, the Market Street Marine Terminal is a driving economic force for the State of New Hampshire and southern coastal Maine communities. In addition to commercial activity, the port is critical to emergency response capabilities in Portsmouth Harbor. The facility supports fire, security, and terrorist response drills with local and federal law enforcement. If there is an emergency on board a ship, the pilot brings the ship to the Terminal.

The loss of the barge wharf prohibits the berthing of a ship and a barge as was possible previously with the two wharfs. Therefore, the added length on the main wharf will remedy the problem.

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**Env-Wt 204.03 (g): If applicable, a complete explanation of the alternative that is proposed to be substituted for the requirement in the rule, including written documentation or data, or both, to support the alternative.**

The proposed project will include the construction of a new dock structure approximately 60 x 120 feet to extend the south end of the existing wharf and construction of a new dock structure approximately 145 x 80 feet to extend the north end of the existing wharf. This equates to approximately 18,800 SF of additional wharf area.

**Env-Wt 204.03 (h): Whether the waiver is needed for a limited duration and, if so, an estimate of when the waiver will no longer be needed.**

The waiver is needed to obtain a permit to construct a permanent structure with a design life of at least 50 years.

**Env-Wt 204.03 (i): A complete explanation of why the applicant believes that having the waiver granted will meet the criteria in Env-Wt 204.05.**

**Env-Wt 204.05**

**(1) Granting a waiver will not result in:**

- a. An avoidable adverse impact on the environment or natural resources of the state, public health, or public safety;**
- b. An impact on abutting properties that is more significant than that which would result from complying with the rule; or**
- c. A statutory requirement being waived; and**

**(2) Any benefit to the public or the environment from complying with the rule is outweighed by the operational or economic costs to the applicant.**

The proposed project is located at an existing industrial port. The locations of the proposed wharf extensions are along a shoreline that is currently riprap, and the location of the north extension is in the footprint of the former Sarah Mildred Long bridge. Impacts from construction of the project to the Piscataqua River will be minimized to the maximum extent practicable by implementing construction best management practices to avoid or minimize impacts to water quality and sensitive species.

The project will not adversely impact public health or public safety.

The project is located entirely on property owned by the NH Division of Ports and Harbors. The Port is located within the waterfront industrial zone in the City of Portsmouth and is surrounded by areas zoned as commercial. There are two abutting properties, the railroad line and a commercial dock. The project will not adversely impact abutting properties.

The requested waiver does not require waiver of a statutory requirement.

As noted above, strict compliance with Env-Wt 402.21 would not allow for the proposed project to be constructed and would require the Market Street Marine Terminal to continue to operate at reduced capacity. If the proposed project is not constructed, there would be little benefit to the environment since this area would continue to be a waterfront industrial zone and the port would continue to be in operation. There would also be potential negative environmental impact from not constructing this project in the form of increased highway truck traffic in the region if certain ships were forced to dock at ports

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

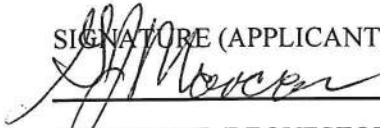
elsewhere in the Northeast and complete shipments over highways, a less efficient means of transportation. The operational and economic costs to the applicant (NH Division of Ports and Harbors) and State of New Hampshire that would result from compliance with this rule would outweigh the minimal benefit to the environment. The economic activities of the Port and the Piscataqua River terminals generated state and local taxes of \$22.8 million across New Hampshire and Maine. The Port and the Piscataqua River have a positive impact on the regional economy contributing \$274.5 million to the regional economy and generating 2,350 jobs.

Initials: The information provided is true, complete, and not misleading to the knowledge and belief of the signer.

Initials: The signer understands that:

- Any waiver granted based on false, incomplete, or misleading information shall be subject to revocation; and
- He or she is subject to the penalties for falsification in official matters, currently established in RSA 641.

SIGNATURE (APPLICANT):

  
\_\_\_\_\_

PRINT NAME LEGIBLY:

Geno Marconi

DATE: 3/28/2023

SIGNATURE (REQUESTOR):

  
\_\_\_\_\_

PRINT NAME LEGIBLY:

Christine Perron

DATE: 3/28/2023

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

REQUEST FOR WAIVER

Rule for which a waiver is sought: Env-Wt 606.03(c)

Project Location

Market Street Marine Terminal, 555 Market Street  
Portsmouth, NH 03801  
Tax Map 119/Lot Number 5

Waiver Requester\*

Christine Perron, McFarland-Johnson, Inc.  
53 Regional Drive, Concord, NH 03301  
cperron@mjinco.com  
(603) 931-3327

\*Requester is not the applicant

Applicant Information

Geno Marconi, Director of Ports and Harbors  
NH Division of Ports and Harbors  
555 Market Street, Portsmouth, NH 03801  
g.marconi@peasedev.org  
(603) 436-8500

The Pease Development Authority (PDA) Division of Ports and Harbors (DPH) oversees the management, maintenance, operation, and maritime security of the ports, harbors, and navigable tidal rivers of the State of New Hampshire. Included in this charge is the Market Street Marine Terminal located on the Piscataqua River. The site is also known as the Port of New Hampshire and is the state's only deep water, public access, general cargo marine terminal.

The proposed project is part of, and necessitated by, the replacement of the Sarah Mildred Long (SML) Bridge carrying US Route 1 Bypass over the Piscataqua River. The Market Street Marine Terminal is adjacent to the SML Bridge. Until recently, the bridge divided the port between the main wharf and the barge wharf. The bridge was recently replaced and a new alignment was selected to better accommodate current and future marine navigation. The new bridge now passes through the western end of the barge wharf. The new alignment required partial demolition of the wharf, blocked access to the boat ramp, and substantially reduced the berthing length along the barge wharf. The Federal Highway Administration (FHWA) through NHDOT is funding the functional replacement of the barge wharf to compensate for impacts caused by the new alignment of the SML Bridge. Functional replacement is a federally authorized method of right of way compensation for public facilities (23 CFR 710.509).

The purpose of this project is to replace the lost functionality of the barge wharf by incorporating that functionality into the main wharf. With the new bridge alignment, the barge wharf can no longer be used to moor barges and the available laydown area has been reduced.

Chapter Env-Wt 600 addresses projects in tidal waters and Part Env-Wt 606 addresses design and construction criteria for tidal waters. Env-Wt 606.03 addresses Piers, Docks, Wharves, and Floats Criteria. Env-Wt 606.03(c) states the following:

*Superstructures shall not completely shield the underlying area from direct sunlight.*

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
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Strict adherence to Env-Wt 606.03(c) would not be in the best interest of the public or the environment. Therefore, a waiver of this rule is requested per Env-Wt 204.

**Env-Wt 204.03 (f): A complete explanation of why a waiver is being requested, including an explanation of the operational and economic costs of complying with the rule.**

The purpose of the proposed project is to address a loss in functionality at the Port caused by the relocation of public infrastructure that necessitated the removal of a portion of the barge wharf. The need for this project is evidenced by the following factors that prevent the main wharf in its current configuration from fully replacing the lost operational capacity of the barge wharf:

- The new bridge alignment required the partial demolition of the barge wharf, which reduced the berthing length along the barge wharf. This, combined with the proximity of the new bridge structure, prevents the use of the barge wharf for mooring barges.
- A 75-foot section of the north end of the main wharf is too shallow for some vessels since it has never been dredged to the necessary -36 foot Mean Lower Low Water (MLLW) dredge depth due to its proximity to the former bridge.
- The existing fender system is not designed to accommodate barges through all tidal ranges. Due to the loss of space at the barge wharf, barges must now use the main wharf and they cannot safely do so during all tide ranges with the current fender system.
- The new bridge alignment reduced the available laydown area at the barge wharf.

The proposed project is meeting the Env-Wt rules to the greatest extent practical. The new structures have been designed to have the fewest number of pilings necessary to support the structures. The wharf extensions must match into the existing wharf structure; therefore, the height of the new wharf structures cannot be increased to reduce under-structure shading. Strict adherence to Env-Wt 606.03(c) would require a design that would not meet design and safety standards of an industrial port facility. The proposed wharf structures will serve large vessels, including tankers and cargo ships, and must have the capacity for safely and efficiently allowing ship-to-shore and shore-to-ship transfers.

**Env-Wt 204.03 (g): If applicable, a complete explanation of the alternative that is proposed to be substituted for the requirement in the rule, including written documentation or data, or both, to support the alternative**

The two sections of proposed wharf will consist of concrete filled steel pipe piles with a reinforced concrete deck structure. There will be a total of 74 piles for the north (44 piles) and south wharf (30 piles) extensions. As proposed, the project has been designed for the following loads:

- |   |                            |
|---|----------------------------|
| DEAD LOAD: ACTUAL WEIGHT OF THE STRUCTURE   | 2. DESIGN VESSEL           |
| LIVE LOAD:                                  | a. 750 FOOT LOA            |
| 1. VEHICLE AND EQUIPMENT                    | b. 35 FOOT DRAFT           |
| a. 1,000 PSF UNIFORM LIVE LOAD              | c. 63,000 TON DISPLACEMENT |
| b. 250 TON CRAWLER CRANE (MAX PICK 55 TONS) | 3. MOORING FITTINGS        |
|   | a. 100 TON BOLLARD         |
|   | b. 42" CLEAT (25 TON)      |

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

**Env-Wt 204.03 (h): Whether the waiver is needed for a limited duration and, if so, an estimate of when the waiver will no longer be needed.**

The waiver is needed to obtain a permit to construct a permanent structure with a design life of at least 50 years.

**Env-Wt 204.03 (i): A complete explanation of why the applicant believes that having the waiver granted will meet the criteria in Env-Wt 204.05.**

**Env-Wt 204.05 (a)(1): Granting a waiver will not result in:**

**a. An avoidable adverse impact on the environment or natural resources of the state, public health, or public safety;**

**b. An impact on abutting properties that is more significant than that which would result from complying with the rule; or**

**c. A statutory requirement being waived; and**

**(2) Any benefit to the public or the environment from complying with the rule is outweighed by the operational or economic costs to the applicant.**

The proposed project is located at an existing industrial port. The locations of the proposed wharf extensions are along a shoreline that is currently riprap, and the location of the north extension is in the footprint of the former Sarah Mildred Long bridge. There are no eelgrass beds, shellfish beds, or other sensitive habitats in the vicinity of the wharf extensions. Impacts from construction of the project to the Piscataqua River will be minimized to the maximum extent practicable by implementing construction best management practices to avoid or minimize impacts to water quality and sensitive species.

The project will not adversely impact public health or public safety.

The project is located entirely on property owned by the NH Division of Ports and Harbors. The Port is located within the waterfront industrial zone in the City of Portsmouth and is surrounded by areas zoned as commercial. There are two abutting properties, the railroad line and a commercial dock. The project will not adversely impact abutting properties.

The requested waiver does not require waiver of a statutory requirement.

As noted above, strict adherence to Env-Wt 606.03(c) would require a design that would not meet design and safety standards of an industrial port facility. A design that complies with this rule would likely require open grating on the deck, which would be a safety concern and would also increase the potential for contaminants to enter the river. Strict compliance with this rule would provide little benefit to the environment since this area would continue to be a waterfront industrial zone and the area currently contains no sensitive habitats. The operational and economic costs to the applicant (NH Division of Ports and Harbors) and State of New Hampshire that would result from compliance with this rule would outweigh the minimal benefit to the environment. If the new wharf extensions did not meet safety and design standards, the port would need to continue operating at a reduced capacity. The economic activities of the Port and the Piscataqua River terminals generated state and local taxes of \$22.8 million across New Hampshire and Maine in 2011. The Port and the Piscataqua River have a positive impact on the regional economy contributing \$274.5 million to the regional economy and generating 2,350 jobs.

**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731**

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SIGNATURE (APPLICANT): \*



PRINT NAME LEGIBLY:

Geno Marconi

DATE: 3/28/2023

SIGNATURE (REQUESTOR):



PRINT NAME LEGIBLY:

Christine Perron

DATE: 3/28/2023

## **Turbidity Control and Monitoring Plan**

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**MARKET STREET MARINE TERMINAL (PORT OF NH)  
FUNCTIONAL REPLACEMENT PROJECT  
PORTSMOUTH 15731  
NHDES File Number: 2022-00429**

## **Turbidity Control and Monitoring Plan**

The Pease Development Authority Division of Ports and Harbors (PDA-DPH) is proposing a 2,000-foot defined mixing zone (approximately 1,000 feet downstream and 1,000 feet upstream from the proposed project) to control discharges from the proposed dredging and pile installation associated with the Functional Replacement Project at the Market Street Marine Terminal (NHDES File Number: 2022-00429).

The river depths in the main channel to the east of the Port are about 35 to 45 feet, with a maximum tidal range of 9.6 feet upstream at Dover Point to 13.2 feet downstream at Kittery Point. The river depths in the vicinity of the wharf are 24 to 34 feet. Currents in the Piscataqua River can reach speeds that exceed 5 knots. The NOAA-predicted tidal currents for this section of the river show a typical flood tide velocity of around 2 knots and ebb flows of about 4 knots. The Piscataqua River bottom is primarily a hard substrate, consisting largely of rock ledge, gravel, and cobble. Fine sediments generally do not settle on the substrate due to the high tidal currents in the lower estuary. The river is between 1,300 feet and 1,600 feet wide in the vicinity of the Port.

The Functional Replacement Project will consist of in-water work, with the following activities expected to have the greatest potential for generating turbidity in the river:

- Dredging

Dredging of the riverbed adjacent to the north end of the extended wharf is proposed. The dredge area consists of approximately 61,450 sq ft, removing approximately 16,000 CY of sediment and 800 CY of rock to a depth of -36' MLLW.

- Removal of Buried Debris

Metal debris and other obstructions including steel and timber from remnant structures and large boulders that are partially or entirely buried in the sediment of the Piscataqua River have been identified in the vicinity of the northern and southern wharf extensions. These obstructions could potentially pose a barrier to the installation of the casings and piles. Obstructions will be identified during the installation of the proposed piles and will be removed as necessary using an excavator or auger type drill mounted on the existing wharf and/or a barge.

- Pile Installation

The pile installation process consists of rotary and percussion drilling contained within a steel casing. The casing will be installed through the overburden to the top of bedrock. The typical process would be to vibrate the casing down using a vibratory hammer, with a short period using

an impact hammer to assure firm bearing on bedrock. Depending on the depth of overburden, the casing may be installed with an impact hammer the entire depth. The typical duration of casing installation is approximately 60 minutes. Typically, 1- 2 piles may be installed per day depending on production and challenges encountered.

Once the temporary casing is installed to bedrock, a drilling bucket will be used within the casing to remove the remaining sediments and overburden soils. Sediment removed from the casing with the drilling bucket will be placed into containers and transferred to stockpiles on shore. After the overburden material is removed, an air hammer is used to advance a socket into bedrock. Once the bedrock is drilled, the permanent casing is installed in the rock socket. Concrete is placed within the rock socket and permanent casing using the tremie method and displacing standing water. The temporary casing is then removed using a vibratory hammer.

Drilling water released from the top of the casing from the beginning of the drilling process through installation of the piles will contain some sediment and rock fragments. Turbidity generated from the pile driving activities will be monitored as outlined below.

Cofferdams are not a viable option in the project location due to water depths, substantial cost, as well as the proximity to the Federal Navigation Channel. Additional turbidity control BMPs such as turbidity curtains would not be effective due to the high current velocity in the river.

The Army Corps Piscataqua River turning basin project located upstream of the proposed project assumed that the majority of the sand and gravel to be dredged for that project would settle out within 1,000 feet of dredging. This assumption was based on prior monitoring conducted during Boston Harbor and other dredging operations while dredging silty material, which showed that the majority of resuspended material settled within 1,000 feet from the dredge. Other projects in the river that have been completed, including the replacement of the Sarah Mildred Long Bridge (2014-01053) and the Maine DOT underwater cable project (2021-01126), did not generate large turbidity plumes during sediment-generating construction activities. Given the coarse substrate in the project area and the high water velocities, it is reasonable to assume that any turbidity plume would be less than 1,000 ft. Based on the strong currents (1.7 to 2 feet per second on average) and what has been observed during past construction projects in this area of the river, any turbidity is expected to dissipate sooner than 1,000 feet and would not extend across the river, which is between 1,300 and 1,600 feet wide.

There is potential for turbidity to exceed effluent limitations during construction. Therefore, the Department is proposing a defined mixing zone to ensure compliance with the CGP effluent limitations during the construction activities described above.

Water quality sampling during construction to meet New Hampshire specific effluent limitations as published in Part 9.1.1.c of the 2017 Construction General Permit (CGP) is considered too hazardous due to river velocities and boat traffic in the river. Turbidity will instead be monitored visually as described below.

**The Turbidity Control and Monitoring Plan will entail the following:**

1. All turbidity monitoring during dredging, debris removal, and pile installation will be completed by a qualified Contractor.

