**CONTRACT DOCUMENTS AND SPECIFICATIONS**

**for**

# South Mill St & Mechanic St Pump Station

## Seawall Reconstruction

## City of Portsmouth Job #7147

## Bid #10-11

## State of New Hampshire

## John P. Bohenko, City Manager

Prepared by:

City of Portsmouth
Engineering Division
Public Works Department

## TABLE OF CONTENTS


| | |
|---|---|
| INVITATION TO BID | 3 |
| INSTRUCTION TO BIDDERS | 5 |
| AWARD AND EXECUTION OF CONTRACT | 7 |
| PROPOSAL | 9 |
| BID BOND | 12 |
| BIDDER'S QUALIFICATIONS | 14 |
| CONTRACT AGREEMENT | 16 |
| NOTICE OF INTENT TO AWARD | 19 |
| NOTICE TO PROCEED | 20 |
| CHANGE ORDER | 21 |
| PERFORMANCE BOND | 22 |
| LABOR AND MATERIALS PAYMENT BOND | 24 |
| MAINTENANCE BOND | 27 |
| CONTRACTOR'S AFFIDAVIT | 28 |
| CONTRACTOR'S RELEASE | 29 |
| GENERAL REQUIREMENTS | 30 |
| CONTROL OF WORK | 32 |
| TEMPORARY FACILITIES | 34 |
| INSURANCE | 35 |
| MEASUREMENT AND PAYMENT | 36 |
| STANDARD SPECIFICATIONS | 41 |
| SHOP DRAWINGS | 42 |
| TECHNICAL SPECIFICATIONS | 43 |

City of Portsmouth
Portsmouth, New Hampshire
Department of Public Works

# South Mill St & Mechanic St Pump Station Seawall Reconstruction

## INVITATION TO BID

**Sealed** bid proposals, **plainly marked, South Mill St. & Mechanic St Pump Station Seawall Reconstruction**, Bid Proposal #10-11 **on the outside of the mailing envelope as well as the sealed bid envelope,** addressed to the Finance/Purchasing Department, City Hall, 1 Junkins Avenue, Portsmouth, New Hampshire, 03801, will be accepted until **September 9, 2010 at 2:00pm**; at which time all bids will be publicly opened and read aloud.

This project consists of reconstruction work to two different seawalls located in the City of Portsmouth. The first wall is alongside South Mill Street between Marcy St. and Pickering Ave. The second wall is located on the site of the Mechanic Street sewer pumping station located at the intersection of Mechanic St and Gates St. Work may begin at any time on or after September 9th, 2010. All sections of the marine work shall be completed December 31st 2010. Final paving and cleanup around the seawalls shall be complete by May 15th, 2011. Liquidated damages for failure to complete the work on schedule shall be assessed at $100.00 per day.

There will be a mandatory pre-bid meeting with the City Engineer and Project Engineer on Wednesday September 1st, 2010 at 9:00 a.m. at the Portsmouth Public Works Building located at 680 Peverly Hill Road.

The successful contractor shall provide all labor, materials and equipment to provide Seawall Reconstruction in accordance with the contract documents.

The contractor shall be responsible for all work specified in the contract documents, including shoring, footings, wall construction, revetment construction, incidental work and restoration of the work areas disturbed by this work. All work to be in complete accordance with sound construction practice in conformance with the attached contract documents.

Bidders shall have a minimum of three years experience in marine construction and prior seawall construction experience.

Bidders must determine the quantities of work required and the conditions under which the work will be performed.

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts. The City of Portsmouth further reserves the right to reject any or all bids, to waive technical or legal deficiencies, to re-bid, and to accept any bid that it may deem to be in the best interest of the City. The City further reserves the right to approve or deny subcontractors for this project.

Each Bidder shall furnish a bid security in the amount of ten percent (10%) of the bid. The Bid Security may be in the form of a certified check or a bid bond executed by a surety company authorized to do business in the State of New Hampshire, made payable to the City of Portsmouth, N.H.

Questions may be directed to and specifications may be obtained from the Finance/Purchasing Department on the third floor at the above address, or by calling the Purchasing Clerk at 603-610-7227. Specifications may also be obtained from the City's website www.cityofportsmouth.com. Addenda to this bid document, if any, including written answers to questions, will be posted by close of business on September 7, 2010 on the City of Portsmouth website under the project heading.

## INSTRUCTIONS TO BIDDERS

## BIDDING REQUIREMENTS AND CONDITIONS

1. Special Notice to Bidders

Appended to these instructions is a complete set of bidding and general contract forms. These forms may be detached and executed for the submittal of bids. The plans, specifications, and other documents designated in the proposal form will be considered as part of the proposal, whether attached or not.

The bidders must submit a statement of bidder's qualifications.

**Addenda to this bid document, if any, including written answers to questions, will be posted by August 21, 2009 on the City of Portsmouth website at http://www.cityofportsmouth.com/finance/purchasing.htm under the project heading. Addenda and updates will NOT be sent directly to firms. Contractors submitting a bid should check the web site daily for addenda and updates after the release date. Firms should print out, sign and return addenda with the proposal. Failure to do so may result in disqualification.**

2. Interpretation of Quantities in Bid Schedules

The quantities appearing in the bid schedule are approximate only and are prepared for the comparison of bids. Payment to the contractor will be made only for actual work performed and accepted in accordance with the contract. Any scheduled item of work to be done and materials to be furnished may be increased, decreased or omitted as hereinafter provided, and no claim for loss, anticipated profits or costs incurred in anticipation of work not ultimately performed will be allowed due to such increase or decrease.

3. Examination of Plans, Specifications and Site Work

The bidder is expected to examine carefully the site of the proposed work, the plans, standard specifications, supplemental specifications, special provisions and contract forms before submitting a proposal. The submission of a bid shall be considered conclusive evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract. It will be conclusive evidence that the bidder has also investigated and is satisfied with the sources of supply for all materials.

Plans, surveys, measurements, dimensions, calculations, estimates and statements as to the condition under which the work is to be performed are believed to be correct, but the contractors must examine for themselves, as no allowance will be made for any errors or inaccuracies that maybe found therein.

4. Familiarity with Laws

The bidder is assumed to have made himself or herself familiar with all federal and state laws and all local by-laws, ordinances and regulations which in any manner affect those engaged or employed on the work or affect the materials or equipment used in the work or affect the conduct of the work, and the bidder, if awarded the contract, shall be obligated to perform the work in conformity with said laws, by-laws, ordinances and regulations notwithstanding its ignorance thereof. If the bidder shall discover any provision in the plans or specifications which is in conflict with any such law, by-law, ordinance or regulation the bidder shall forthwith report it to the engineer in writing.

5. Preparation of Proposal

a) The bidder shall submit its proposal upon the forms furnished by the Owner. The bidder shall specify a lump sum price in figures, for each pay item for which a quantity is given and shall also show the products of the respective prices and quantities written in figures in the column provided for that purpose and the total amount of the proposal obtained by adding the amount of the several items. All words and figures shall be in ink or typed.
If a unit price or a lump sum bid already entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it and initialed by the bidder, also with ink.

b) The bidder's proposal must be signed with ink by the individual, by one or more general partners of a partnership, by one or more members or officers of each firm representing a joint venture; by one or more officers of a corporation, by one or more members (if member-managed) or managers (if manager-managed) of a limited liability company, or by an agent of the contractor legally qualified and acceptable to the owner. If the proposal is made by an individual, his or her name and post office address must be shown, by a partnership the name and post office address of each general and limited partner must be shown; as a joint venture, the name and post office address of each venturer must be shown; by a corporation, the name of the corporation and its business address must be shown, together with the name of the state in which it is incorporated, and the names, titles and business addresses of the president, secretary and treasurer.

6. Nonconforming Proposals

Proposals will be considered nonconforming and may be rejected in the Owner's sole discretion for any of the following reasons:

- If the proposal is on a form other than that furnished by the Owner, or if the form is altered or any portion thereof is detached;
- If there are unauthorized additions, conditional or altered bids, or irregularities of any kind which may tend to make the proposal or any portion thereof incomplete, indefinite or ambiguous as to its meaning;
- If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award; or
- If the proposal does not contain a unit price for each pay item listed except in the case of authorized alter pay items.

7. Proposal Guaranty

No proposal will be considered unless accompanied by a bid bond, surety, or similar guaranty of the types and in an amount not less than the amount indicated in the Invitation to Bid. All sureties shall be made payable to the "City of Portsmouth". If a bid bond is used by the bidder it shall be:

- In a form satisfactory to the Owner;
- With a surety company licensed, authorized to do business in, and subject to the jurisdiction of the courts of the State of New Hampshire; and
- Conditioned upon the faithful performance by the principal of the agreements contained in the sub-bid or the general bid.

In the event any irregularities are contained in the proposal guaranty, the bidder will have four business days (not counting the day of opening) to correct any irregularities. The corrected guaranty must be received by 4:00 p.m. If irregularities are not corrected to the satisfaction of the Owner, the Owner, in its sole discretion, may rejected the bid.

8. Delivery of Proposals

When sent by mail, the sealed proposal shall be addressed to the Owner at the address and in the care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in the invitation for bids. Proposals received after the time for opening of the bids will be returned to the bidder, unopened.

9. Withdrawal of Proposals

A bidder will be permitted to withdraw his or her proposal unopened after it has been submitted if the Owner receives a request for withdrawal in writing prior to the time specified for opening the proposals.

10. Public Opening of Proposals

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present.

11. Disqualification of Bidders

Any or all of the following reasons may be deemed by Owner in its sole discretion as being sufficient for the disqualification of a bidder and/or the rejection of the proposal:

- More than one proposal for the same work from an individual, firm, or corporation under the same or different name;
- Evidence of collusion among bidders;
- Failure to submit all required information requested in the bid specifications;
- If the Contractor lacks sufficient prior experience with seawall construction or is otherwise not qualified to do the work;
- Lack of competency or of adequate machinery, plant or other equipment, as revealed by the statement of bidders qualification or otherwise;
- Uncompleted work which, in the judgment of the owner, might hinder or prevent the prompt completion of additional work if awarded;
- Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts;
- Default or unsatisfactory performance on previous contracts; or
- Such disqualification would be in the best interests of the Owner.

12. Material Guaranty and Samples

Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the construction of the work, and the Owner may, in its sole discretion, reject the bid based on the contents of the statement or as a result of the failure of the bidder to submit the statement.

## AWARD AND EXECUTION OF CONTRACT

1. Consideration of Proposals

After the proposals are opened and read, they will be compared on the basis of the total price for all sections of work and any such additional considerations as may be identified in the bid documents. The results of such comparisons will be immediately available to the public. In case of a discrepancy between the prices written in words and those written figures, the prices written in words shall govern. In case of a discrepancy between the total shown in the proposal and that obtained by adding the products of the quantities of items and unit bid prices, the latter shall govern.

2. Award of Contract

Within 30 calendar days after the opening of proposals, if a contract is to be awarded, the award will be made to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified, in writing, mailed to the address on his or her proposal, that his or her bid has been accepted and that the bidder has been awarded the contract.

3. Reservation of Rights

The Owner reserves the right to reject any or all proposals, to waive technicalities or to advertise for new proposals, if, in the sole discretion of the Owner, the best interest of the City of Portsmouth will be promoted thereby. The Owner further reserves the right to modify the scope of work in the event that bids exceed budgeted amounts.

The Owner reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability of the Owner.

4. Return of Proposal Guaranty

All proposal guaranties, except those of the three lowest bidders, will be returned upon request following the opening and checking of the proposals. The proposal guaranties of the three lowest bidders will be returned within ten days following the award of the contract if requested.

5. Contract Bonds

At the time of the execution of the contract, the successful bidder shall furnish:

- A performance bond in the amount of 100 percent of the contract amount.
- Labor and materials payment bond in the sum equal to 100 percent of the contract amount.

At the time of project completion, the Owner may, in its sole discretion, permit the Contractor to substitute a maintenance bond in lieu of holding retainage for the entire guaranty period. If a bond is furnished it shall meet the following criteria:

- The bond shall be in an amount equal to 20 percent of the contract amount. Such bond shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the contractor. The guarantee shall remain in effect for a period of one year after the date of final acceptance of the job by the Owner.

Each bond shall be: (1) in a form satisfactory to the Owner; (2) with a surety company licensed and authorized to do business and with a resident agent designated for services of process in the State of New Hampshire; and (3) conditioned upon the faithful performance by the principal of the agreements contained in the original bid. All premiums for the contract bonds are to be paid by the contractor.

6. Execution and Approval of Contract

The successful bidder is required to present all contract bonds, to provide proof of insurance, and to execute the contract within 10 days following receipt of the City's notification of acceptance of the bid. No contract shall be considered as in effect until it has been fully executed by all parties.

7. Failure to Execute Contract

Failure to execute the contract and to provide acceptable bonds and proof of insurance within 10 days after notification of acceptance of bid shall be just cause for the cancellation of the award and the forfeiture of the proposal guarantee which shall become the property of the Owner, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible bidder, or the City may exercise its reserved rights including the rejection of all bids or re-advertisement.

**PROPOSAL FORM**

# South Mill St & Mechanic St Pump Station Seawall Reconstruction

CITY OF PORTSMOUTH, N.H.

To the City of Portsmouth, New Hampshire, herein called the Owner.

The undersigned, as Bidder, herein referred to as singular and masculine declares as follows:

1. All interested in the Bid as Principals are named herein.

2. This bid is not made jointly, or in conjunction, cooperation or collusion with any other person, firm, corporation, or other legal entity;

3. No officer, agent or employee of the Owner is directly or indirectly interested in this Bid.

4. The bidder has carefully examined the sites of the proposed work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this Bid, and the bidder has carefully read and examined the Drawings, Agreement, Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;

5. The bidder understands that the quantities of work calculated in the Bid or indicated on the Drawings or in the Specifications or other Contract Documents are approximate and are subject to increase or decrease or deletion as deemed necessary by the Portsmouth City Engineer. Any such changes will not result in or be justification for any penalty or increase in contract prices; and agrees that, if the Bid is accepted the bidder will contract with the Owner, as provided in the Contract Documents, this Bid Form being part of said Contract Documents, and that the bidder will supply or perform all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other activities required by the Contract Documents in the manner and within the time therein set forth, and that the bidder will take in full payment therefore the following item prices, to wit:

**PROPOSAL FORM**

| ITEM # | EST. QTY. | UNITS | ITEM DESCIPTION & UNIT PRICE IN WORDS | UNIT PRICE IN FIGURES | ITEM TOTAL IN FIGURES |
|---|---|---|---|---|---|
| 1 | 1 | U | South Mill Street Seawall Repair (Complete in accordance with plans & spec.) | $_____ | $_____ |
| 2 | 1 | U | Mechanic St Pump Station Seawall Repair (Complete in accordance with plans & spec.) | $_____ | $_____ |
| 3 | 1 | $ | **Deduct** amount for alternative railing coating (See specifications 2800 & 9968) | $-_____ | $_____ |
| 618.7 | 200 | Hrs | Traffic Control Flagger<br>Seventeen Dollars per Hour Worked | $17.00 | $3,400.00 |
| 619.1 | 1 | U | Maintenance of Traffic | $_____ | $_____ |

To Bidder:

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts.

It is the intention of this contract that the items listed above describe completely and thoroughly the entirety of the work as shown on the plans and as described in the specifications. All other items required to accomplish the above items are considered to be subsidiary work, unless shown as a pay item.

## TOTAL FOR PROJECT AND BASIS OF AWARD

In Figures $_____

In Words $_____

The undersigned agrees that for extra work, if any, performed in accordance with the terms and provisions of the Contract Documents, the bidder will accept compensation as stipulated therein.

_____
Date

_____
Company

By:_____
Signature

_____
Business Address

Title:_____

_____
City, State, Zip Code

Telephone:_____

The Bidder has received and acknowledged Addenda No._____through _____.

All Bids are to be submitted on this form and in a sealed envelope, plainly marked on the outside with the Bidder's name and address and the Project name as it appears at the top of the Proposal Form.

**BID SECURITY BOND**

(This format provided for convenience, actual Bid Bond is acceptable in lieu of, if compatible.)

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____, as Principal, and

_____, as Surety, are hereby

held and firmly bound unto _____

IN THE SUM OF _____

as liquidated damages for payment of which, well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of this obligation is such that whereas the Principal has submitted to the

_____ _____

A CERTAIN Bid attached hereto and hereby made a part hereof to enter into a contract in writing, hereinafter referred to as the "AGREEMENT" and or "CONTRACT", for

_____

_____

_____

NOW THEREFORE,

(a) If said Bid shall be rejected or withdrawn as provided in the INFORMATION FOR BIDDERS attached hereto or, in the alternative,

(b) If said Bid shall be accepted and the Principal shall duly execute and deliver the form of AGREEMENT attached hereto and shall furnish the specified bonds for the faithful performance of the AGREEMENT and/or CONTRACT and for the payment for labor and materials furnished for the performance of the AGREEMENT and or CONTRACT,

then this obligation shall be void , otherwise it shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder in no event shall exceed the amount of this obligation.