2. Visual monitoring is proposed due to potential safety concerns associated with obtaining water samples upstream and downstream from the wharf. Visual monitoring will take place from a consistent location as determined by the Contractor. The vantage point is anticipated to be from the Sarah Mildred Long Bridge, from the Contractor's barge, or with a drone.
3. Visual monitoring will start within 30 minutes after the start of work, once every two hours that work is underway, and end 30 minutes after the in-water work ends.
4. Visible turbidity will be allowed during in-water work under the parameters outlined below. Visible turbidity is assumed to be approximately 25 NTUs or greater.
5. Visual markers will be established in the river at four (4) locations (two (2) upstream and two (2) downstream). Due to the presence of the Federal Navigation Channel, it is not feasible to place permanent markers (i.e. buoys or similar devices) in the Piscataqua River. Visual markers will be established by the Contractor using landmarks along the banks of the river as well as using the width of the existing lift span as a reference for estimating the width of a potential plume. Location of the markers will be based on distance from the work being monitored – it is assumed that pile installation or debris removal at the south end of the wharf will not be carried out concurrently with dredging, pile installation, or debris removal at the north end.

A marker will be established 500' and 1,000' upstream of the work being monitored, and 500' and 1,000' downstream of the work being monitored. The purpose of the 500' marker is to evaluate aquatic organism passage within the mixing zone. It is assumed that if turbidity is visible but does not extend more than halfway across the width of the river, then there is adequate aquatic organism passage through the mixing zone. The approximate middle of the river channel is the lift span of the Sarah Mildred Long Bridge.

6. Action:
  - a. If turbidity is visible at either of the 500' markers and extends more than halfway across the river, work will stop temporarily until there is no visible turbid discharge. It is assumed that if a turbidity plume extending more than halfway across the river is visible at either of the 500' markers, the turbid discharge could potentially be impacting aquatic organism passage.
  - b. If turbidity is visible at either of the 1,000' markers, there is potential that turbidity at the end of the mixing zone will be greater than 10 NTUs above background or the CGP effluent limitation has been exceeded. Work will be temporarily stopped until there is no visible turbid discharge seen at the 1,000 markers and the NHDES Wetlands Bureau will be notified within 24 hours of stopping work.
  - c. Work will be allowed to continue only if and once turbidity is not visible at the 500' markers.
  - d. During dredging operations, monitoring will take place as specified in Item 3 above for the entire duration of dredging activity.

- e. Monitoring will take place during the first three days of debris removal and pile installation as specified in Item 3 above. Monitoring may be reduced to no less than twice a day (at least once within 30 minutes after the start of work and once after 4 hours) for the remaining duration of debris removal and pile installation provided there are no temporary work stoppages. If temporary work stoppages occur, daily monitoring will be resumed until there are no temporary work stoppages for at least two consecutive days of in-water work.
- f. Photographs will be taken during each monitoring event.

7. Reporting:

- a. A report will be submitted to the NHDES Wetlands Bureau every two weeks of monitoring or following a temporary work stoppage.
- b. Each report will summarize observations, timing, and status of work, and provide photo documentation.

## **Impact Plans (Revised)**

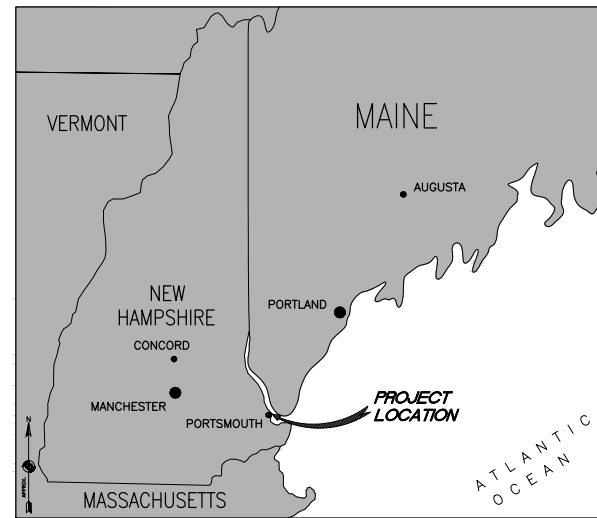
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# PEASE DEVELOPMENT AUTHORITY

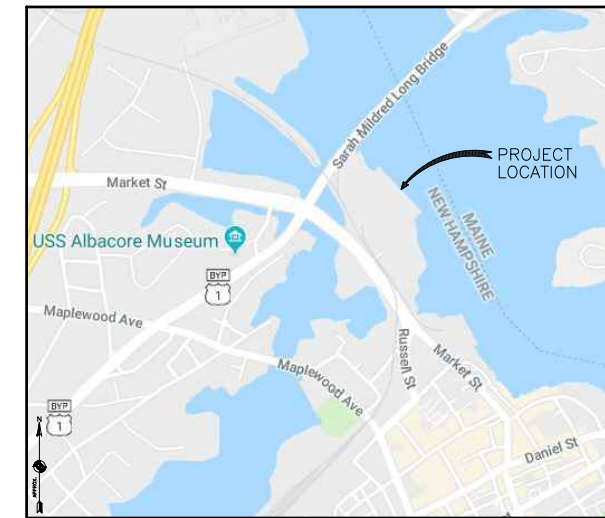
## Division of Ports and Harbors Portsmouth, New Hampshire

# MARKET STREET MARINE TERMINAL FUNCTIONAL REPLACEMENT BARGE DOCK ENVIRONMENTAL IMPACT PLANS

APRIL 2023



VICINITY MAP  
N.T.S.

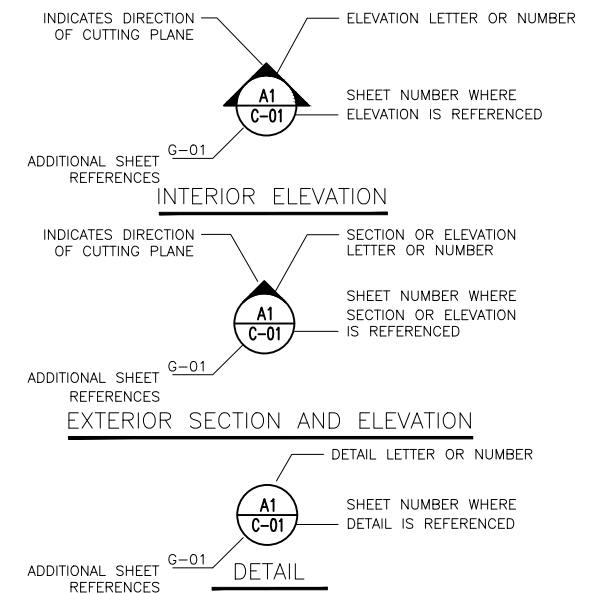


LOCATION MAP  
N.T.S.

### LIST OF DRAWINGS

NUMBER	NAME	TITLE
<u>GENERAL</u>		
1	G-001	TITLE SHEET
2	G-002	GENERAL NOTES
3	G-003	SITE PHOTOS - 01
4	G-004	SITE PHOTOS - 02
5	G-005	SITE PHOTOS - 03
6	G-101	EXISTING CONDITIONS PLAN
7	G-102	PROJECT OVERVIEW PLAN
<u>CIVIL</u>		
8	C-101	WETLAND IMPACT PLAN
9	C-102	SHORELAND IMPACT PLAN
10	C-103	GENERAL SECTIONS
11	C-104	DREDGING PLAN
12	C-105	DREDGE SECTIONS
13	C-106	RIPRAP PLAN
14	C-107	RIPRAP SECTIONS
<u>STRUCTURAL</u>		
15	S-101	PILE PLAN
16	S-102	PILE SECTION AND DETAILS
17	S-103	FRAMING PLAN
18	S-104	FLOATING DOCK PLAN AND DETAILS

### ELEVATION, SECTION OR DETAIL SYMBOLS



REVISION	DATE	DESCRIPTION	BY

603.786.1870  
inquiry@peasedevelopment.com

**Appledore Marine Engineering, LLC**

600 State St, Suite E  
Portsmouth New Hampshire 03801

DATE: \_\_\_\_\_

TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
FUNCTIONAL REPLACEMENT BARGE DOCK

TITLE SHEET

PROJECT No.:	5213
CAD DWG FILE:	S213_permit_01_G-001.dwg
DESIGNED BY:	SND
DRAWN BY:	KMV
CHECKED BY:	NJE
SCALE:	AS SHOWN

G-001

SHEET 1 OF 18

**GENERAL NOTES:**

1. THE DRAWINGS AND SPECIFICATIONS FORM A PART OF THE CONTRACT DOCUMENTS. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. IN THE EVENT OF A CONFLICT BETWEEN THE SPECIFICATIONS AND THE DRAWINGS, THE SPECIFICATIONS SHALL TAKE PRECEDENCE. A COPY OF THE DRAWINGS AND SPECIFICATIONS MUST BE KEPT ONSITE AT ALL TIMES DURING THE PROJECT.
2. COORDINATE ALL WORK WITH FACILITY PERSONNEL AND PORT OPERATIONS ON A DAILY BASIS. THE CONSTRUCTION WORK SHALL NOT INTERFERE WITH ONGOING OPERATIONS. SCHEDULE AND COORDINATE ALL WORK, INCLUDING ALLOWABLE WORK WINDOWS, WITH THE OWNER. MAINTAIN THE WORK SITE TO THE SATISFACTION OF THE OWNER.
3. COORDINATE MATERIAL STORAGE AND LAYDOWN AREAS WITH THE OWNER.
4. COORDINATE ALL BARGE ACCESS AND MOORING LOCATIONS WITH THE OWNER.
5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR JOB SITE SAFETY. DETERMINE CONSTRUCTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE FACILITIES AND THEIR COMPONENTS DURING ALL PHASES OF CONSTRUCTION. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIEDOWNS. SUCH MATERIAL SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AND BE REMOVED FROM THE OWNER'S PROPERTY AFTER COMPLETION OF THE PROJECT. ALL PROPOSED STAGING AREAS SHALL BE COORDINATED WITH THE OWNER BEFORE STARTING WORK. TEMPORARY CONSTRUCTION STAGING/STORAGE AREA SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION UPON COMPLETION OF THE PROJECT.
6. DIMENSIONS AND DETAILS OF THE EXISTING CONSTRUCTION ARE FROM LIMITED ARCHIVE DRAWINGS AND FIELD INVESTIGATIONS. CHECK AND VERIFY ALL DIMENSIONS AND DETAILS OF THE EXISTING CONSTRUCTION PRIOR TO COMMENCING CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER BEFORE ORDERING MATERIALS AND PROCEEDING WITH THE AFFECTED PART OF THE WORK.
7. EXISTING CONDITIONS DRAWINGS ARE INTENDED TO PROVIDE GENERAL OVERVIEW OF STRUCTURES BUT DO NOT INCLUDE ALL APPURTENANCES AND CONDITIONS.
8. METHODS OF DEMOLITION, CONSTRUCTION, AND ERECTION ARE THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED.
9. PREVENT ANY DISTURBANCE OR DAMAGE TO EXISTING STRUCTURES.
10. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DONE TO EXISTING STRUCTURES AND VESSELS AS A RESULT OF PERFORMING THE WORK.
11. AT THE END OF EACH WORKING DAY, THE CONSTRUCTION SITE MUST BE LEFT IN A NEAT AND CLEAN CONDITION.
12. COMPLY WITH ALL APPLICABLE O.S.H.A REGULATIONS AND SAFETY REQUIREMENTS.
13. REPORT SPILLS AND LEAKS OR OIL OR OTHER HAZARDOUS SUBSTANCES (IE OIL, ANTIFREEZE, CHEMICALS, ETC.) OCCURRING DURING THE PERFORMANCE OF THIS CONTRACT IMMEDIATELY UPON DISCOVERY, REGARDLESS OF THE QUANTITY.
14. THE OWNER WILL CHARGE TO THE CONTRACTOR ANY ADDITIONAL COSTS OF INSPECTION OR TESTING WHEN PRIOR REJECTION MAKES REINSPECTION OR RETESTING NECESSARY.

**REFERENCES AND STANDARDS:**

1. AMERICAN CONCRETE INSTITUTE (ACI) BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 2019 (ACI 318-19)
2. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, 16TH EDITION, 2022 (AISC-16)
3. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES, 2022 (ASCE 7-22)
4. ASCE SEISMIC DESIGN OF PIERS & WHARVES, 2014 (ASCE 61-14)
5. DEPARTMENT OF DEFENSE UNIFIED FACILITIES CRITERIA (UFC) DESIGN: PIERS AND WHARVES, 2017 (UFC 4-152-01)

**DESIGN CRITERIA:**

THE NORTH AND SOUTH WHARF EXTENSIONS HAVE BEEN DESIGNED AND ANALYZED FOR THE FOLLOWING LOADS:

DEAD LOAD: ACTUAL WEIGHT OF THE STRUCTURE

LIVE LOAD:

1. VEHICLE AND EQUIPMENT
  - a. 1,000 PSF UNIFORM LIVE LOAD
  - b. 250 TON CRAWLER CRANE (MAX PICK 55 TONS)
2. DESIGN VESSEL
  - a. 750 FOOT LOA
  - b. 35 FOOT DRAFT
  - c. 63,000 TON DISPLACEMENT
3. MOORING FITTINGS
  - a. 100 TON BOLLARD
  - b. 42" CLEAT (25 TON)

**UTILITIES NOTES:**

1. THE EXACT SIZE & LOCATION OF ALL EXISTING UTILITIES IMPACTED BY THE WORK SHALL BE FIELD VERIFIED PRIOR TO START OF CONSTRUCTION. NOTIFY "DIG SAFE" (1-888-344-7233) AT LEAST 14 CALENDAR DAYS PRIOR TO COMMENCEMENT OF GROUND PENETRATING ACTIVITY.
2. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE OWNER AT THE CONTRACTOR'S EXPENSE. NOTIFY THE OWNER A MINIMUM OF 5 DAYS IN ADVANCE OF ANY OUTAGES.

**ENVIRONMENTAL CONTROL NOTES:**

1. THIS PROJECT REQUIRES THE IMPLEMENTATION OF A BEST MANAGEMENT PRACTICES PLAN (BMP) DURING ALL CONSTRUCTION WORK TO PREVENT/MINIMIZE ENVIRONMENTAL IMPACTS DURING THE CONSTRUCTION ACTIVITY.
2. ENVIRONMENTAL CONTROLS MUST CONFORM TO ALL STATE, LOCAL, AND FEDERAL REGULATIONS AND PERMITS. ENVIRONMENTAL CONTROLS SHALL INCLUDE BUT NOT BE LIMITED TO MEASURES TO CONTROL TURBIDITY, PH, AND DUST.
3. A COPY OF ALL PERMITS MUST BE POSTED ON SITE DURING CONSTRUCTION IN A PROMINENT LOCATION VISIBLE TO INSPECTING PERSONNEL.
4. USE NETS, TARPS, WORK PLATFORMS, OR OTHER APPROVED EQUIVALENT MEANS TO PREVENT DEBRIS FROM FALLING INTO THE RIVER. REMOVE DEBRIS THAT HAS FALLEN INTO THE RIVER. THE OWNER MAY CONDUCT UNDERWATER INSPECTIONS TO ENSURE THAT ALL DEMOLITION AND CONSTRUCTION DEBRIS HAS BEEN REMOVED PRIOR TO DEMOBILIZING.
5. STORAGE, FUELING AND LUBRICATION OF EQUIPMENT AND MOTOR VEHICLES MUST BE CONDUCTED IN A MANNER THAT AFFORDS THE MAXIMUM PROTECTION AGAINST SPILL AND EVAPORATION. FUEL, LUBRICANTS AND OIL MUST BE MANAGED AND STORED IN ACCORDANCE WITH ALL FEDERAL, STATE, REGIONAL, AND LOCAL LAWS AND REGULATIONS. THERE SHALL BE NO STORAGE OF FUEL ON THE PROJECT SITE. FUEL MUST BE BROUGHT TO THE PROJECT SITE AS NEEDED. EQUIPMENT OPERATION, ACTIVITIES, OR PROCESSES PERFORMED BY THE CONTRACTOR SHALL BE IN ACCORDANCE WITH ALL FEDERAL AND STATE AIR EMISSION AND PERFORMANCE LAWS AND STANDARDS.
6. ALL PILE DRIVING MUST OCCUR DURING DAYLIGHT HOURS AND MUST FOLLOW ALL RESTRICTIONS REQUIRED BY THE APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS. PILE DRIVING IS NOT PERMITTED FROM APRIL 1 THROUGH JUNE 30.
7. DREDGING MUST OCCUR BETWEEN NOVEMBER 15 AND MARCH 15.

**SURVEY CONTROL NOTES:**

1. MAINTAIN ADEQUATE SURVEY CONTROL AT ALL TIMES TO ESTABLISH AND MAINTAIN ALL LINES AND ELEVATIONS.
2. HORIZONTAL DATUM BASED ON NAD 1983, NEW HAMPSHIRE STATE PLANE (CONUS) ZONE-NH 2800.
3. ELEVATIONS ARE IN FEET BASED ON MEAN LOWER LOW WATER (MLLW) PROJECT DATUM. TIDAL ELEVATIONS ARE BASED ON THE 1983-2001 TIDAL EPOCH AND NOAA TIDE STATION 8419870 SEAVEY ISLAND, MAINE.
4. TOPOGRAPHIC SURVEY PERFORMED BY DOUCET SURVEY. IN MAY AND JULY 2018 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.
5. HYDROGRAPHIC SURVEY PERFORMED BY STEELE ASSOCIATES IN DECEMBER 2022 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.