**BID SECURITY BOND** (continued)

The Surety, for value received, hereby agrees that the obligation of said surety and its bond shall be in no way impaired or affected by any extensions of the time within such BID may be accepted, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the parties hereto have duly executed

this bond on the _____ day of _____, 20__.

_____L.S.
(Name of Principal)

(SEAL)

BY _____

_____
(Name of Surety)

BY _____

**STATEMENT OF BIDDER'S QUALIFICATIONS**

Supply with Bid

**All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. Add separate sheets if necessary**

1. Name of Bidder

2. Permanent Main Office Address

3. Form of Entity

4. When Organized

5. Where Organized

6. How many years have you been engaged in the contracting business under your present name; also state names and dates of previous firm names, if any.

7. Contracts on hand; (schedule these, showing gross amount of each contract and the approximate anticipated dates of completion).

8. General character of work performed by your company.

8(a) Identify and describe at least three completed seawall projects performed in the last five years and provide reference contact information.

9. Have you ever failed to complete any work awarded to you? _____(no)____(yes). If so, where and why?

10. Have you ever defaulted on a contract?
_____(no)_____(yes). If so, where and why?

11. Have you ever failed to complete a project in the time allotment according to the Contract Documents?
_____(no)_____(yes). If so, where and why?

12. List the most important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.

13. List your major equipment available for this contract.

14. List your key personnel such as project superintendent and foremen available for this contract.

**STATEMENT OF BIDDERS QUALIFICATIONS** (continued)

15. List any subcontractors whom you would expect to use for the following (unless this work is to be done by your own organization and if so please state).

Railings _____
Paving _____
Concrete _____

**The City reserves the right to disallow any subcontractor.**

16. With what banks do you do business?

a. Do you grant the Owner permission to contact this/these institutions? ____(yes) ___(no).

b. Latest Financial Statements, certified audited if available, prepared by an independent certified public accountant, may be requested by Owner. If requested, such statements must be provided within five (5) business days or the bid proposal will be rejected. Certified Audited Statementsare preferred. Internal statements may be attached only if independent statements were not prepared.

Dated at _____ this _____ day of _____, 20___.

_____
Name of Bidder

BY_____

TITLE_____

State of_____

County of_____

_____being duly sworn, deposes and

says that the bidder is _____of_____
(Name of Organization)

and answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this ____day of _____, 20__.

_____
Notary of Public
My Commission expires_____

## CONTRACT AGREEMENT

## South Mill St & Mechanic St Pump Station Seawall Reconstruction

THIS AGREEMENT made as of the xxxxxxxx day of xxxxxx in the year **2010,** by and between the City of Portsmouth, New Hampshire (hereinafter call the Owner) and xxxxxxxxxx (hereinafter called the Contractor),

WITNESSETH; that the Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

**ARTICLE I**- Work - The Contractor shall perform all work as specified or indicated in the Contract Documents for the completion of the Project. The Contractor shall provide, at his expense, all labor, materials, equipment and incidentals as may be necessary for the expeditious and proper execution of the Project.

**ARTICLE II** - ENGINEER - The City Engineer or his authorized representative will act as engineer in connection with completion of the Project in accordance with the Contract Documents.

**ARTICLE III** - CONTRACT TIME - The work will commence in accordance with the Notice to Proceed. **All marine work shall be completed no later than December 31st, 2010. All work shall be complete by May 15, 2011.**

**ARTICLE IV** - CONTRACT PRICE - Owner shall pay Contractor for performance of the work in accordance with the Contract Documents as shown under item prices in the Bid Proposal.

**ARTICLE V** - PAYMENT - Partial payments will be made in accordance with the Contract Documents. Upon final acceptance of the work and settlement of all claims, Owner shall pay the Contractor the unpaid balance of the Contract Price, subject to additions and deductions provided for in the Contract Documents.

**ARTICLE VI** - RETAINAGE – To insure the proper performance of this Contract, the Owner shall retain **ten percent** of the Contract Price as specified in the Contract Documents.

**ARTICLE VII** - LIQUIDATED DAMAGES - In event the Contractor fails to successfully execute the work within the specified contract time the Owner shall assess the Contractor liquidated damages in the amount of **one hundred dollars ($100)** for each calendar day beyond the specified completion date for each section of work. Liquidated damages shall be deducted from the Contract Price prior to final payment of the Contractor.

**CONTRACT AGREEMENT** (continued)

**ARTICLE VIII** – CONTRACT DOCUMENTS – The Contract Documents which comprise the contract between Owner and Contractor are attached hereto and made a part hereof and consist of the following:

8.1 This Agreement
8.2 Contractor's Bid and Bonds
8.3 Notice of Award, Notice to Proceed
8.4 Instruction to Bidders
8.5 General Requirements, Control of Work, Temporary Facilities, Measurement and Payment, Standard Specifications
8.6 Insurance Requirements
8.7 Standard and Technical Specifications
8.8 Drawings
8.9 Special Provisions
8.10 Any modifications, including change orders, duly delivered after execution of this Agreement.

**ARTICLE IX** – TERMINATION FOR DEFAULT – Should contractor at any time refuse, neglect, or otherwise fail to supply a sufficient number or amount of properly skilled workers, materials, or equipment, or fail in any respect to prosecute the work with promptness and diligence, or fail to perform any of its obligations set forth in the Contract, Owner may, at its election, terminate the employment of Contractor, giving notice to Contractor in writing of such election, and enter on the premises and take possession, for the purpose of completing the work included under this Agreement, of all the materials, tools and appliances belonging to Contractor, and to employ any other persons to finish the work and to provide the materials therefore at the expense of the Contractor.

**ARTICLE X** – INDEMNIFICATION OF OWNER – Contractor will indemnify Owner against all suits, claims, judgments, awards, loss, cost or expense (including without limitation attorneys' fees) arising in any way out of the Contractor's negligent performance of its obligations under this Contract. Contractor will defend all such actions with counsel satisfactory to Owner at its own expense, including attorney's fees, and will satisfy any judgment rendered against Owner in such action.

**ARTICLE XI** – PERMITS – The Contractor will secure at its own expense, all other permits and consents required by law as necessary to perform the work and will give all notices and pay all fees and otherwise comply with all applicable City, State, and Federal laws, ordinances, rules and regulations.

**ARTICLE XII** – INSURANCE – The Contractor shall secure and maintain, until acceptance of the work, insurance with limits not less than those specified in the Contract.

**ARTICLE XIII** – MISCELLANEOUS –

A. Neither Owner nor Contractor shall, without the prior written consent of the other, assign, sublet or delegate, in whole or in part, any of its rights or obligations under any of the Contract Documents; and, specifically not assign any monies due, or to become due, without the prior written consent of Owner.

B. Owner and Contractor each binds himself, his partners, successors, assigns and legal representatives, to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents.

C. The Contract Documents constitute the entire Agreement between Owner and Contractor and may only be altered amended or repealed by a duly executed written instrument.

D. The laws of the State of New Hampshire shall govern this Contract without reference to the conflict of law principles thereof.

E. Venue for any dispute shall be the Rockingham County Superior Court unless the parties otherwise agree.

IN WITNESS WHEREOF, the parties hereunto executed this

AGREEMENT the day and year first above written.

**BIDDER:**

BY:_____

TITLE:_____

**CITY OF PORTSMOUTH, N.H.**

BY:_____
John P. Bohenko

TITLE: City Manager

## NOTICE OF INTENT TO AWARD

Date:

TO:

IN AS MUCH as you were the low responsible bidder for work entitled:

**South Mill St & Mechanic St Pump Station Seawall Reconstruction**

You are hereby notified that the City intends to award the aforesaid project to you.

Immediately take the necessary steps to execute the Contract and to provide required bonds and proof of insurance within ten (10) calendar days from the date of this Notice.

The City reserves the right to revoke this Notice if you fail to take the necessary steps to execute this Contract.

City of Portsmouth
Portsmouth, New Hampshire

Judie Belanger,
Finance Director

**NOTICE TO PROCEED**

DATE:

## South Mill St & Mechanic St Pump Station Seawall Reconstruction

TO:

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK IN ACCORDANCE

WITH THE AGREEMENT DATED xxxxxxxxxxxxxxx, ON OR AFTER xxxxxxxxxxxxxx. ALL MARINE

WORK SHALL BE COMPLETED BY December 31, 2010. ALL WORK SHALL BE COMPLETE BY MAY 15, 2011.

CITY OF PORTSMOUTH, N.H.

_____

BY: Steven F. Parkinson, PE

TITLE: Public Works Director

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE TO
PROCEED IS HEREBY ACKNOWLEDGED BY

_____

This the _____day of_____ 20__

By:_____

Title:_____

**CHANGE ORDER**

Change Order Number Date of Issuance

Owner: CITY OF PORTSMOUTH, N.H

Contractor:

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Change Order

Attachments: _____

| CHANGE IN CONTRACT PRICE | CHANGE IN CONTRACT TIME |
|---|---|
| Original Contract Price:<br>$ | Original Completion Date: |
| Contract Price prior to this Change Order:<br>$ | Contract date prior to this Change Order: |
| Net Increase or Decrease of this Change Order:<br>$ | Net Increase or Decrease of this Change Order: |
| Contract Price with all approved Change Orders:<br>$ | Contract Due date with all approved Change Orders: |

| RECOMMENDED: | APPROVED: | | APPROVED: |
|---|---|---|---|
| by_____ | by_____ | by_____ | by_____ |
| PW Director | City Finance | City Manager | Contractor |

**PERFORMANCE BOND**

(This format provided for convenience, actual Performance Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS

that _____as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of_____ and authorized to do business in the State of New Hampshire as surety, hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Obligee, hereinafter called Owner, in the amount of _____ Dollars ($_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents. WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Owner for _____in accordance with drawings and specifications prepared by the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall well and faithfully do and perform the things agreed by him to be done and performed, according to the terms of said Contract and such alterations as may be made in said Contract during progress work, and shall further indemnify and save harmless the said Owner in accordance with the Contract and shall remedy without cost to the Owner any defect which may develop within one year from the time of completion and acceptance of the work.

The Surety hereby waives notice of any alteration in work or extension of time made by the Owner or any of its agents or representatives.

Whenever Contractor shall be, and declared by Owner to be, in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

(1) Complete the Contract in accordance with its terms and conditions, or

**PERFORMANCE BOND** (continued)

(2) Obtain a bid or bids for submission to the Owner for completing the Contract in accordance with its terms and conditions, and upon determination by Owner and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Owner and make available as work progresses (even though there should be a default or a succession of defaults under the contract of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by the Owner to Contractor under the Contract and any amendments thereto, less the amount paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of (2) years from the date on which final payment under the contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of Owner.

Signed and sealed this _____ day of _____

A.D., 20___ .

In the presence of:

_____ BY: _____

(Witness) (Principal) (Seal)

_____

(Surety Company)

_____ BY: _____

(Witness) (Title) (Seal)

Note:

If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners.

If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers.

If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

## LABOR AND MATERIAL PAYMENT BOND

(This format provided for convenience, actual Labor and Material Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS:

that _____

as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of

_____ and authorized to do business in the State of New Hampshire hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the

amount of _____ Dollars ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a

contract with Owner for _____ in accordance with drawings and specifications prepared by the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and for the hire of all equipment, tools, and all other things contracted for or used in connection therewith, then this obligation shall be void, otherwise it shall remain in full force and effect, subject however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or, with a subcontractor of the Principal for labor, material, equipment, or other things used or reasonably required for use in the performance of the Contract. "Labor and material" shall include but not be limited to that part of water, gas, power, light, heat, oil and gasoline, telephone service or rental of equipment applicable to the Contract.

(2) The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such a claimant, may sue on this bond for the use of such claimant, prosecute the suit by final judgment for such sum or sums as may be

**LABOR AND MATERIAL PAYMENT BOND** (continued)

justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any such suit or any costs or expenses of any such suit, and principal and surety shall jointly and severally indemnify, defend and hold the Owner harmless for any such suit, costs or expenses.

(3) No suit or action shall be commenced hereunder by any claimant:

(a) Unless Claimant, other than one having a direct contract with the Principal, shall have given notice to all the following:

The Principal, the Owner and the Surety above named, within six (6) calendar months after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of New Hampshire save that such service need not be made by a public officer.

(b) After the expiration of one (1) year following the date on which Principal ceased all work on said contract, it being understood , however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a State court of competent jurisdiction in and for the county or other political subdivision of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere. (4) The amount of this bond may be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien by presented under and against this bond.

Signed and sealed this _____ day of _____, 20____. In the presence of:

_____ BY: _____
(Witness) (Principal) (Seal)

_____
(Surety Company)

_____ BY: _____
(Witness) (Title) (Seal)

**LABOR AND MATERIAL PAYMENT BOND** (continued)

Note:
If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners.

If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers.

If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

## MAINTENANCE BOND

At the Owner's election, a maintenance bond may be substituted for retainage at the completion of the project. If the Owner permits a maintenance bond, it shall be in the amount of **Twenty Percent (20%)** of the contract price with a corporate surety approved by the Owner. Such bond shall be provided at the time of Contract completion and shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the Contractor. This guarantee shall remain in effect for a period of one year after the date of final acceptance of the job by the Owner.

**CONTRACTOR'S AFFIDAVIT**

STATE OF _____:

COUNTY OF _____:

Before me, the undersigned, a _____
(Notary Public, Justice of the Peace)

in and for said County and State personally appeared, _____
(Individual, Partner, or duly authorized representative of Corporate)

who, being duly sworn, according to law deposes and says that the cost of labor, material, and equipment and outstanding claims and indebtedness of whatever nature arising out of the performance of the Contract between

CITY OF PORTSMOUTH, NEW HAMPSHIRE

and _____
(Contractor)

of _____

Dated: _____

has been paid in full for Construction of: **South Mill St & Mechanic St Pump Station Seawall Reconstruction**

_____
(Individual, Partner, or
duly authorized
representative of
Corporate Contractor)

Sworn to and subscribed
before me this _____day
of _____ 20____

_____

**CONTRACTOR'S RELEASE**

KNOW ALL MEN BY THESE PRESENTS that _____

(Contractor) of _____, County of _____and State of

_____ does hereby acknowledge

that_____(Contractor)

has on this day had, and received from the CITY OF PORTSMOUTH NEW HAMPSHIRE, final and completed

payment for the Construction of:

## South Mill St & Mechanic St Pump Station Seawall Reconstruction

NOW THEREFORE, the said _____

(Contractor)

for myself, my heirs, executors, and administrators) (for itself, its successors and assigns) do/does by these presents remise, release, quit-claim and forever discharge the City of Portsmouth, New Hampshire, its successors and assigns, of and from all claims and demands arising from or in connection with the said Contract dated _____, and of and from all, and all manners of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specifications, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law of equity, or otherwise, against the City of Portsmouth, New Hampshire, its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of record time to the date of these presents.

IN WITNESS WHEREOF,

Contractor:

_____ By:_____

print name of witness:_____ Its Duly Authorized _____

Dated: _____

## GENERAL REQUIREMENTS

**SCOPE OF WORK**

1. INTENT OF CONTRACT

The intent of the Contract is to provide for the construction and completion in every detail of the work described. The Contractor shall furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the terms of the Contract. The Contractor shall be required to conform to the intent of the plans and specifications. No extra claims shall be allowed for portions of the work not specifically addressed in the plans and specifications but required to produce a whole and complete project, such work will be considered subsidiary to the bid items.

2. INCIDENTAL WORK

Incidental work items for which separate payment is not measured includes, but is not limited to, the following items:

a. Clearing, grubbing and stripping (unless otherwise paid for)
b. Clean up
c. Plugging existing sewers and manholes
d. Signs
e. Mobilization/Demobilization (unless otherwise paid for)
f. Restoration of property
g. Cooperation with other contractors, abutters and utilities.
h. Utility crossings, (unless otherwise paid for)
i. Minor items - such as replacement of fences, guardrails, rock wall, etc.
j. Steel and/or wood sheeting as required.
k. Accessories and fasteners or components required to make items paid for under unit prices or lump sum items complete and functional.

3. ALTERATION OF PLANS OR OF CHARACTER OF WORK

The Owner reserves the right, without notice to Surety, to make such alterations of the plans or of the character of the work as may be necessary or desirable to complete fully and acceptably the proposed construction; provided that such alterations do not increase or decrease the contract cost. Within these cost limits, the alterations authorized in writing by the Owner shall not impair or affect any provisions of the Contract or bond and such increases or decreases of the quantities as a result from these alterations or deletions of certain items, shall not be the basis of claim for loss or for anticipated profits by the contractor. The contractor shall perform the work as altered at the contract unit price or prices.