**ABBREVIATIONS**

APPROX	APPROXIMATE
DIA, Ø	DIAMETER
℄	BASELINE
EA	EACH
EL	ELEVATION IN FEET
EQ	EQUAL(LY)
HOTL	HIGHEST OBSERVABLE TIDE LINE
IN	INCH(S)
MHW	MEAN HIGH WATER
MHHW	MEAN HIGHER HIGH WATER
MIN	MINIMUM
MLLW	MEAN LOWER LOW WATER
MLW	MEAN LOW WATER
NAVD88	NATIONAL VERTICAL DATUM 1988
NTS	NOT TO SCALE
OC	ON CENTER
PSF	POUNDS PER SQUARE FOOT
SQ	SQUARE
SSP	STEEL SHEET PILE
TYP	TYPICAL

<b>Appledore Marine Engineering, LLC</b> 600 State St, Suite E Portsmouth New Hampshire 03801 603.786.1970 inquiry@appledoremarine.com	DATE: _____ TITLE: _____ (DRAWN) _____ (SCALE) _____
<b>PEASE DEVELOPMENT AUTHORITY</b> DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL, PORTSMOUTH, NH <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b>	
<b>GENERAL NOTES</b>	
PROJECT No.: 5213 CAD DWG FILE: S213_peritl_01_G-001.dwg DESIGNED BY: SNID DRAWN BY: KMV CHECKED BY: NJE SCALE: AS SHOWN	
<b>G-002</b>	
SHEET 2 OF 18	

1

2

3

4

5

D

C

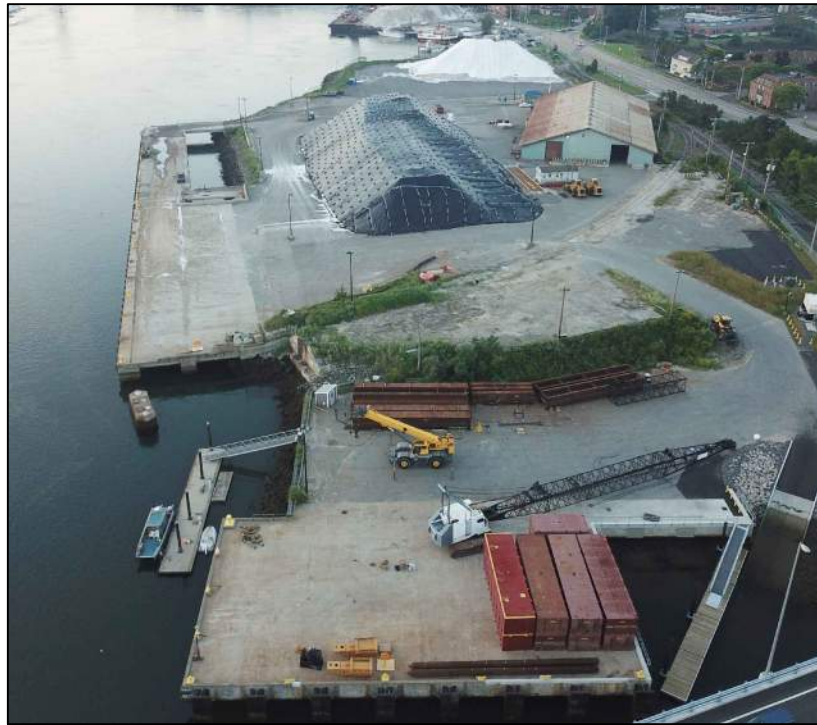
B

A



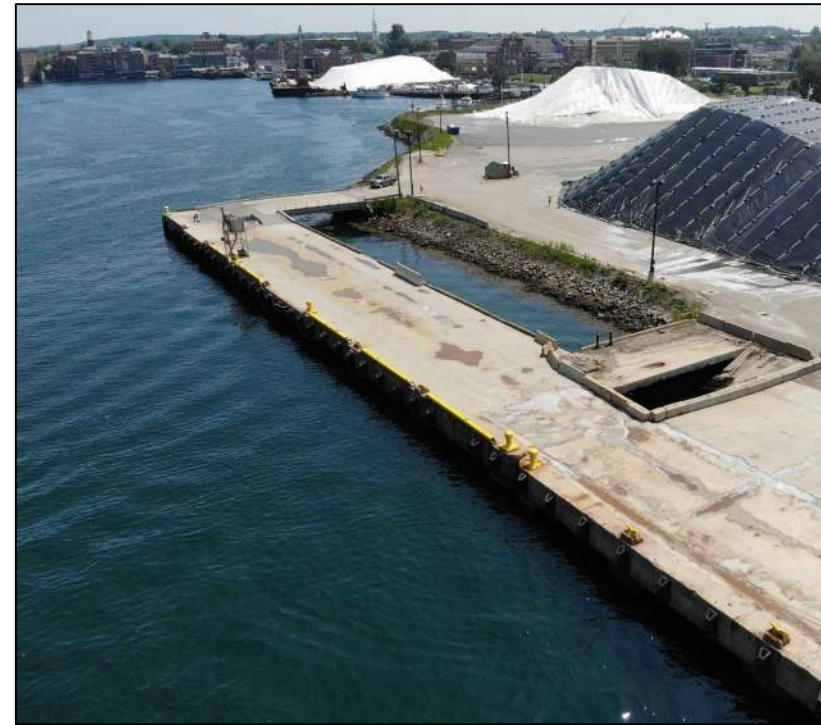
OVERALL SITE  
LOOKING SOUTH

C1



OVERALL SITE  
LOOKING SOUTHEAST

C3



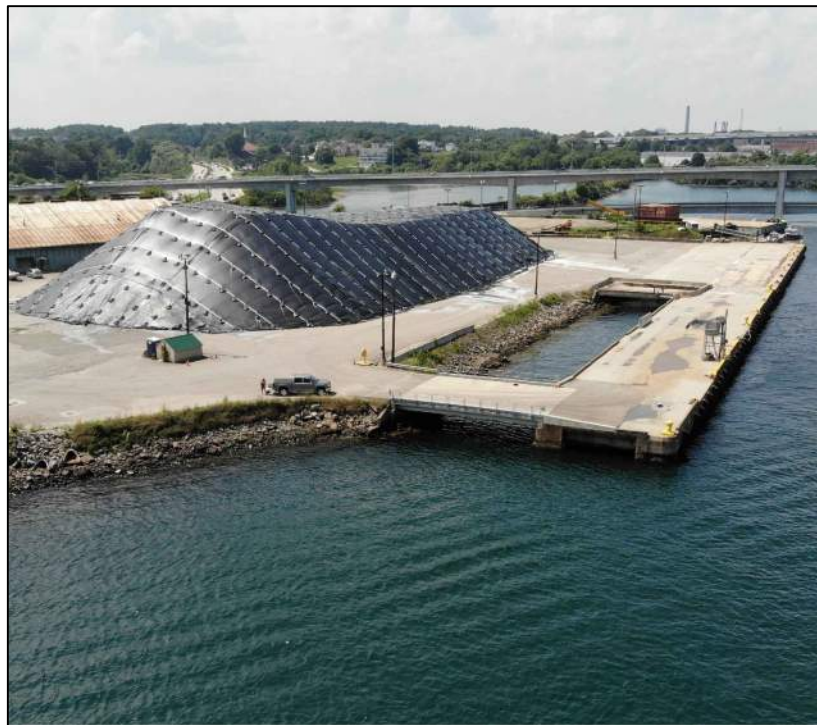
MAIN WHARF (1964 VINTAGE)  
LOOKING SOUTHEAST

C4



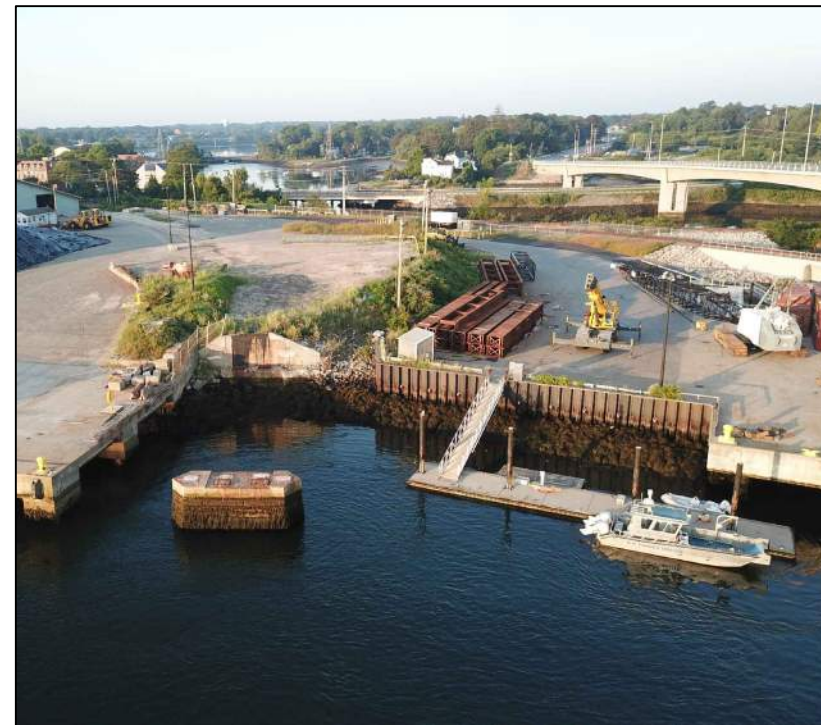
MAIN WHARF (1977 VINTAGE)  
LOOKING WEST

A1



SOUTH WHARF EXTENSION LOCATION  
LOOKING WEST

A3



NORTH WHARF EXTENSION LOCATION  
LOOKING SOUTH

A4

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603.766.1870  
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(SEAL)

PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**  
SITE PHOTOS - 01

PROJECT No.:	5213
CAD DWG FILE:	S213_permit_02_G-003.dwg
DESIGNED BY:	SND
DRAWN BY:	KMV
CHECKED BY:	NJE
SCALE:	AS SHOWN

G-003  
SHEET 3 OF 18

1

2

3

4

5

CHECK GRAPHIC SCALE BEFORE USING.



1

2

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D

C

B

A



**NORTH WHARF EXTENSION LOCATION**  
LOOKING SOUTHWEST (C1)



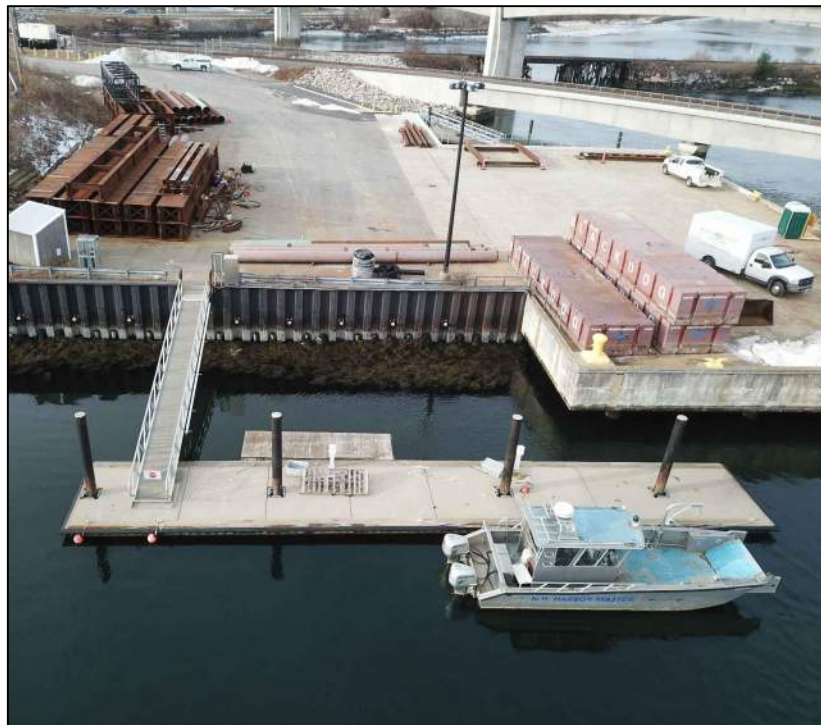
**BRIDGE PIER 14**  
LOOKING SOUTHWEST (C3)



**BRIDGE ABUTMENT 13**  
LOOKING SOUTHWEST (C4)



**BARGE WHARF BULKHEAD**  
LOOKING WEST (A1)



**FLOATING DOCK**  
LOOKING SOUTHWEST (A3)



**FLOATING DOCK - NEW LOCATION**  
LOOKING SOUTHWEST (A4)

1

2

3

4

5

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Portsmouth New Hampshire 03801  
SUBMITTED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

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PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**  
SITE PHOTOS - 02

PROJECT No.: 5213  
CAD DWG FILE: 5213\_permit\_02\_G-003.dwg  
DESIGNED BY: SMD  
DRAWN BY: KMV  
CHECKED BY: NJE  
SCALE: AS SHOWN

G-004  
SHEET 4 OF 18

CHECK GRAPHIC SCALE BEFORE USING.



MAIN WHARF - END SECTION  
LOOKING NORTHWEST

C1



MAIN WHARF - SOUTH ACCESS BRIDGE  
LOOKING SOUTHWEST

C3



MAIN WHARF - BRIDGE ABUTMENT  
LOOKING WEST

C4



SOUTH WHARF EXTENSION REVETMENT  
LOOKING WEST

A1



MAIN WHARF - FENDER SYSTEM  
LOOKING SOUTHWEST

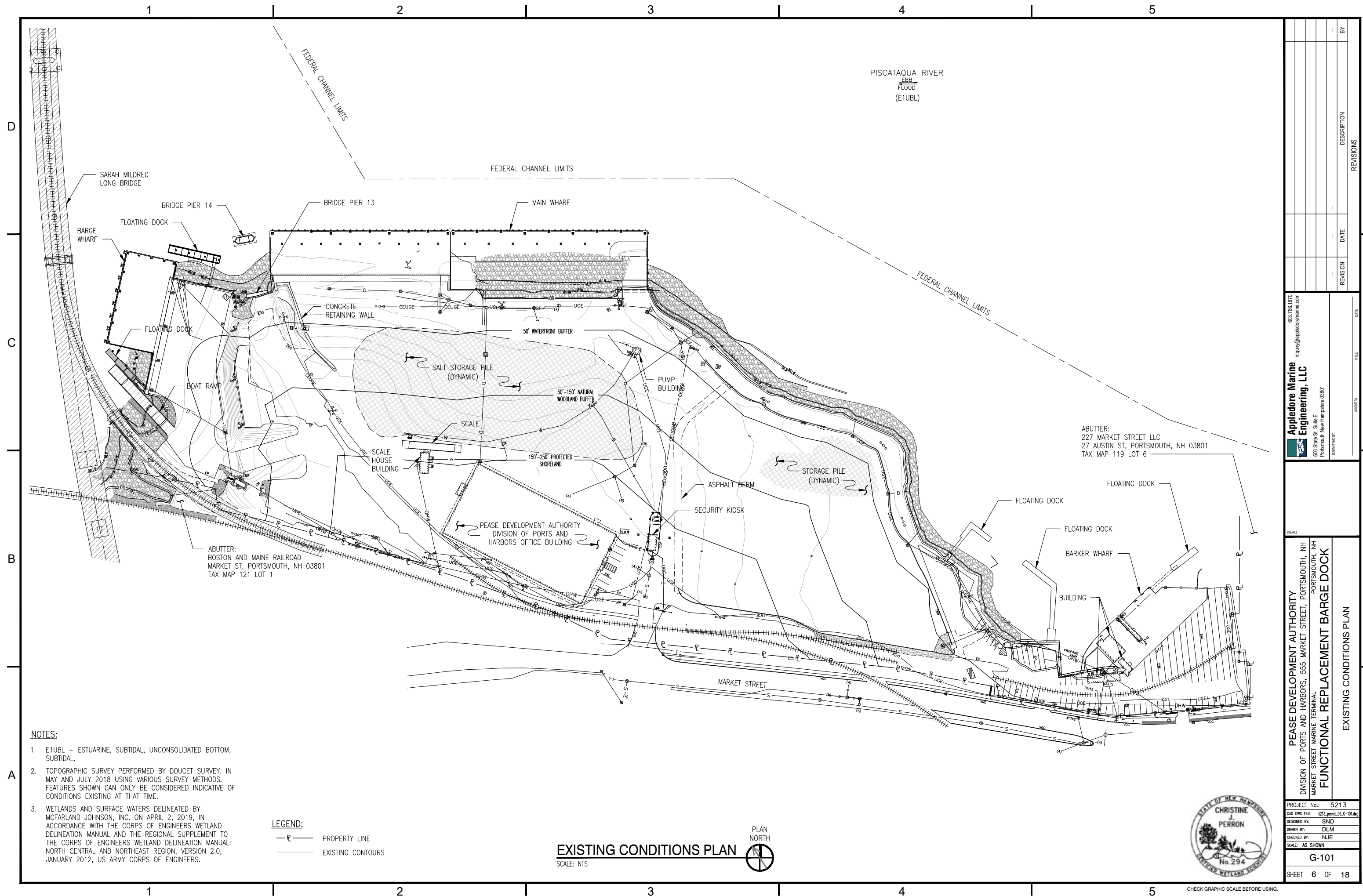
A3



BARGE WHARF - FENDER SYSTEM  
LOOKING SOUTH

A4

<p>603.766.1870 inquiry@applecoremarine.com</p> <p><b>Applecore Marine Engineering, LLC</b> 600 State St., Suite E Portsmouth New Hampshire 03801</p> <p>SUBMITTED BY: _____ DATE: _____</p>		<p>DATE</p> <p>TITLE</p> <p>REVISION</p> <p>DESCRIPTION</p> <p>BY</p>	
<p>PEASE DEVELOPMENT AUTHORITY DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b></p> <p>SITE PHOTOS - 03</p>		<p>PROJECT No.: 5213</p> <p>CAD DWG FILE: 5213_permit_02_G-003.dwg</p> <p>DESIGNED BY: SIND</p> <p>DRAWN BY: KMV</p> <p>CHECKED BY: SIND</p> <p>SCALE: AS SHOWN</p> <p>G-005</p> <p>SHEET 5 OF 18</p>	



**NOTES:**

1. E1UBL - ESTUARINE, SUBTIDAL, UNCONSOLIDATED BOTTOM, SUBTIDAL.
2. TOPOGRAPHIC SURVEY PERFORMED BY DOUCET SURVEY, IN MAY AND JULY 2018 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.
3. WETLANDS AND SURFACE WATERS DELINEATED BY MCFARLAND JOHNSON, INC. ON APRIL 2, 2019, IN ACCORDANCE WITH THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL AND THE REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTH CENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012, US ARMY CORPS OF ENGINEERS.