4. EXTRA WORK ITEMS

Extra work shall be performed by the Contractor in accordance with the specifications and as directed, and will be paid for at a price as provided in the Contract documents or if such pay items are not applicable than at a price negotiated between the contractor and the Owner or at the unit bid price. If the Owner determines that extra work is to be performed, a change order will be issued.

5. CHANGE ORDERS

The Owner reserves the right to issue a formal change order for any increase, decrease, deletion, or addition of work or any increase in contract time or price. The contractor shall be required to sign the change order and it shall be considered as part of the Contract documents.

6. FINAL CLEANING UP

Before acceptance of the work, the contractor shall remove from the site all machinery, equipment, surplus materials, rubbish, temporary buildings, barricades and signs. All parts of the work shall be left in a neat and presentable condition. On all areas used or occupied by the contractor, regardless of the contract limits, the bidder shall clean-up all sites and storage grounds.

The items prescribed herein will not be paid for separately, but shall be paid for as part of the total contract price.

7. ERRORS AND INCONSISTENCY IN CONTRACT DOCUMENTS

Any provisions in any of the Contract Documents that may be in conflict with the paragraphs in these General Requirements shall be subject to the following order of precedence for interpretation.

1. Standard Specifications for Road & Bridge Construction will govern General Requirements.

2. Technical Specifications will govern Standard Specifications.

3. Plans will govern Technical Specifications, and General Requirements.

## CONTROL OF WORK

1. AUTHORITY OF ENGINEER

(a) All work shall be done under supervision of the City Engineer and to his satisfaction. The City Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work; all questions that may arise as to the interpretation of the plans and specifications; and all questions as to the acceptable fulfillment of the Contract by the Contractor.

(b) The City Engineer will have the authority to suspend the work wholly or in part for such periods as he may deem necessary due to the failure of the Contractor to correct conditions unsafe for workers or the general public; for failure to carry out provisions of the Contract; for failure to carry out orders; for conditions considered unsuitable for the prosecution of the work, including unfit weather; or for any other condition or reason deemed to be in the public interest. The Contractor shall not be entitled any additional payments arising out of any such suspensions.

(c) The Owner reserves the right to demand a certificate of compliance for a material or product used on the project. When the certificate of compliance is determined to be unacceptable to the City Engineer the Contractor may be required to provide engineering and testing services to guarantee that the material or product is suitable for use in the project, at its expense (see Sample of Certificate of Compliance).

2. PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPES

(a) The Contractor shall use every precaution to prevent injury or damage to wires, poles, or other property of public utilities; trees, shrubbery, crops, and fences along and adjacent to the right-of-way, all underground structures such as pipes and conduits, within or outside of the right-of-way; and the Contractor shall protect and carefully preserve all property marks until an authorized agent has witnessed or otherwise referenced their location.

(b) The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

(c) When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or as a result of the failure to perform work by the Contractor, the Contractor shall restore, at its own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing rebuilding, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

(d) The Contractor shall paint with tree paint all scars made on fruit or ornamental trees by equipment, construction operations, or the removal of limbs larger than one inch in diameter. Damaged trees must be replaced if so determined by the City Arborist, in his or her sole discretion.

(e) If the Contractor fails to repair, rebuild or otherwise restore such property as may be deemed necessary, the Owner, after 48 hours notice, may proceed to do so, and the cost thereof may be deducted from any money due or which may become due the Contractor under the contract.

(f) It is the intent of the Parties that the Contractor preserve, to as great an extent as possible, the natural features of the site.

**CONTROL OF WORK** (continued)

3. MAINTENANCE DURING CONSTRUCTION

The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and workers to ensure that the structure is kept in satisfactory conditions at all times.

4. SAFETY PRECAUTIONS

Upon commencement of work, the Contractor shall be responsible for initiating, maintaining and supervising all safety precautions necessary to ensure the safety of employees on the site, other persons who may be affected thereby, including the public, and other property at the site or adjacent thereto.

5. PERMITS

It will be the responsibility of the Contractor to obtain all permits required for the operation of equipment in, or on, all city streets and public ways.

The City has applied for a wetland permit from NHDES wetlands bureau allowing work within 100' of the highest observable tide line. As of this date, the City has not received final approval for the work. Upon the City's receipt of the approved permit, the Contractor will be furnished with a copy of the permit and the Contractor will be required to abide by all conditions of that permit.

The City has received its release of funds from the US Housing and Urban Development in accordance with the National Environmental Policy Act of 1969 (as amended).

6. BARRICADES, WARNING SIGNS AND TRAFFIC OFFICERS

(a) The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Roadway closed to traffic shall be protected by effective barricades. Obstructions shall be illuminated during hours of darkness. Suitable warning signs shall be provided to control and direct traffic in a proper manner, as approved by the engineer.

(b) The Contractor will be held responsible for all damage to the work from traffic, pedestrians, animals or any other cause due to lack of adequate controlling devices.

(c) The Contractor shall provide such police officers as the City Engineer deems necessary for the direction and control of traffic within the site of project.

The work prescribed herein will not be paid for separately but will be paid for as part of the Contract Price unless specifically appearing as a bid item.

## TEMPORARY FACILITIES

1. STORAGE FACILITIES

(a) The Contractor shall not store materials or equipment in a public right-of-way beyond the needs of one working day. Equipment and materials shall be stored in an approved location.

(b) The Contractor shall protect all stored materials from damage by weather or accident and shall insure adequate drainage at and about the storage location.

(c) Prior to final acceptance of the work all temporary storage facilities and surplus stored materials shall be removed from the site.

2. SANITARY FACILITIES

(a) The Contractor shall provide for toilet facilities for the use of the workers employed on the work.

(b) Temporary toilet facilities may be installed provided that the installation and maintenance conform with all State and local laws, codes, regulations and ordinances governing such work. They shall be properly lit and ventilated, and shall be kept clean at all times.

(c) Prior to final acceptance of the work all temporary toilet facilities shall be removed from the site.

3. TEMPORARY WATER

The Contractor shall make all arrangements with the local water department for obtaining water connections to provide the water necessary for construction operations and shall pay all costs.

4. TEMPORARY ELECTRICITY

The Contractor shall make all arrangements with the Public Service Company for obtaining electrical connections to provide the electrical power necessary for construction operations and security lighting and shall pay all electrical connection and power costs.

The Contractor shall be responsible with obtaining an electrical permit from the City Electrical Inspector.

## INSURANCE REQUIREMENTS

Insurance shall be in such form as will protect the Contractor from all claims and liabilities for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this contract whether such operation by himself or by anyone directly or indirectly employed by him.

### AMOUNT OF INSURANCE

A) Comprehensive General Liability:
Bodily injury or Property Damage - $2,000,000
Per occurrence and general aggregate

B) Automobile and Truck Liability:
Bodily Injury or Property Damage - $2,000,000
Per occurrence and general aggregate

Coverage amounts may be met with excess policies

Additionally, the Contractor shall purchase and maintain the following types of insurance:

A) Full Workers Comprehensive Insurance coverage for all people employed by the Contractor to perform work on this project. This insurance shall at a minimum meet the requirements of the most current laws of the State of New Hampshire.

B) Contractual Liability Insurance coverage in the amounts specified above under Comprehensive General Liability.

C) Product and Completed Operations coverage to be included in the amounts specified above under Comprehensive General Liability.

D) Marine coverage to be included in the amounts specified above under Comprehensive General Liability.

### ADDITIONAL INSURED

All liability policies (including any excess policies used to meet coverage requirements) shall include the City of Portsmouth, New Hampshire as named Additional Insureds.

1) The contractor's insurance shall be primary in the event of a loss.
2) City of Portsmouth shall be listed as a Certificate Holder. The City shall be identified as follows:

City of Portsmouth
Attn: Legal Department
1 Junkins Avenue
Portsmouth, NH 03801

## MEASUREMENT AND PAYMENT

1. MEASUREMENT OF QUANTITIES

(a) All work completed under the contract will be measured according to the United States standard measure.

(b) The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice. Unless otherwise stated all quantities measured for payment shall be computed or adjusted for "in place" conditions.

(c) Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures having an area of 9 square feet or less. Unless otherwise specified, transverse measurements for area computations will be the dimensions shown on the plans or ordered in writing.

(d) Structures will be measured according to lines shown on the plans or as ordered unless otherwise provided for elsewhere in the specifications.

(e) In computing volumes of excavation, embankment, and borrow, the average end area method will be used. Where it is impracticable to measure by the cross-section method, acceptable methods involving three-dimensional measurement may be used. When measurement of borrow in vehicles is permitted, the quantity will be determined as 80 percent of the loose volume.

(f) In computing volumes of concrete, stone and masonry, the prismoidal method will be used. The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois.

(g) Except as specified below, all materials that are measured or proportioned by weight shall be weighed on scales which the Contractor has had sealed by the State or by a repairman registered by the Commissioner of Agriculture. All weighing shall be performed in a manner prescribed under the Rules and Regulations of the Bureau of Weights and Measures of the New Hampshire Department of Agriculture.

(h) Weighing of materials on scales located outside New Hampshire will be permitted for materials produced or stored outside the state, when requested by the Contractor and approved. Out-of-state weighing in order to be approved, must be performed by a licensed public weigh master or a person of equal authority in the state concerned on scales accepted in the concerned state.

(i) Each truck used to haul material being paid for by weight shall bear a plainly legible identification mark, and if required, shall be weighed empty daily at such times as directed.

(j) When material is weighed, the individual weight slips, which shall be furnished by the Contractor, for trucks, trailers, or distributors, shall show the following information: the date; the project; the material or commodity; the dealer or vendor; the Contractor or Subcontractor; the location of the scales; the vehicle registration number or other approved legible identification mark; the tare and net weights, with gross weights when applicable; and the weigher's signature or his signed initials.

**MEASUREMENT AND PAYMENT** (continued)

(k) The right is reserved to weight any truck, trailer, or distributor, at locations designated, before and after making deliveries to the project.

(l) Bituminous materials will be measured by the gallon or ton.

(m) When material is specified to be measured by the cubic yard but measurement by weight is approved, such material may be weighed and the weight converted to cubic yards for payment purposes. Necessary conversion factors will be determined by the Owner.

(n) The term "lump sum" when used as an item of payment will mean complete payment for the work described in the item.

(o) When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories, so as to provide the item complete and functional. Except as may be otherwise provided, partial payments for lump sum items will be made approximately in proportion to the amount of the work completed on those items.

(p) Material wasted without authority will not be included in the final estimate.

2. SCOPE OF PAYMENT

(a) The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage or expense of whatever character arising out of the nature of the work or the prosecution thereof.

(b) The Contractor shall be liable to the Owner for failure to repair, correct, renew or replace, at his own expense, all damage due or attributable to defects or imperfections in the construction which defects or imperfections may be discovered before or at the time of the final inspection and acceptance of the work.

(c) No monies, payable under the contract or any part thereof, except the first estimate, shall become due or payable if the Owner so elects, until the Contractor shall satisfy the Owner that the Contractor has fully settled or paid all labor performed or furnished for all equipment hired, including trucks, for all materials used, and for fuels, lubricants, power tools, hardware and supplies purchased by the Contractor and used in carrying out said contract and for labor and parts furnished upon the order of said Contractor for the repair of equipment used in carrying out said contract; and the Owner, if he so elects, may pay any and all such bills, in whole or in part, and deduct the amount of amounts so paid from any partial or final estimate, excepting the first estimate.

**MEASUREMENT AND PAYMENT** (continued)

3. COMPENSATION FOR ALTERED QUANTITIES

(a) Except as provided for under the particular contract item, when the accepted quantities of work vary from the quantities in the bid schedule the Contractor shall accept as payment in full, so far as contract items are concerned, at the original contract unit prices for the accepted quantities of work done. No allowance will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the Bidder and subsequent loss of expected reimbursements therefore or from any other cause.

(b) Extra work performed will be paid for at the contract bid prices or at the price negotiated between the Owner and the Contractor if the item was not bid upon. If no agreement can be negotiated, the Contractor will accept as payment for extra work, cost plus 15% (overhead and profit). Costs shall be substantiated by invoices and certified payroll.

4. PARTIAL PAYMENTS

Partial payments will be made on a monthly basis during the contract period. From the total amount ascertained as payable, an amount equivalent to ten percent (10 %) of the whole will be deducted and retained by the Owner until such time as the work receives final acceptance.

5. FINAL ACCEPTANCE

Upon due notice from the Contractor of presumptive completion of the entire project, the City Engineer will make an inspection. If all construction provided for and contemplated by the contract is found complete to his satisfaction, this inspection shall constitute the final inspection and the City Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of the final inspection.

If, however, the inspection discloses any work in whole or in part, as being unsatisfactory, the City Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection provided the work has been satisfactorily completed. In such event, the City Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

**MEASUREMENT AND PAYMENT** (continued)

6. ACCEPTANCE AND FINAL PAYMENT

(a) When the project has been accepted and upon submission by the Contractor of all required reports, completed forms and certifications, the Owner will review the final estimate of the quantities of the various classes of work performed. The Contractor may be required to certify that all bills for labor and material used under this contract have been paid.

(b) The Contractor shall file with the Owner any claim that the Contractor may have regarding the final estimate at the same time the Contractor submits the final estimate. Failure to do so shall be a waiver of all such claims and shall be considered as acceptance of the final estimate. From the total amount ascertained as payable, an amount equal to ten percent (10%) of the whole will be deducted and retained by the Owner for the guaranty period. This retainage may be waived, at the discretion of the City, provided the required Maintenance Bond has been posted. After approval of the final estimate by the Owner, the Contractor will be paid the entire sum found to be due after deducting all previous payments and all amounts to be retained or deducted under the provisions of the contract.

(c) All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

7. GENERAL GUARANTY AND WARRANTY OF TITLE

(a) Neither the final certification of payment nor any provision in the contract nor partial or entire use of the improvements embraced in this Contract by the Owner or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express or implied warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of twelve (12) months from the date of final acceptance of the work. The Owner will give notice of defective materials and work with reasonable promptness.

(b) No material, supplies or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease purchase or other agreement by which an interest therein or in any part thereof is retained by the Seller or supplier. The Contractor shall warrant good title to all materials, supplies and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have the right to a lien upon any improvements or appurtenances thereon.

Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontractors and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

**MEASUREMENT AND PAYMENT** (continued)

8. NO WAIVER OF LEGAL RIGHTS

(a) Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or be stopped from recovering from the Contractor or his Surety, or both, such overpayment as it may sustain by failure on the part of the Contractor to fulfill his obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

(b) The Contractor, without prejudice to the Contract shall be liable to the terms of the Contract, shall be liable to the Owner for latent defects, fraud or such gross mistakes as may amount to fraud, and as regards the Owner's right under any warranty or guaranty.

9. TERMINATION OF CONTRACTOR'S RESPONSIBILITY

Whenever the improvement provided for by the Contract shall have been completely performed on the part of the Contractor and all parts of the work have been released from further obligations except as set forth in his bond and as provided in Section 8 above.

## STANDARD SPECIFICATIONS

The Standard Specifications for Road and Bridge Construction of the State of New Hampshire Department of Transportation and any Addenda shall apply but without regard to Section 100 "General Conditions" of those Standard Specifications

## SHOP DRAWINGS

Shop Drawings for all manufactured items will be submitted to the city for approval.

# TECHNICAL SPECIFICATIONS

## INDEX


| DIVISION | | # OF PAGES |
|---|---|---|
| Section 02000 - | Sitework | 4 |
| Section 02050 - | Removals | 3 |
| Section 02200 - | Earthwork | 8 |
| Section 02373 - | Geotextile | 5 |
| Section 02455 - | Steel H-Piles | 7 |
| Section 02510 - | Bituminous Pavement | 2 |
| Section 02800 | Site Improvements | 2 |
| Section 03300 - | Concrete | 13 |
| Section 04400 | Stone Masonry | 4 |
| Section 04410 | Stone Riprap & Revetment | 2 |
| Section 05120 - | Structural Steel | 3 |
| Section 09968 | Coating of Steel Structures | 3 |

# SECTION 02000

# SITEWORK

## PART 1.0 - GENERAL

### 1.1 REFERENCE STANDARDS

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section.

The Contract Drawings indicate and show limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work.

All work included or ordered under this contract shall be done in conformity with these specifications, the applicable provisions of the State of NH Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition, hereinafter referred to as "Standard Specifications" or “NHDOT SSRBC”, and the City of Portsmouth rules, and City regulations, codes, ordinances.