**LEGEND:**

- P - PROPERTY LINE
- - - - - EXISTING CONTOURS

**EXISTING CONDITIONS PLAN**

SCALE: NTS



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 inquiry@appledoremaine.com  
**Appledore Marine Engineering, LLC**  
 600 State St, Suite E  
 Portsmouth New Hampshire 03801  
 SUBMITTED BY: [ ] DATE: [ ]

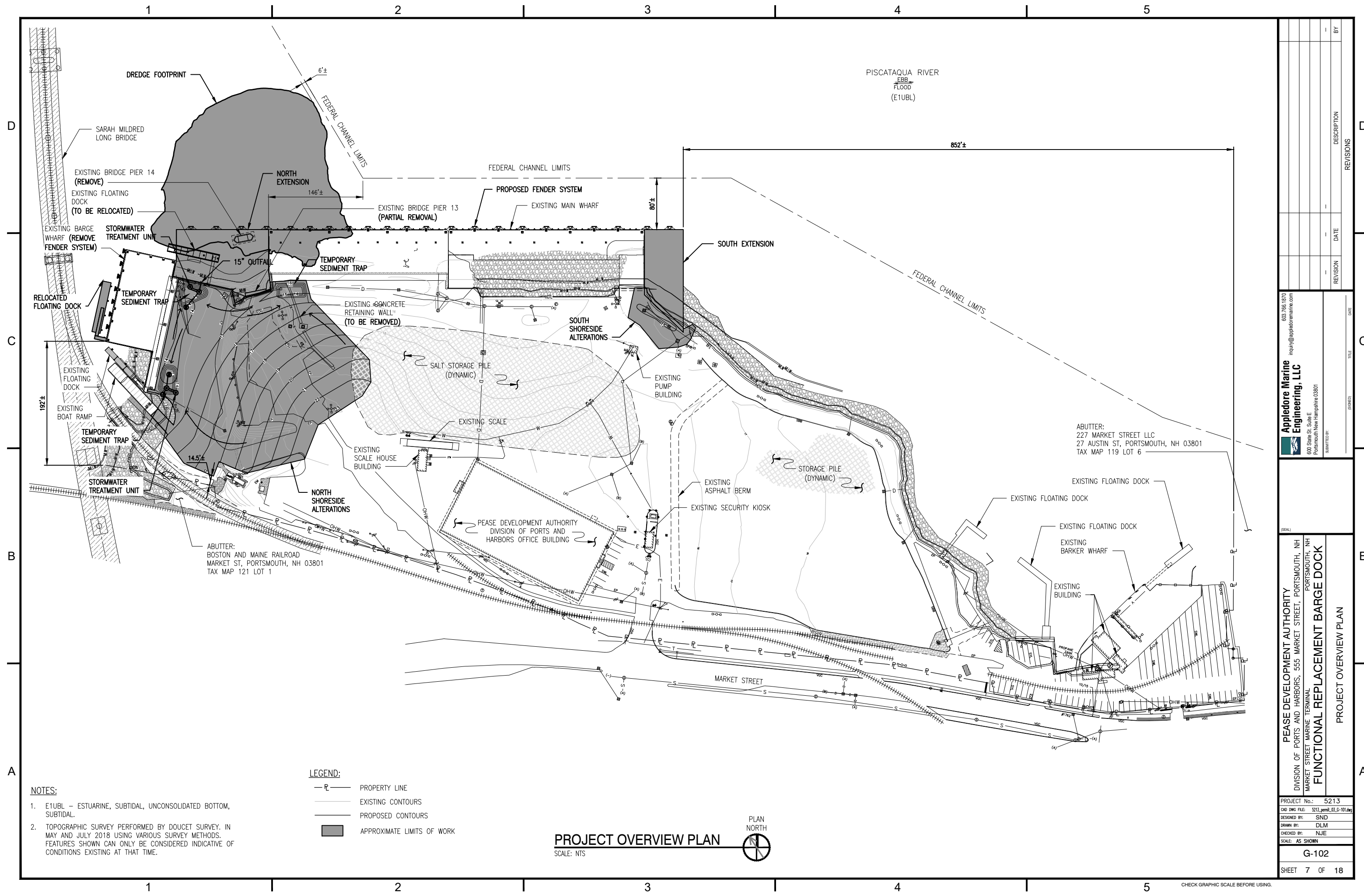
(SEAL)

**PEASE DEVELOPMENT AUTHORITY**  
 DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
 MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**  
 EXISTING CONDITIONS PLAN

PROJECT No.:	5213
CAD DWG FILE:	S213_permit_03_G-101.dwg
DESIGNED BY:	SND
DRAWN BY:	DLM
CHECKED BY:	NJE
SCALE:	AS SHOWN

**G-101**  
 SHEET 6 OF 18

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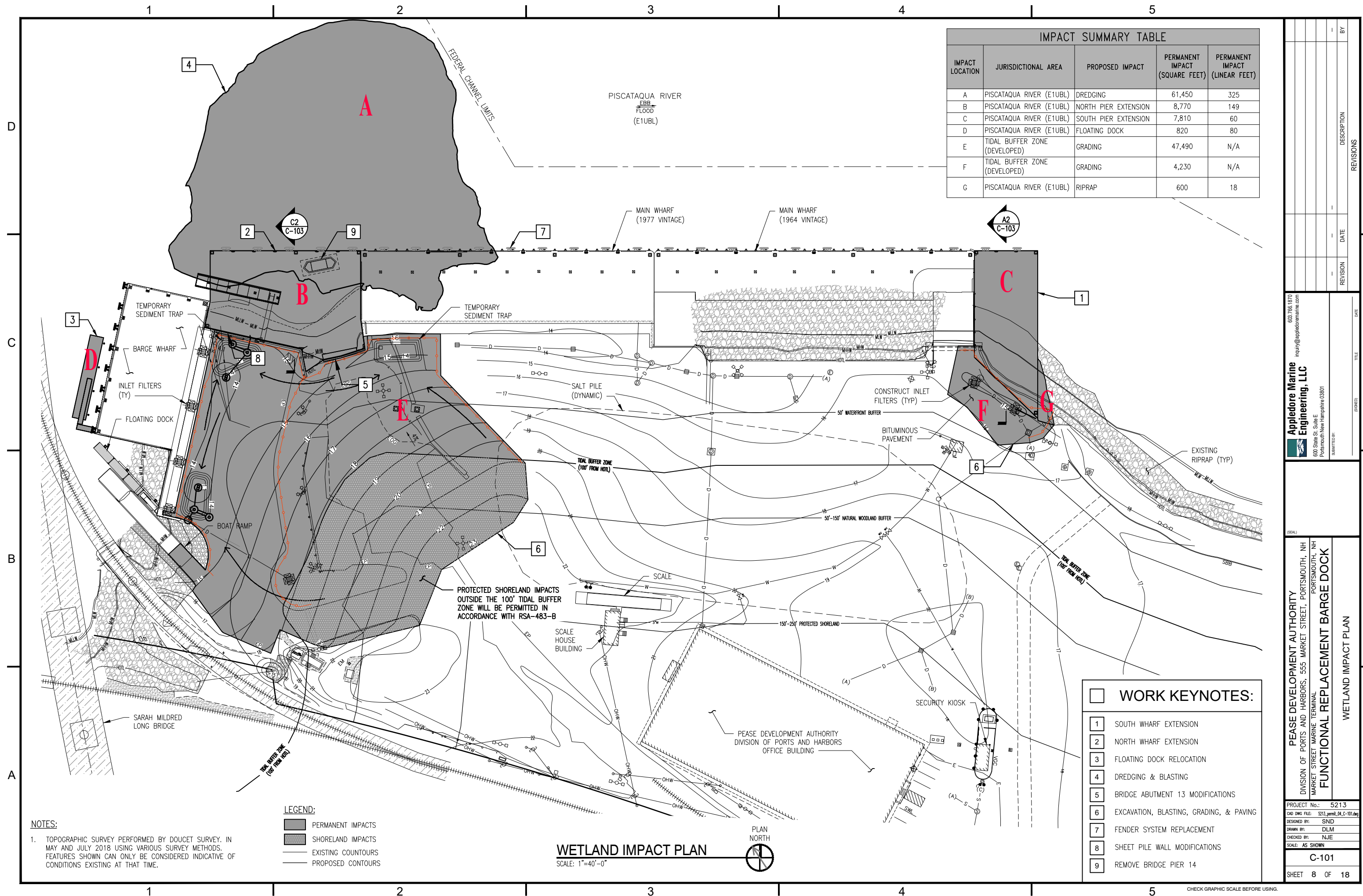
- NOTES:**
1. E1UBL - ESTUARINE, SUBTIDAL, UNCONSOLIDATED BOTTOM, SUBTIDAL.
  2. TOPOGRAPHIC SURVEY PERFORMED BY DOUCET SURVEY. IN MAY AND JULY 2018 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.

- LEGEND:**
- P — PROPERTY LINE
  - — — EXISTING CONTOURS
  - — — PROPOSED CONTOURS
  - APPROXIMATE LIMITS OF WORK

**PROJECT OVERVIEW PLAN**  
SCALE: NTS



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<p>PEASE DEVELOPMENT AUTHORITY DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b></p> <p>PROJECT OVERVIEW PLAN</p>	
<p>PROJECT No.: 5213 CAD DWG FILE: S213_permit_03_G-101.dwg DESIGNED BY: SND DRAWN BY: DLM CHECKED BY: NJE SCALE: AS SHOWN</p>	
<p><b>G-102</b></p>	
<p>SHEET 7 OF 18</p>	



IMPACT LOCATION	JURISDICTIONAL AREA	PROPOSED IMPACT	PERMANENT IMPACT (SQ. FEET)	PERMANENT IMPACT (LINEAR FEET)
A	PISCATAQUA RIVER (E1UBL)	DREDGING	61,450	325
B	PISCATAQUA RIVER (E1UBL)	NORTH PIER EXTENSION	8,770	149
C	PISCATAQUA RIVER (E1UBL)	SOUTH PIER EXTENSION	7,810	60
D	PISCATAQUA RIVER (E1UBL)	FLOATING DOCK	820	80
E	TIDAL BUFFER ZONE (DEVELOPED)	GRADING	47,490	N/A
F	TIDAL BUFFER ZONE (DEVELOPED)	GRADING	4,230	N/A
G	PISCATAQUA RIVER (E1UBL)	RIPRAP	600	18

**NOTES:**  
 1. TOPOGRAPHIC SURVEY PERFORMED BY DOUCET SURVEY, IN MAY AND JULY 2018 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.

**LEGEND:**  
 [Solid Grey] PERMANENT IMPACTS  
 [Hatched Grey] SHORELAND IMPACTS  
 [Dashed Line] EXISTING CONTOURS  
 [Solid Line] PROPOSED CONTOURS

**WETLAND IMPACT PLAN**  
 SCALE: 1"=40'-0"  
 PLAN NORTH

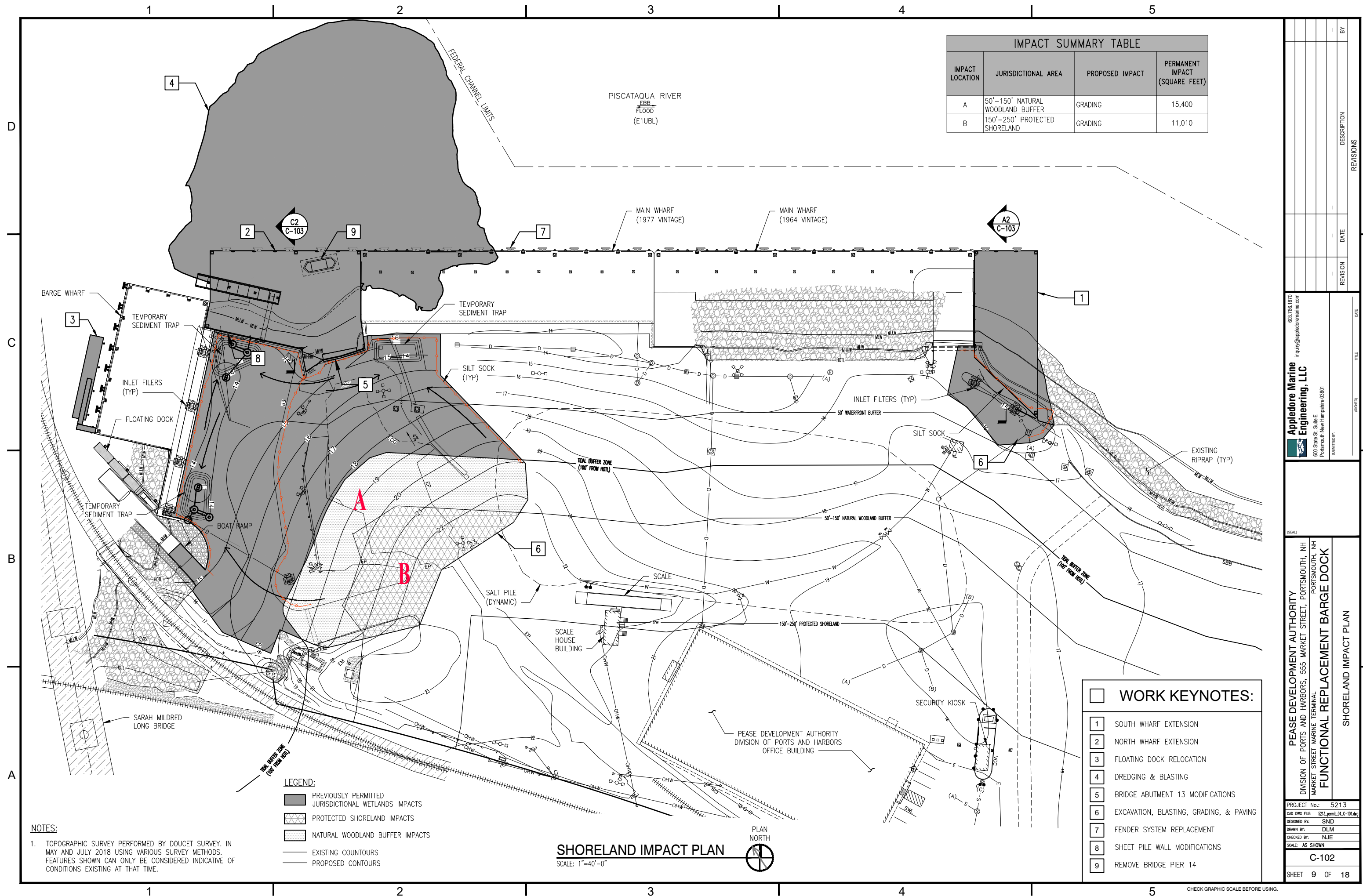
- WORK KEYNOTES:**
- 1 SOUTH WHARF EXTENSION
  - 2 NORTH WHARF EXTENSION
  - 3 FLOATING DOCK RELOCATION
  - 4 DREDGING & BLASTING
  - 5 BRIDGE ABUTMENT 13 MODIFICATIONS
  - 6 EXCAVATION, BLASTING, GRADING, & PAVING
  - 7 FENDER SYSTEM REPLACEMENT
  - 8 SHEET PILE WALL MODIFICATIONS
  - 9 REMOVE BRIDGE PIER 14

603.766.1870  
 inquiry@appledoremarine.com  
**Appledore Marine Engineering, LLC**  
 600 State St, Suite E  
 Portsmouth New Hampshire 03801  
 SUBMITTED BY: [Signature]  
 (DATE)

PEASE DEVELOPMENT AUTHORITY  
 DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
 MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**  
 WETLAND IMPACT PLAN

PROJECT No.: 5213  
 CAD DWG FILE: S213\_permit\_M\_C-101.dwg  
 DESIGNED BY: SND  
 DRAWN BY: DLM  
 CHECKED BY: NJE  
 SCALE: AS SHOWN  
**C-101**  
 SHEET 8 OF 18

REVISION	DATE	DESCRIPTION	BY



IMPACT SUMMARY TABLE			
IMPACT LOCATION	JURISDICTIONAL AREA	PROPOSED IMPACT	PERMANENT IMPACT (SQ. FEET)
A	50'-150' NATURAL WOODLAND BUFFER	GRADING	15,400
B	150'-250' PROTECTED SHORELAND	GRADING	11,010

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**Appledore Marine Engineering, LLC**  
 600 State St, Suite E  
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 MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**  
 SHORELAND IMPACT PLAN

PROJECT No.: 5213  
 CAD DWG FILE: S213\_permit\_M\_C-101.dwg  
 DESIGNED BY: SND  
 DRAWN BY: DLM  
 CHECKED BY: NJE  
 SCALE: AS SHOWN

**NOTES:**  
 1. TOPOGRAPHIC SURVEY PERFORMED BY DOUCET SURVEY, IN MAY AND JULY 2018 USING VARIOUS SURVEY METHODS. FEATURES SHOWN CAN ONLY BE CONSIDERED INDICATIVE OF CONDITIONS EXISTING AT THAT TIME.