B. Definitions:

1) Definition: Whenever the word “Owner” is referred to in the Specifications, it shall mean CITY OF PORTSMOUTH and it’s authorized representatives.
2) Definition: Whenever the word “Owner Representative” is referred to in the Specifications, it shall mean the local CITY OF PORTSMOUTH’s authorized representative.
3) Definition: Whenever the word “Engineer” is referred to in the Specifications, it shall mean Waterfront Engineers LLC., and it’s authorized representatives.

C. Titles to divisions and paragraphs in these specifications and in the notes on the drawings are for convenience, and shall not be taken as an exact, correct or completed segregation of materials and labor.

D. No responsibility is assumed by the Engineer or the Owner for omissions or duplications by the Contractor or its subcontractors due to real or alleged error in arrangement of matter in this specification or on the drawings.

E. Latest revisions of federal, state and reference standards/specifications shall be used where only the specification number without date or revision number is given in specifications.

F. Measurement and payment clauses listed in state and reference standards/specifications are not applicable.

## 1.2 SPECIFICATIONS

If conflicts arise between any of the Specifications, the project manual specifications shall govern, unless otherwise directed by the Engineer. The contract drawings shall govern in a case of conflict between the drawings and the specifications.

## 1.3 GENERAL

A. Omissions from the plans and/or specifications of express reference to any labor or materials reasonably to be inferred there from and necessary for the proper execution of the work shall not relieve the Contractor or Subcontractor from furnishing them of a kind in keeping with the general character of the work.

B. The Engineer shall decide all questions which may arise as to the quality, quantity, acceptability, fitness and rate of progress of the several kinds of work, and materials to be performed and furnished under the contract and shall decide all questions which may arise as to the fulfillment of the contract on the part of the Contractor. The Engineer's determination and decisions shall be final and conclusive.

## 1.4 PROJECT CONDITIONS

A. It was not possible for the Owner and/or Engineer to observe all existing conditions in the completion of these documents. Unforeseen conditions are expected to be discovered. The accuracy of the existing conditions data is not guaranteed to the Contractor. During the execution of the work, it shall be the Contractor's responsibility to discover, identify and observe existing conditions not anticipated by the Construction Documents and promptly notify the Engineer of such conditions in writing and proposed solutions at no additional cost. The Contractor's bid shall anticipate delays associated with conflicts with existing utilities.

B. Much of this work is in or near tidal water and the contractor shall assume that water levels will vary – schedule work accordingly.

## 1.5 ADDITIONAL REPSONSIBILITIES

A. PERMITS:

The following permits have been obtained. Contractor is responsible for familiarizing himself with the conditions of these permits and conducting all work in accordance with these permits:

1) NH DES Wetlands Bureau Permit approval.

The Contractor shall obtain all permits required by local, state and federal governing authorities for removal and disposal of all demolition materials.

B. UTILITIES:

The Contractor shall provide proper notices, make necessary arrangements and perform all other Service required for the removal or the care, protection, and maintenance of utilities, including, but not limited to: water, drainage, electric, telephone, wires, and all other items of this character above or below ground, on and around the site, assuming all responsibility and paying all costs related thereto. Related Service to any existing facilities shall not be disrupted without the prior approval of the Owner, and then only to the minimum extent required. The Contractor shall call *Digsafe at least 72 working day hours* in advance of any excavation, demolition, clearing/grubbing or other ground disturbance.

The Contractor shall comply with CITY OF PORTSMOUTH ordinances, rules and regulations.

C. JOB SITE LAYOUT, CONDITIONS AND MEASUREMENTS:

Contractor shall determine all lines and grades and field verify existing job conditions and measurements shown on the drawings. All discrepancies shall be reported to the Engineer for clarification. No additional compensation will be made to the Contractor for any error or negligence neither on its part, nor for discrepancies between actual conditions found at the site and as indicated in the Contract Documents after the work has commenced.

D. ROADS AND ACCESS TO THE SITE:

Access to the site for workmen and the delivery or removal of construction materials and/or equipment shall be made only from locations approved by the Owner. Existing roads shall remain accessible to vehicles at all times (at least one lane), unless temporary closures are scheduled in advance with the Owner. Contractor shall obtain hauling permits and route approvals from governing authorities as applicable.

E. MUD & DUST CONTROL:

1) Contractor shall continuously implement a mud & dust control program to minimize dust generation and prevent tracking of mud onto roadways.

F. RECORD DRAWINGS:

1) Contractor shall submit red line Record Drawings of all work on paper in a format acceptable to the Owner and Engineer upon project completion and prior to final payment.

G. TRAFFIC REGULATIONS AND PARKING:

1) The Contractor shall provide adequate personnel, flagmen, signs, barricades and equipment to properly regulate traffic at times when the work interferes with the normal flow of traffic both on and off the site. Parking areas and roadways outside the limits of the contract shall be kept free of debris resulting from construction related traffic. If at any time the Engineer or the City of Portsmouth determines that additional traffic control personnel are required to execute the work, the Contractor shall provide additional personnel at no additional cost.

- End of Section -

# SECTION 02050

# REMOVALS

## PART 1.0 - GENERAL

### 1.1 REFERENCES

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section.

B. The Contract Drawings indicate and show limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work.

C. Definitions:

1) Definition: Whenever the word “Remove” is referred to in the Contract Documents, it shall mean removal from the project site including legal disposal by the contractor.

### 1.2 SCOPE

A. The work of this section consists of the removal, including legal disposal of materials shown to be removed on the drawings as required for removal work, new construction, or relocation. The contractor is responsible to install replacement load bearing members before removing existing load bearing members indicated for replacement.

### 1.3 JOB CONDITIONS

A. The Contractor shall inspect the premises prior to submittal of its proposal for verification of existing conditions, which will affect its work.

B. Provide necessary protection to ensure the safe passage of persons around the area of removals. Conduct operations to prevent damage to adjacent buildings, structures, and other facilities as well as persons.

C. Promptly repair damages caused to adjacent facilities by removal operations, as directed by the Owner and at no cost to the Owner.

## 1.4 PERMITS

A. The Contractor shall obtain all permits required by local, state and federal governing authorities for removal and disposal of all removal materials.

## 1.5 DISPOSAL OF REMOVED MATERIALS

A. At regular intervals, remove from the site all debris, rubbish, and other materials resulting from removal operations, and legally dispose of off the site. Storage or sale of removed materials to be removed will not be permitted on the site.

B. Burning of removed materials will not be permitted on the site.

C. Any removal/stockpiled materials/soils that are temporarily stored on site shall be protected from erosion and from causing sedimentation.

D. Carefully remove, retain and store on-site in a protected area under cover any items indicated to be salvaged, reused, or reinstalled.

## 1.6 CLEANING-UP

A. Clean adjacent structures and improvements of all mud, dust, dirt, and debris caused by removal operations, as directed by Owner.

B. Return remaining adjacent areas to existing condition prior to the start of removal work, unless otherwise noted.

# PART 2.0 - MATERIALS

## 2.1 REMOVALS SCHEDULE

A. Removals include, but may not be limited to, removal of the following materials, structures, systems, etc., as indicated on the drawings:
Removals:
1) Existing fence system, metals, wood, timber, pavement indicated to be removed within work areas. Pull out or cut fence posts flush with stone surfaces.
2) Existing surplus excavated material including soil, stones, concrete, pavement, debris.
3) Existing Incidental items, such as existing concrete, metals, fabrics, timber, timber, etc.

Salvage/reinstall:
1) Existing stone materials – remains property of the owner, maybe reused if approved for reuse, or deliver to Harvard St storage yard.

## PART 3.0 - EXECUTION

### 3.1 DETAILS OF WORK

A. All removal materials shall be taken from the site by the Contractor and unless otherwise noted or directed by the Owner, will become its property. None of the removal materials shall be reused in the new permanent construction unless specifically noted on the plans or specifications or approved in writing by the Owner. All materials removed from the site shall be legally disposed of.

B. Existing items salvaged for reuse shall be handled and stored carefully with adequate contractor indexing for reinstallation. The stored materials shall be protected from theft. Reinstall these items in the same locations in-kind, unless otherwise specified.

C. The Contractor shall provide adequate construction fencing for protection of the area and monitoring of construction fence openings to ensure the public does not enter the construction/work areas.

D. The contractor shall immediately retrieve debris that falls onto the intertidal area/water and shall maintain adequate equipment at the site to perform such retrieval.

- End of Section -

# SECTION 02200

# EARTHWORK

## PART 1.0 GENERAL

### 1.1 GENERAL REQUIREMENTS

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section.