- LEGEND:**
- PREVIOUSLY PERMITTED JURISDICTIONAL WETLANDS IMPACTS
  - PROTECTED SHORELAND IMPACTS
  - NATURAL WOODLAND BUFFER IMPACTS
  - EXISTING CONTOURS
  - PROPOSED CONTOURS

- WORK KEYNOTES:**
- 1 SOUTH WHARF EXTENSION
  - 2 NORTH WHARF EXTENSION
  - 3 FLOATING DOCK RELOCATION
  - 4 DREDGING & BLASTING
  - 5 BRIDGE ABUTMENT 13 MODIFICATIONS
  - 6 EXCAVATION, BLASTING, GRADING, & PAVING
  - 7 FENDER SYSTEM REPLACEMENT
  - 8 SHEET PILE WALL MODIFICATIONS
  - 9 REMOVE BRIDGE PIER 14

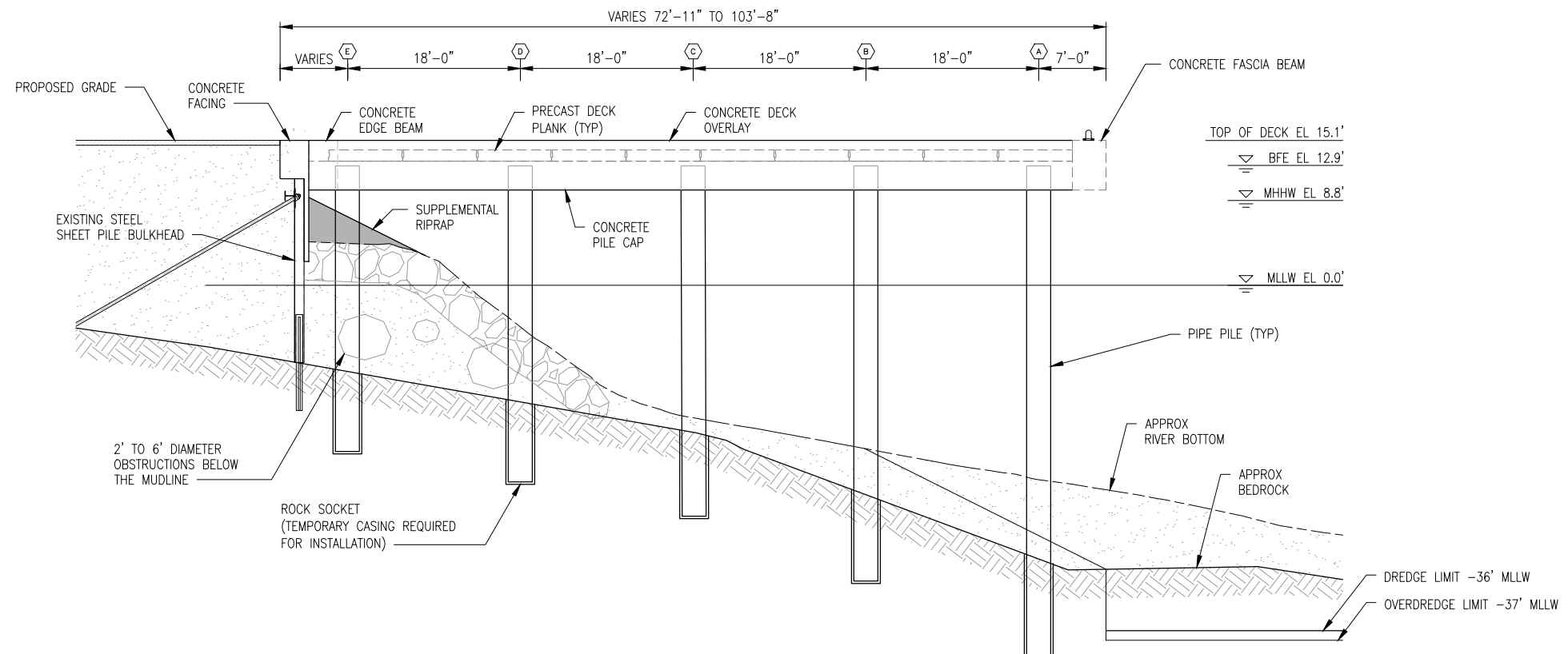
**SHORELAND IMPACT PLAN**  
 SCALE: 1"=40'-0"

REVISION	DATE	DESCRIPTION	BY

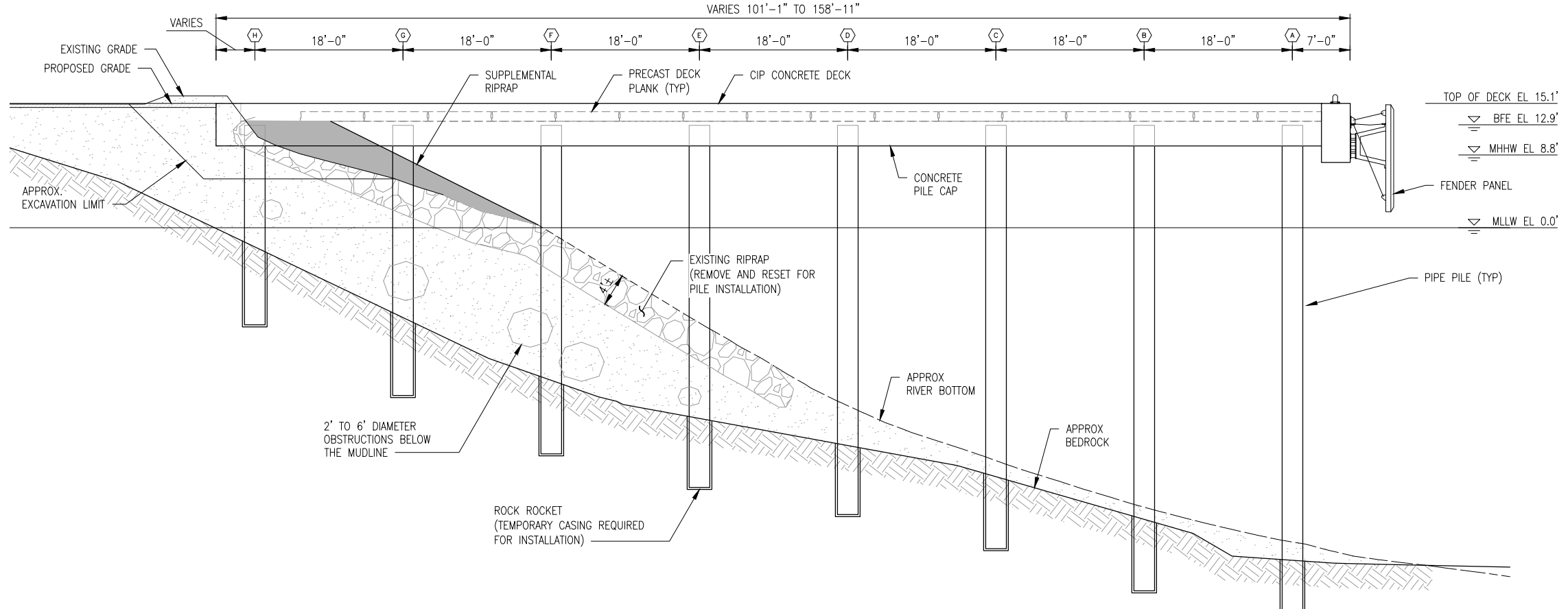
**ELEVATION REFERENCE TABLE**

REFERENCE	MLLW
DECK ELEVATION	15.10
BASE FLOOD ELEVATION (BFE)	12.86
HIGHEST OBSERVED TIDE (02/07/1978)	12.52
HIGHEST ASTRONOMICAL TIDE (HAT) (06/15/1995)	10.52
MEAN HIGHER HIGH WATER (MHHW)	8.84
MEAN HIGH WATER (MHW)	8.43
NORTH AMERICAN VERTICAL DATUM (NAVD88)	4.62
MEAN SEA LEVEL (MSL)	4.43
MEAN TIDE LEVEL (MTL)	4.38
NATIONAL GEODETIC VERTICAL DATUM (NGVD29)	3.86
MEAN LOW WATER (MLW)	0.32
MEAN LOWER LOW WATER (MLLW)	0.00
LOWEST ASTRONOMICAL TIDE (LAT)	-1.67
LOWEST OBSERVED WATER LEVEL (11/30/1955)	-3.35

THE LOCAL TIDAL DATUM INFORMATION AND THE RELATIONSHIP BETWEEN LOCAL TIDE AND NAVD88 IS BASED ON DATA PUBLISHED BY THE U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE FOR STATION "SEAVEY ISLAND, PORTSMOUTH HARBOR", STATION ID: 8419870, TIDAL EPOCH 1983-2001.



**NORTH WHARF EXTENSION GENERAL SECTION** C2  
SCALE: 1/8"=1'-0"



**SOUTH WHARF EXTENSION GENERAL SECTION** A2  
SCALE: 1/8"=1'-0"

NO.	REVISION	DATE	DESCRIPTION	BY

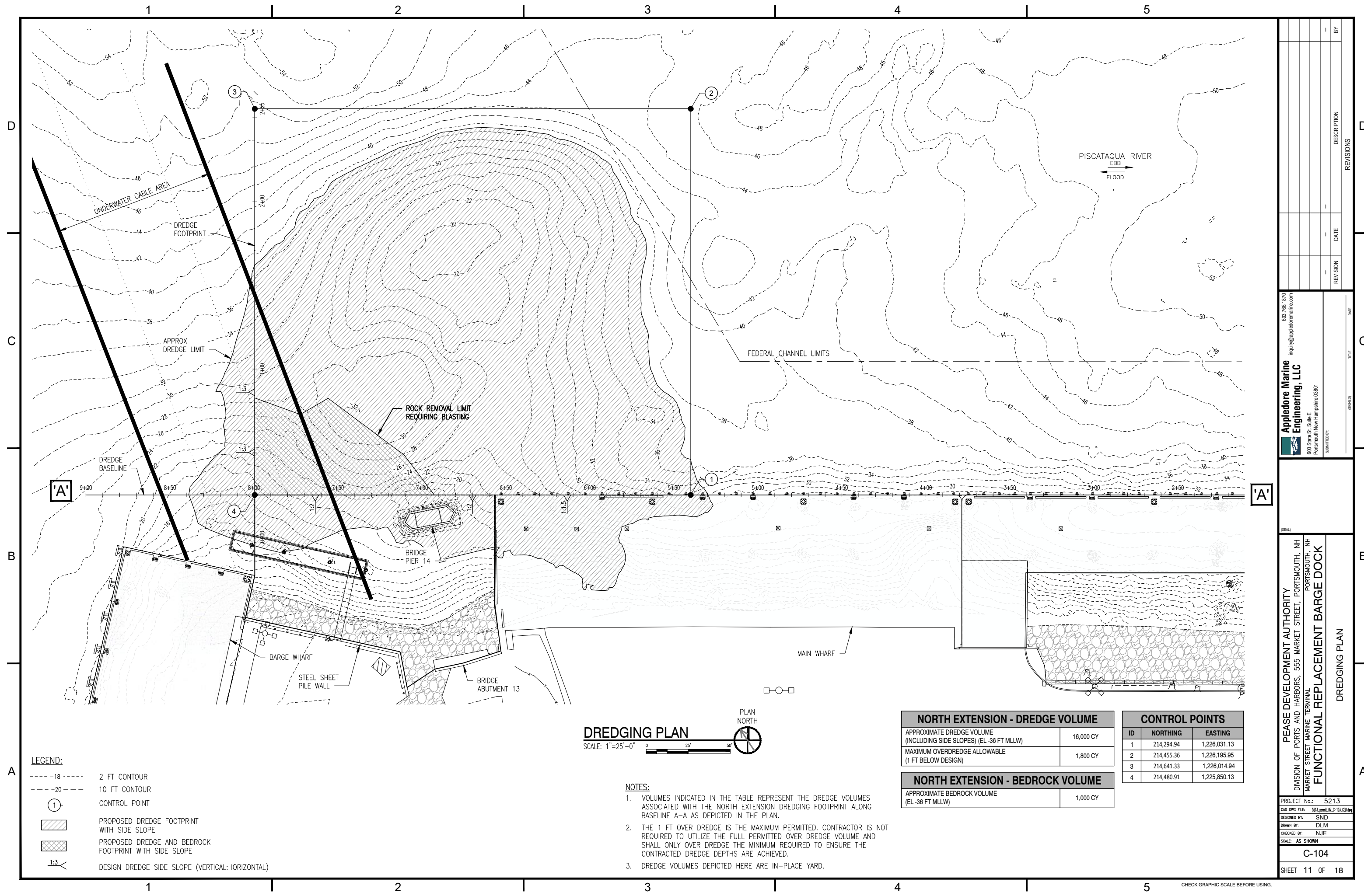
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inquiry@appledoremarine.com  
**Appledore Marine Engineering, LLC**  
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Portsmouth New Hampshire 03801  
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DATE: \_\_\_\_\_

PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**

GENERAL SECTIONS

PROJECT No.:	5213
CAD DWG FILE:	S213_permit_06_S-101.dwg
DESIGNED BY:	SND
DRAWN BY:	KMV
CHECKED BY:	NJUE
SCALE:	AS SHOWN

CHECK GRAPHIC SCALE BEFORE USING.



PISCATAQUA RIVER  
EBB  
FLOOD

FEDERAL CHANNEL LIMITS

**DREDGING PLAN**

SCALE: 1"=25'-0"



- LEGEND:**
- 18 --- 2 FT CONTOUR
  - 20 --- 10 FT CONTOUR
  - ① CONTROL POINT
  - PROPOSED DREDGE FOOTPRINT WITH SIDE SLOPE
  - PROPOSED DREDGE AND BEDROCK FOOTPRINT WITH SIDE SLOPE
  - 1:3 DESIGN DREDGE SIDE SLOPE (VERTICAL:HORIZONTAL)

- NOTES:**
- VOLUMES INDICATED IN THE TABLE REPRESENT THE DREDGE VOLUMES ASSOCIATED WITH THE NORTH EXTENSION DREDGING FOOTPRINT ALONG BASELINE A-A AS DEPICTED IN THE PLAN.
  - THE 1 FT OVER DREDGE IS THE MAXIMUM PERMITTED. CONTRACTOR IS NOT REQUIRED TO UTILIZE THE FULL PERMITTED OVER DREDGE VOLUME AND SHALL ONLY OVER DREDGE THE MINIMUM REQUIRED TO ENSURE THE CONTRACTED DREDGE DEPTHS ARE ACHIEVED.
  - DREDGE VOLUMES DEPICTED HERE ARE IN-PLACE YARD.

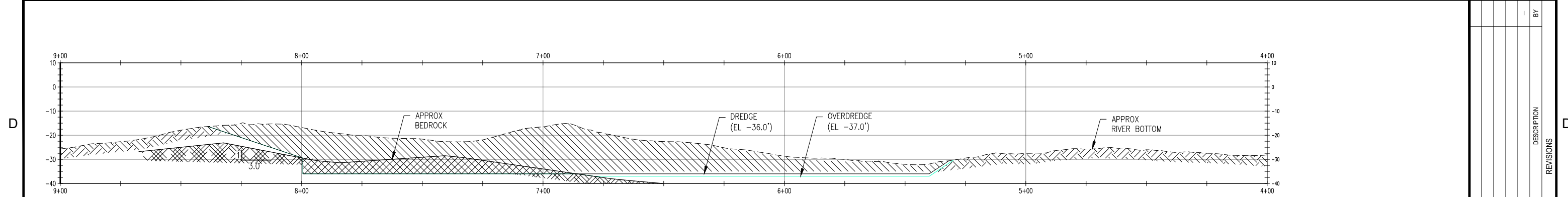
NORTH EXTENSION - DREDGE VOLUME	
APPROXIMATE DREDGE VOLUME (INCLUDING SIDE SLOPES) (EL -36 FT MLLW)	16,000 CY
MAXIMUM OVERDREDGE ALLOWABLE (1 FT BELOW DESIGN)	1,800 CY

NORTH EXTENSION - BEDROCK VOLUME	
APPROXIMATE BEDROCK VOLUME (EL -36 FT MLLW)	1,000 CY

CONTROL POINTS		
ID	NORTHING	EASTING
1	214,294.94	1,226,031.13
2	214,455.36	1,226,195.95
3	214,641.33	1,226,014.94
4	214,480.91	1,225,850.13

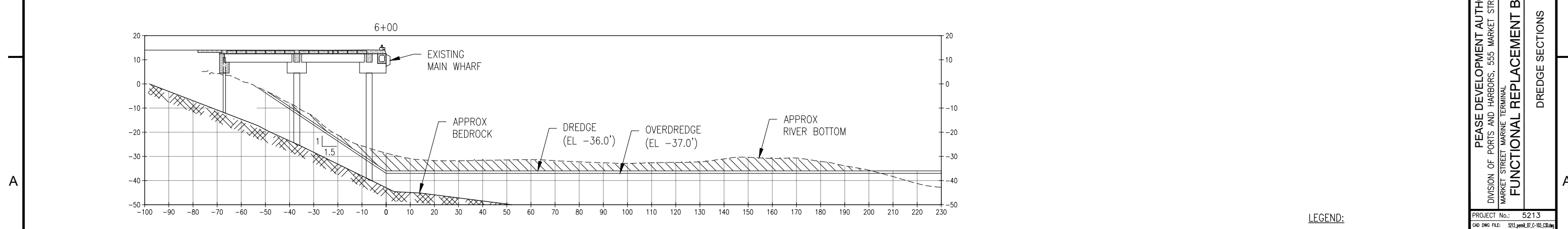
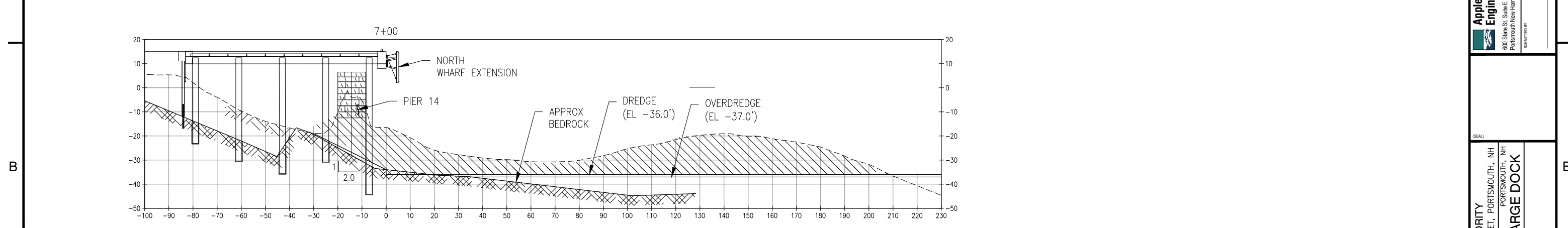
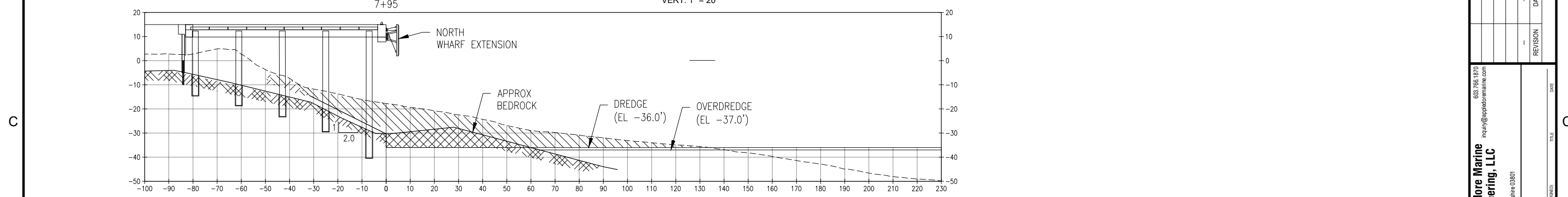
<p style="text-align: center;"><b>Appledore Marine Engineering, LLC</b></p> <p style="font-size: small;">603.786.1870 inquiry@appledoremarine.com 600 State St, Suite E Portsmouth New Hampshire 03801</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>REVISION</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	REVISION	DATE	DESCRIPTION	BY				
REVISION	DATE	DESCRIPTION	BY						
<p style="font-size: x-small;">SUBMITTED BY: _____ (SIGNED) _____ (TITLE) _____ (DATE)</p>									
<p style="font-size: x-small;">PEASE DEVELOPMENT AUTHORITY DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b></p>									
<p style="font-size: x-small;">PROJECT No.: 5213 CAD DWG FILE: 5213_psm_07_C-104.dwg DESIGNED BY: SND DRAWN BY: DLM CHECKED BY: NJE SCALE: AS SHOWN</p>									
<p style="font-size: x-small;">DREDGING PLAN</p>									
<p style="font-size: x-small;">SHEET 11 OF 18</p>									





**DREDGING PROFILE A-A**

HORIZ: 1" = 20'  
VERT: 1" = 20'



**DREDGING SECTIONS A-A**

HORIZ: 1" = 20'  
VERT: 1" = 20'

- LEGEND:**
- DREDGE REMOVAL
  - BEDROCK REMOVAL
  - APPROXIMATE MUDLINE
  - APPROXIMATE BEDROCK

REVISION	DATE	DESCRIPTION	BY

603.766.1870  
inquiry@appledoremaine.com

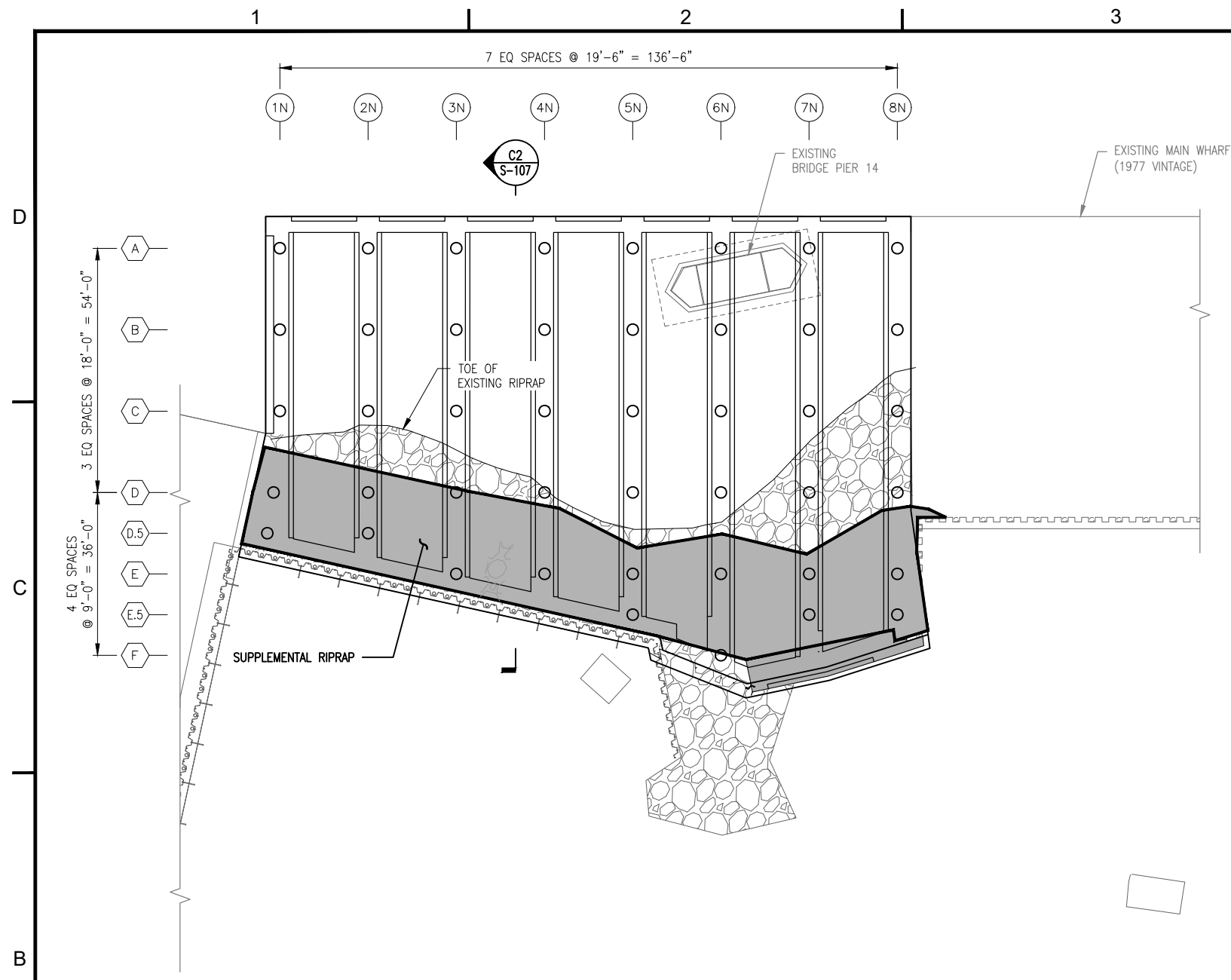
**Appledore Marine Engineering, LLC**  
600 State St, Suite E  
Portsmouth New Hampshire 03801

DATE: \_\_\_\_\_  
TITLE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_

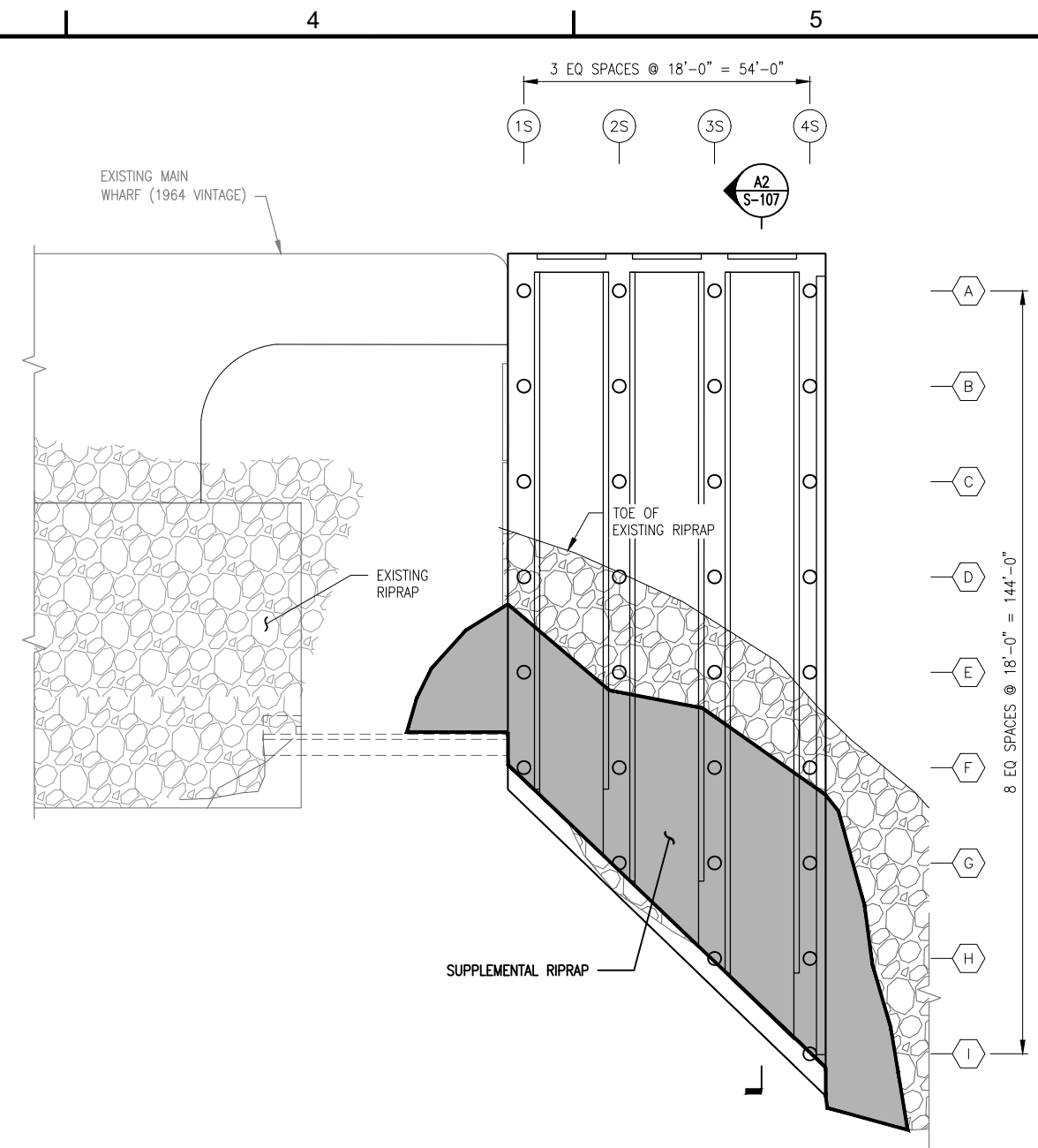
PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**

DREDGE SECTIONS

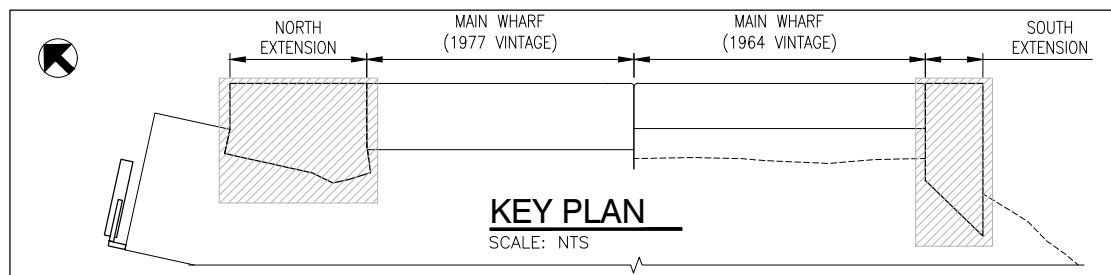
PROJECT No.:	5213
CAD DWG FILE:	0213_pem_01_C-105.dwg
DESIGNED BY:	SND
DRAWN BY:	DLM
CHECKED BY:	NJE
SCALE:	AS SHOWN
<b>C-105</b>	
SHEET 12 OF 18	



**NORTH WHARF EXTENSION RIPRAP PLAN**  
 SCALE: 1/16" = 1'-0"  
 PLAN NORTH



**SOUTH WHARF EXTENSION RIPRAP PLAN**  
 SCALE: 1/16" = 1'-0"  
 PLAN NORTH



**KEY PLAN**  
 SCALE: NTS

603.766.1870 inquiry@appledoremarine.com <b>Appledore Marine Engineering, LLC</b> 600 State St, Suite E Portsmouth New Hampshire 03801 <small>DATE</small> <small>BY</small>	
PEASE DEVELOPMENT AUTHORITY DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b>	PROJECT No.: 5213 CAD DWG FILE: S213_permit_06_S-101.dwg DESIGNED BY: SND DRAWN BY: MDM CHECKED BY: NJE SCALE: AS SHOWN
RIPRAP PLAN SHEET 13 OF 18	

CHECK GRAPHIC SCALE BEFORE USING.

1

2

3

4

5

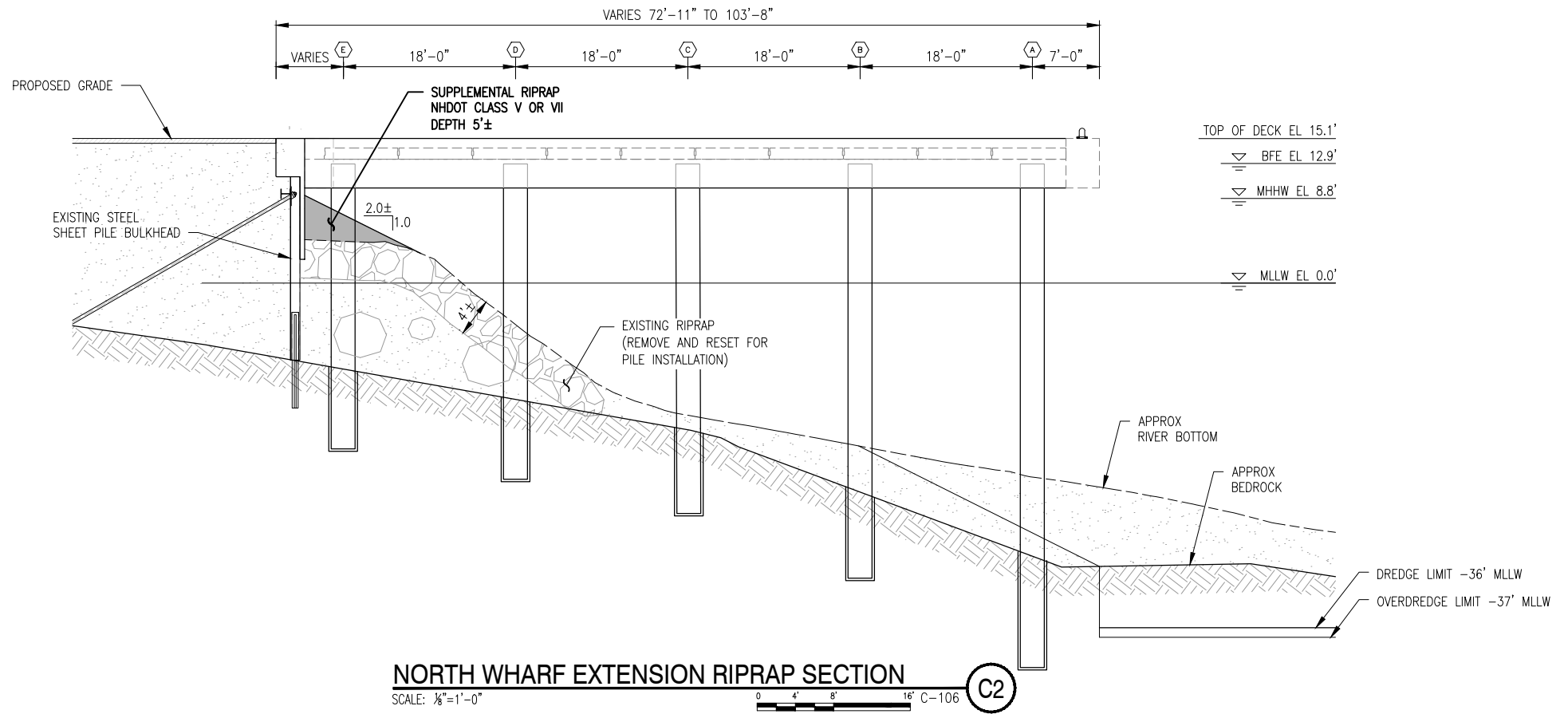
D

C

B

A

RIPRAP SUMMARY TABLE						
RIPRAP CLASSES AND SIZES			PERCENT DISTRIBUTION OF PARTICLE SIZE BY VOLUME (CF)			
NHDOT CLASS	NOMINAL SIZE (IN)	MAXIMUM SIZE (IN.)	<15%	15%-85%	>85%	MAXIMUM
V	18	36	1.3	3.5	8.5	22
VII	24	48	3	8	19	53

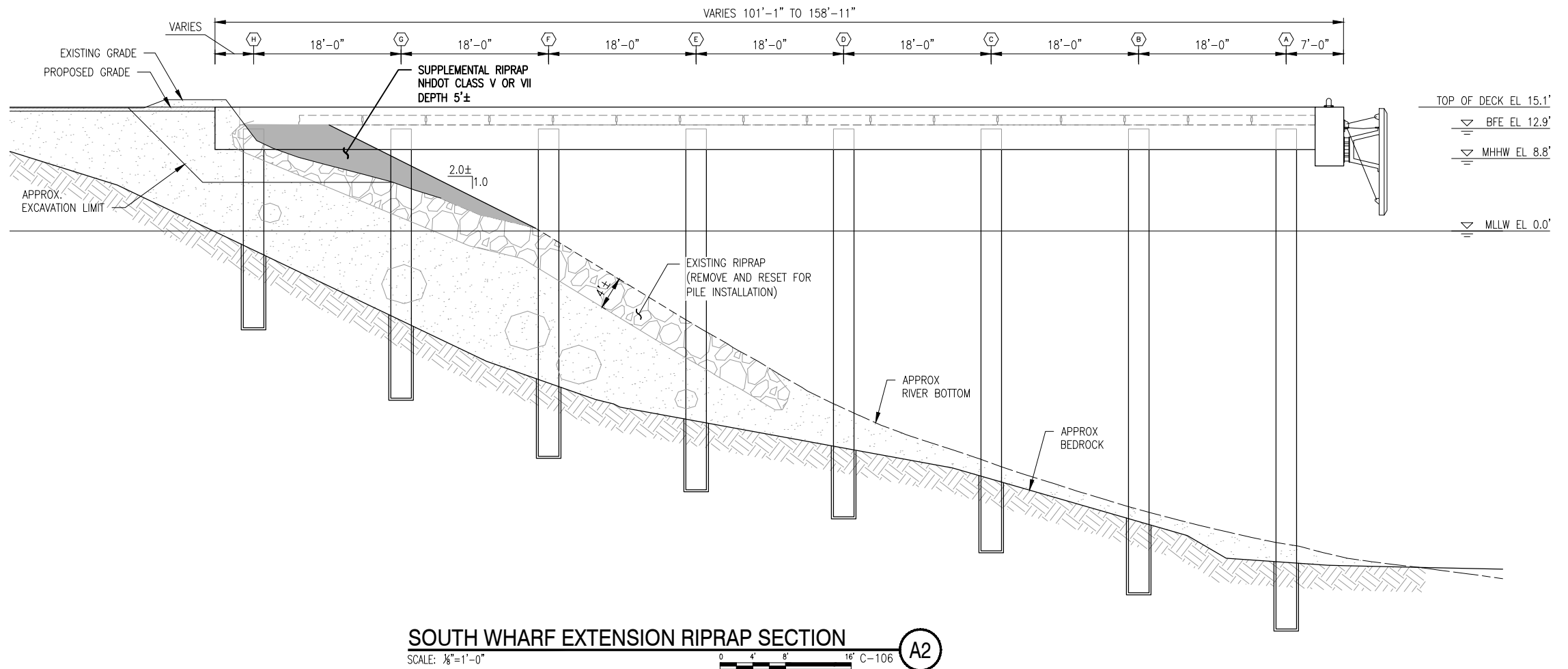


**NORTH WHARF EXTENSION RIPRAP SECTION**

SCALE: 1/8"=1'-0"

0 4' 8' 16' C-106

C2



**SOUTH WHARF EXTENSION RIPRAP SECTION**

SCALE: 1/8"=1'-0"

0 4' 8' 16' C-106

A2

REVISION	DATE	DESCRIPTION	BY

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600 State St, Suite E  
Portsmouth New Hampshire 03801

DATE: \_\_\_\_\_  
TITLE: \_\_\_\_\_  
DRAWN: \_\_\_\_\_

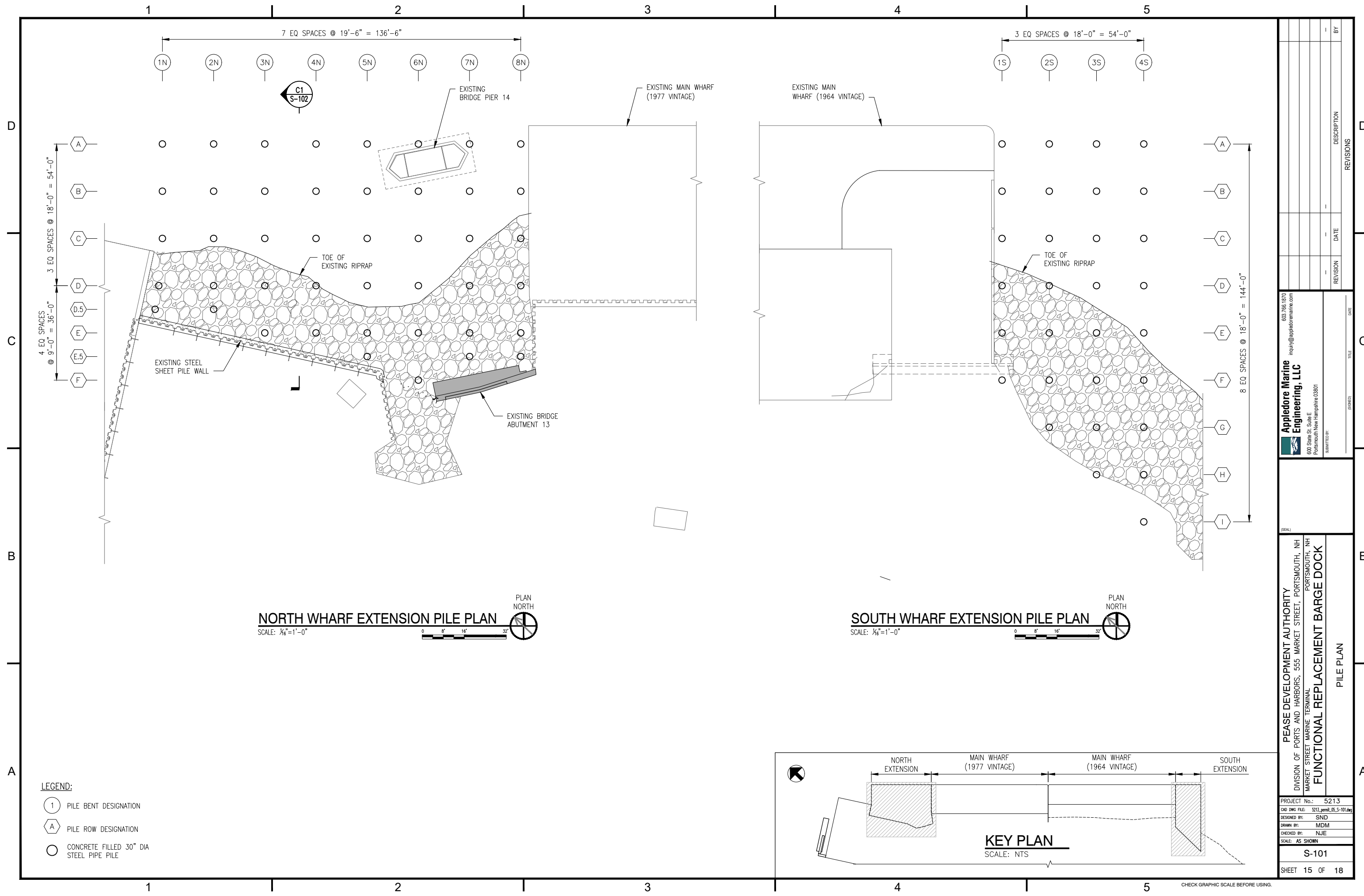
PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL

**FUNCTIONAL REPLACEMENT BARGE DOCK**

RIPRAP SECTIONS

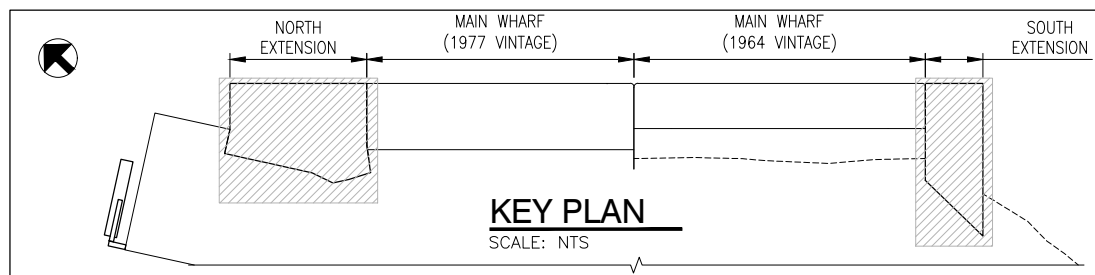
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DESIGNED BY:	SND
DRAWN BY:	KMV
CHECKED BY:	NJE
SCALE:	AS SHOWN

C-107  
SHEET 14 OF 18



**NORTH WHARF EXTENSION PILE PLAN**  
 SCALE: 1/16"=1'-0"  
 PLAN NORTH

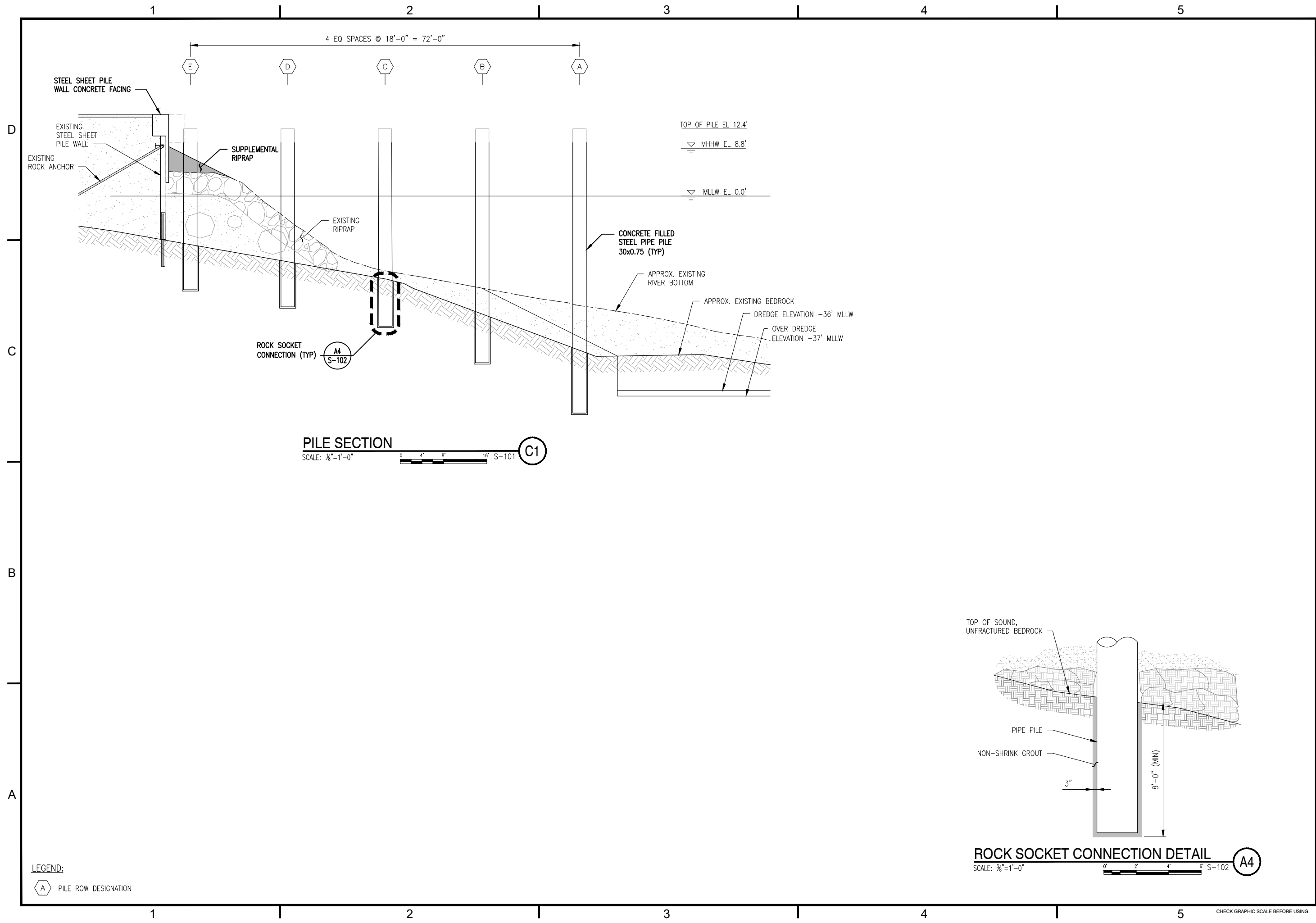
**SOUTH WHARF EXTENSION PILE PLAN**  
 SCALE: 1/16"=1'-0"  
 PLAN NORTH



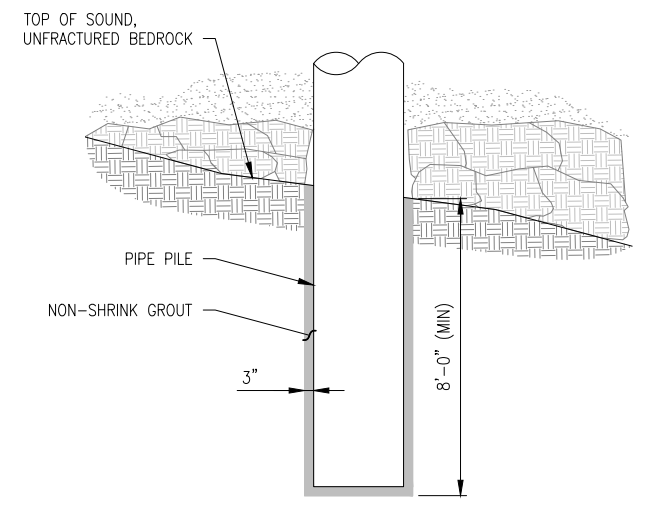
- LEGEND:**
- ① PILE BENT DESIGNATION
  - Ⓐ PILE ROW DESIGNATION
  - CONCRETE FILLED 30" DIA STEEL PIPE PILE

<p>603.766.1870          inquiry@appledoremarine.com  <b>Appledore Marine Engineering, LLC</b>          600 State St, Suite E          Portsmouth New Hampshire 03801</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISION	DATE	DESCRIPTION	BY				
REVISION	DATE	DESCRIPTION	BY						
<p>PEASE DEVELOPMENT AUTHORITY          DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH          MARKET STREET MARINE TERMINAL  <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b></p>									
<p>PROJECT No.: 5213          CAD DWG FILE: S111_permit_06_S-101.dwg          DESIGNED BY: SND          DRAWN BY: MDM          CHECKED BY: NJE          SCALE: AS SHOWN</p>									
<p><b>S-101</b></p>									
<p>SHEET 15 OF 18</p>									

CHECK GRAPHIC SCALE BEFORE USING.



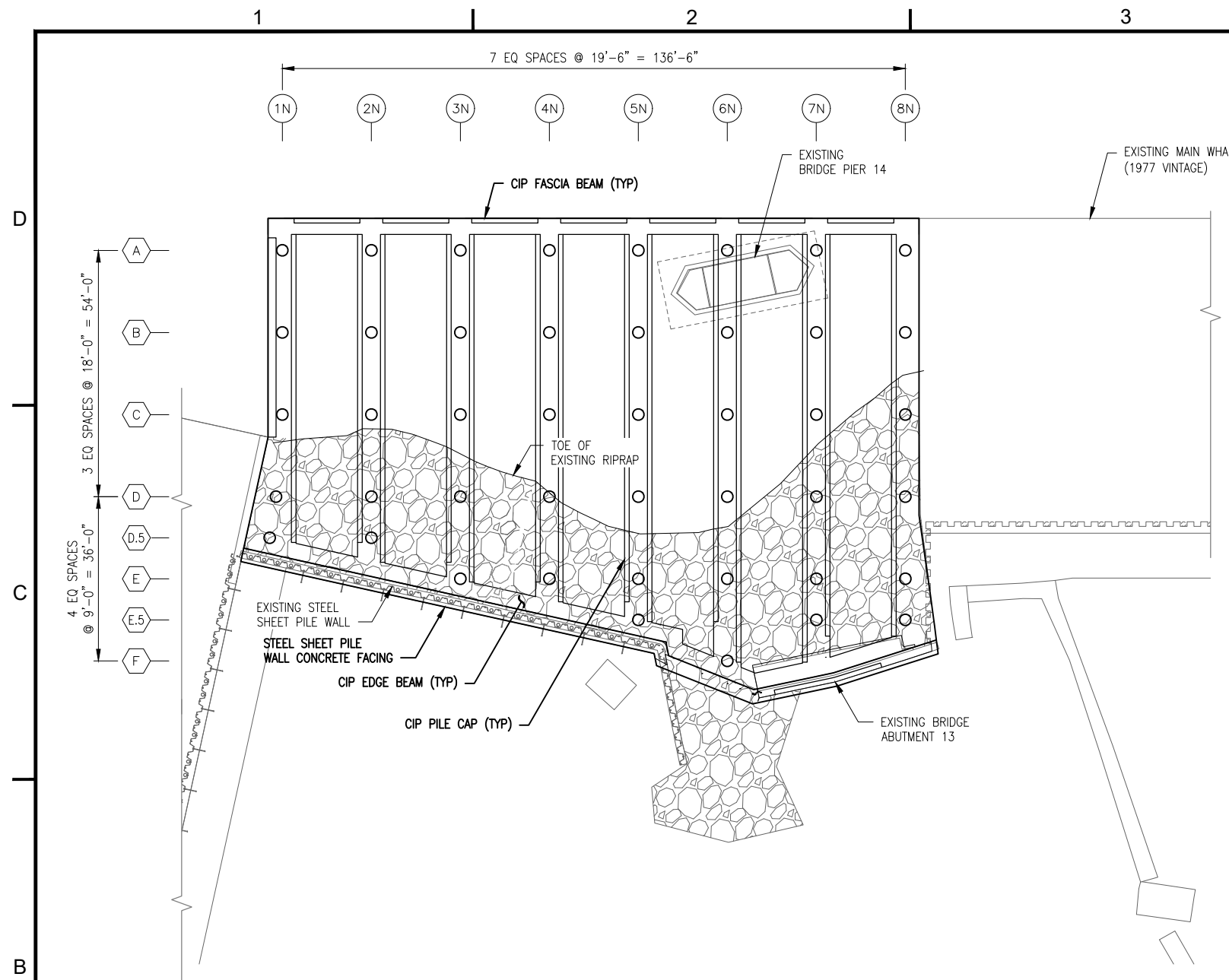
**PILE SECTION**  
SCALE: 3/8"=1'-0" (C1)



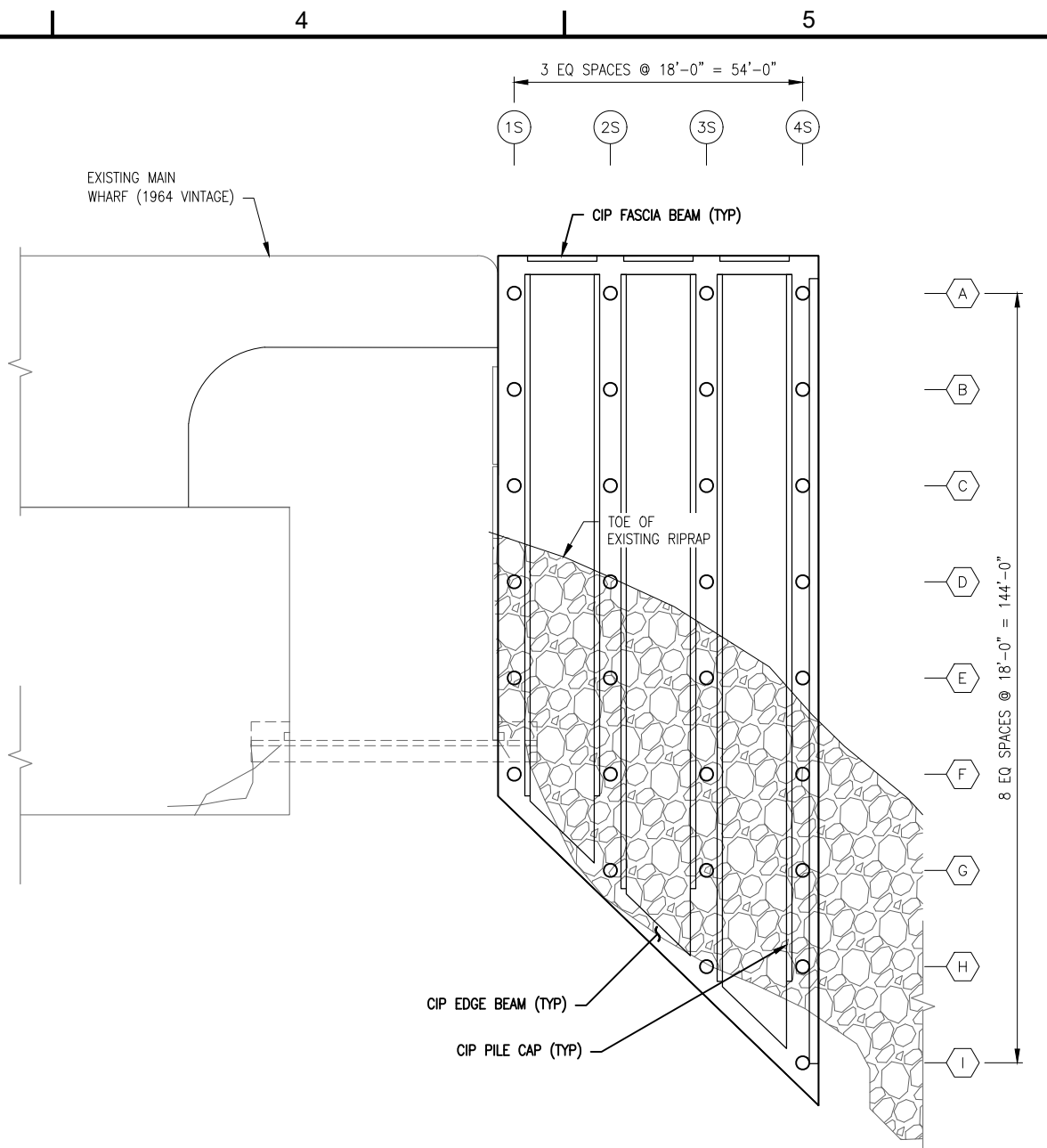
**ROCK SOCKET CONNECTION DETAIL**  
SCALE: 3/8"=1'-0" (A4)

LEGEND:  
A PILE ROW DESIGNATION

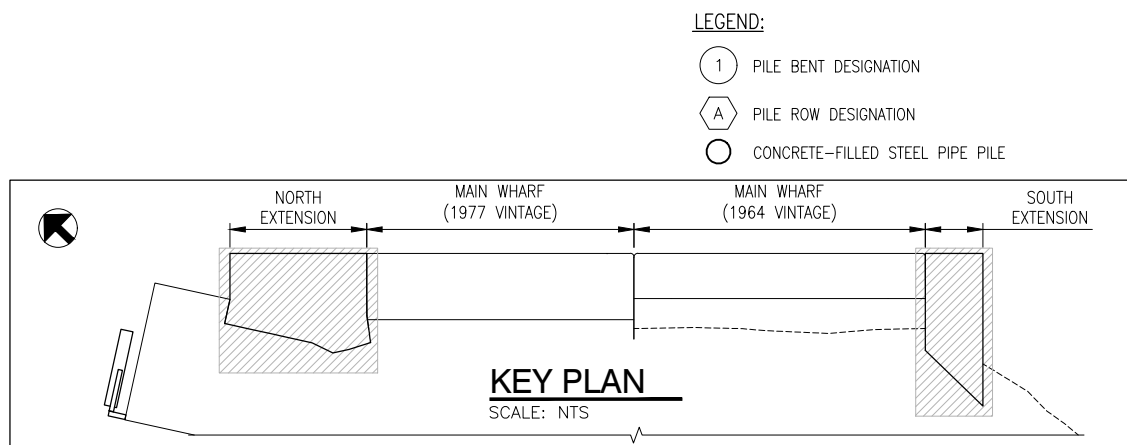
603.766.1870 inquiry@appledoremarine.com		REVISION	DATE	BY
<b>Appledore Marine Engineering, LLC</b>		REVISION	DATE	DESCRIPTION
600 State St, Suite E Portsmouth New Hampshire 03801		REVISION	DATE	DESCRIPTION
SUBMITTED BY:		REVISION	DATE	DESCRIPTION
DRAWN BY: MDM		REVISION	DATE	DESCRIPTION
CHECKED BY: NJE		REVISION	DATE	DESCRIPTION
SCALE: AS SHOWN		REVISION	DATE	DESCRIPTION
PROJECT No.: 5213		REVISION	DATE	DESCRIPTION
CAD DWG FILE: S113_permit_06_S-101.dwg		REVISION	DATE	DESCRIPTION
DESIGNED BY: SND		REVISION	DATE	DESCRIPTION
DRAWN BY: MDM		REVISION	DATE	DESCRIPTION
CHECKED BY: NJE		REVISION	DATE	DESCRIPTION
SCALE: AS SHOWN		REVISION	DATE	DESCRIPTION
PEASE DEVELOPMENT AUTHORITY DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH MARKET STREET MARINE TERMINAL PORTSMOUTH, NH		REVISION	DATE	DESCRIPTION
<b>FUNCTIONAL REPLACEMENT BARGE DOCK</b>		REVISION	DATE	DESCRIPTION
PILE SECTION AND DETAILS		REVISION	DATE	DESCRIPTION
S-102		REVISION	DATE	DESCRIPTION
SHEET 16 OF 18		REVISION	DATE	DESCRIPTION



**NORTH WHARF EXTENSION FRAMING PLAN**  
 SCALE: 1/16"=1'-0"  
 PLAN NORTH



**SOUTH WHARF EXTENSION FRAMING PLAN**  
 SCALE: 1/16"=1'-0"  
 PLAN NORTH

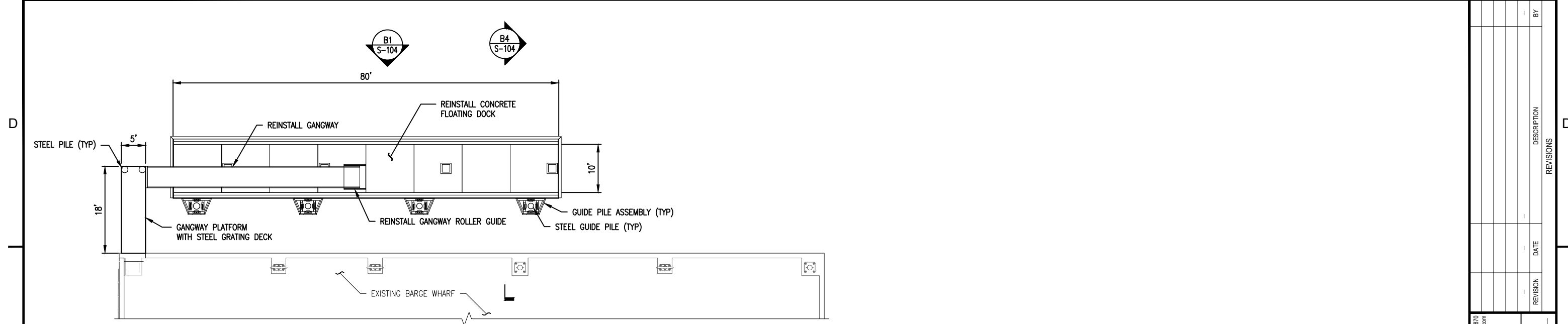


- LEGEND:**
- ① PILE BENT DESIGNATION
  - Ⓐ PILE ROW DESIGNATION
  - CONCRETE-FILLED STEEL PIPE PILE

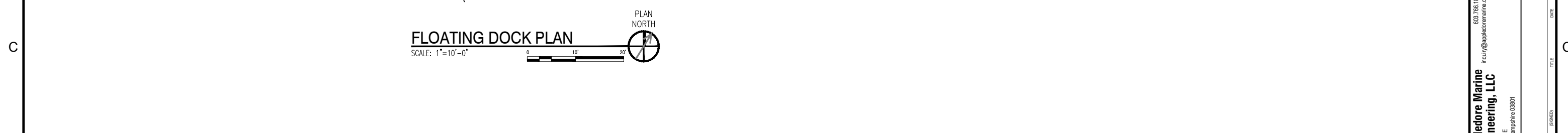
<p>603.766.1870          inquiry@appledoremarine.com  <b>Appledore Marine Engineering, LLC</b>          600 State St, Suite E          Portsmouth New Hampshire 03801</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>REVISION</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	REVISION	DATE	DESCRIPTION	BY				
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<p>PEASE DEVELOPMENT AUTHORITY          DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH          MARKET STREET MARINE TERMINAL  <b>FUNCTIONAL REPLACEMENT BARGE DOCK</b></p>									
<p>PROJECT No.: 5213          CAD DWG FILE: S213_permit_06_S-101.dwg          DESIGNED BY: SND          DRAWN BY: MDM          CHECKED BY: NJE          SCALE: AS SHOWN</p>									
<p><b>S-103</b></p>									
<p>SHEET 17 OF 18</p>									

CHECK GRAPHIC SCALE BEFORE USING.

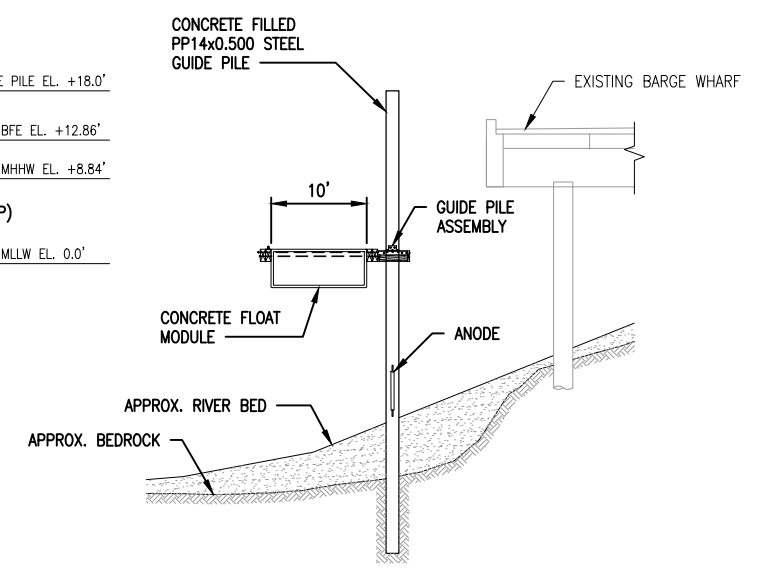
1 2 3 4 5



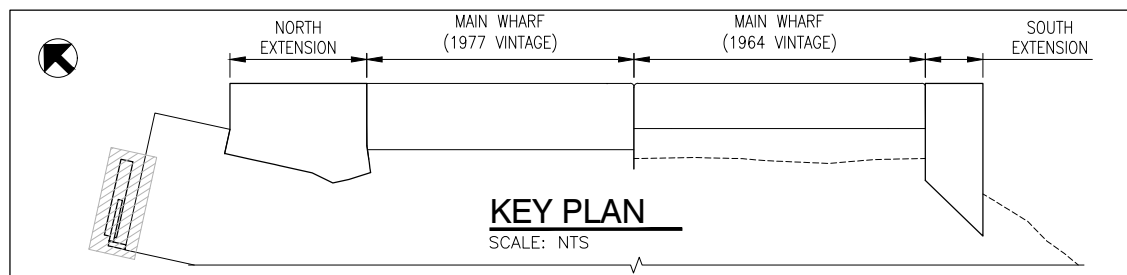
**FLOATING DOCK PLAN**  
SCALE: 1"=10'-0"



**FLOATING DOCK ELEVATION**  
SCALE: 1"=10'-0"



**FLOATING DOCK SECTION**  
SCALE: 1"=10'-0"



**KEY PLAN**  
SCALE: NTS

REVISION	DATE	DESCRIPTION	BY

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inquiry@appledoremarine.com  
**Appledore Marine Engineering, LLC**  
600 State St., Suite E  
Portsmouth New Hampshire 03801  
SUBMITTED BY: \_\_\_\_\_

PEASE DEVELOPMENT AUTHORITY  
DIVISION OF PORTS AND HARBORS, 555 MARKET STREET, PORTSMOUTH, NH  
MARKET STREET MARINE TERMINAL  
**FUNCTIONAL REPLACEMENT BARGE DOCK**

PROJECT No.: 5213  
CAD DWG FILE: S113\_permit\_06\_S-101.dwg  
DESIGNED BY: SND  
DRAWN BY: MDM  
CHECKED BY: NJE  
SCALE: AS SHOWN

**S-104**  
SHEET 18 OF 18