B. The Contract Drawings indicate limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other and both shall be followed to properly complete the work.

### 1.2 SCOPE OF WORK

A. Provide labor, materials, equipment, and service, etc. and perform all operations necessary for earthwork required for the execution of all construction as indicated on the drawings, specified herein or otherwise required for a complete and proper job.

B. Without limiting the generality thereof, the scope of work under this section shall include, but shall not necessarily be limited to, the following items:

1) Excavation and stockpiling of materials suitable for reuse in an on-site location approved by the Owner.

2) Removing existing material and replacing that material in a suitable manner in accordance with the requirements of the plans.

3) Removal and offsite disposal of existing pavements, concrete, and incidentals which may be encountered and backfilling to the grades shown on the plans.

4) Excavation, fill, refill, backfill, subgrade preparation and compaction as indicated or required, including, but not necessarily limited to, all work related to tiebacks, concrete work, as well as general earthwork.

5) Excavation to subgrade limits and disposal of unsuitable or excess soil materials.

6) Proof compacting subgrade.

7) Protection of excavated subgrade areas including diverting surface runoff from excavations.

8) Rough and finish grading.

9) Protection of existing structures, pavements, utilities, etc. to remain.

10) Dust, erosion, situation and environmental controls.

11) Sheeting, shoring and bracing of all excavations and as otherwise necessary. Adequate shoring shall be provided all around the footings to prevent collapse of adjacent soils and salt marsh. Sheeting/shoring between the footing and beach/salt marsh shall be pressure treated lumber or steel and shall be cutoff flush with top of footings and shall remain in place.

## 1.3 LAW AND REGULATIONS

A. All work shall be accomplished in accordance with regulations of local, county, state and federal agencies utility company standards as they apply.

## 1.4 SITE INVESTIGATION

A. The Contractor acknowledges that it has satisfied itself as to the nature and location of the work, the general and local conditions, particularly those bearing upon dewatering, transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, water table or similar physical conditions at the site, the confirmation of subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract. Any failure by the Contractor to acquaint itself with all information concerning these conditions will not relieve it from responsibility for estimating properly the difficulty or cost of successfully performing the work.

## 1.5 JOB CONDITIONS

A. Mud & Dust Control

Use all means necessary to control mud and dust on and near the work and on and near all off-site borrow areas if such mud/dust is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site. Thoroughly moisten all surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the

site. Areas to be left undisturbed for more than two (2) days or when rains are forecast, shall be temporarily stabilized with a suitable covering.

B. Protection

Use all means necessary to protect all materials of this section before, during, and after installation and to protect all objects designated to remain. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner. Side slopes of excavations shall be stabilized from erosion by crushed stone, riprap or equivalent means.

C. Bracing

Properly support all trenches and all other excavations in strict accordance with all pertinent rules and regulations. Brace, sheet, and support trench walls and other excavations in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

D. Turbidity Control

Use all means necessary to control turbidity on and near the work and on and near all off-site disposal areas if such mud/turbidity is caused by the Contractor's operations during performance of the work or if resulting from the condition in which the Contractor leaves the site.

## PART 2.0 - PRODUCTS

### 2.1 FILL MATERIAL, GENERAL

A. Approval Required

All fill material shall be subject to the review of the Engineer. Qualified materials shall not change in source or character unless re-qualified. The Engineer review of a material shall not in any way diminish the Contractor's responsibility to fulfill all requirements of the specifications.

### 2.2 FILL MATERIAL

A. Crushed Stone

The material shall consist of crushed stone, free from clay, loam, or organic matter and shall conform to NHDOT SSRBC "Crushed Stone (fine)" Item 304.4 or "Crushed Stone (course)" Item 304.5 as appropriate.

B. Structural Fill

The material shall consist of crushed gravel free from clay, loam, or organic matter and shall conform to NHDOT SSRBC "Crushed Gravel", Item 304.3.

## 2.3 USE OF MATERIAL

A. Crushed Stone

Material meeting at least the minimum requirements of crushed stone specified herein shall be used as a stabilizing layer for excavation back slopes, under structures and around structures, also for saturated areas at or below the water table and as bedding material for construction.

# PART 3.0 EXECUTION

## 3.1 GENERAL

A. Familiarization

Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, the building and site conditions, and all portions of the work covered by this section. The Contractor shall satisfy itself, by actual examination of the site of the work, as to the existing conditions, contours and the elevations and the amount of work required under this section.

B. Conditions

The Contractor acknowledges that it has satisfied itself as to the nature and location of the work the general and local conditions, particularly those bearing upon site access and transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table, or similar physical conditions at the site, the conformation and subsurface materials to be encountered, the character of equipment and facilities needed prior to and during the prosecution of the work and facilities needed prior to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract.

Any failure by the Contractor to acquaint itself with all available information concerning these conditions will not relieve him from responsibility for

estimating properly the difficulty and cost of successfully performing the work.

C. Protection

The Contractor shall protect existing utilities, the location of which may be shown approximately on the drawings, or which are located in the field by the Contractor or others. Utilities whose location is not known shall be protected insofar as possible. All costs for repair of utilities broken or damaged by the Contractor or its subcontractors shall be the responsibility of the Contractor.

D. Inspection and Tests

Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

E. Over Excavation Correction

Excavation beyond indicated or authorized limits shall be refilled with approved select fill or other approved suitable granular soil material. Refills shall be compacted to 95 percent (Modified Proctor) of the maximum dry density at optimum moisture content. Refills shall be provided as required by the Engineer and at no additional cost to the Owner.

## 3.3 GRADES AND ELEVATIONS

A. The alignment, finished grades & elevations of the site shall be consistent with existing grades and elevations. The Engineer, however, may make such adjustments in grades and alignments as are found necessary in order to improve drainage, match existing elevations and other special conditions encountered. Grading between indicated final grades shall provide smooth, even surfaces, except as otherwise required.

## 3.4 SHEETING, SHORING AND BRACING

A. Provide shoring, sheeting, and/or bracing of excavations as required to assure complete safety against collapse of earth at side of excavations. Alternatively, lay back excavations to a stable slope and armor the exposed backslope with at least 4” of crushed stone.

B. Excavations shall be adequately sheeted, shored and braced as necessary to permit proper execution of the work and to protect all slopes and earth banks. Sheet piling shall be installed if required to prevent cave-ins or settlement and to protect workmen. Shoring and bracing may be removed as the backfilling progresses, but only when banks are safe against caving, taking all necessary precautions to prevent collapse of excavation sides.

1) In removing sheeting or bracing, all necessary precautions shall be taken to prevent voids and collapse of excavation sides. Voids, if formed, shall immediately be filled with gravel and then compacted.

2) The installation of sheeting, shoring, and bracing shall comply with the safety precautions as outlined in the Associated General Contractors of America "Manual of Accident Prevention in Construction," and all local and state regulations. Dewatering shall be performed as required or as directed by the Engineer for all excavations below ground water level.

3) Sheeting/shoring between the footing and beach/salt marsh shall be pressure treated lumber or steel and shall be cutoff flush with top of footings and shall remain in place.

C. Comply with local and state safety regulations and with the provisions of the Occupational Safety and Health Act (OSHA).

## 3.5 PLACING SITE FILL

A. Base courses shall be made with materials indicated on the drawings, and specified in the Specifications.

B. Frost
Fill shall not be placed over frozen soil. Soil that is frozen shall be removed prior to placement of compacted fill. Remove all frozen uncompacted soil prior to placing additional fill for compaction.

C. To the extent that it is practicable, each layer of fill shall be compacted to the specified density the same day it is placed.

E. All fill materials shall be spread uniformly by acceptable methods over the areas required to be covered so that the required thickness after compaction shall be obtained. The material shall be thoroughly consolidated by vibratory tampers, hand tamping or other approved means, to the final compacted grades as required. In no case shall the fill materials be placed in excess of six (6) inches for each lift before compaction, unless otherwise approved by the Engineer. Crushed stone at the bottom of the footing excavations shall be compacted with a vibratory plate compactor/taper during low tide/dewatered conditions. Any

dewatering water shall be discharged to a suitable filtering basin or bag such that turbid water is not released onto the beach, water or stormwater system.

## 3.6 SOILS OBSERVATION

A. The Engineer may perform on-site observations during this phase of the construction operations. Observation by the Engineer may include, but not be limited to, the following:

1) Observations during excavation.

2) Observations during backfilling and compacting operations within that area defined.

3) The field observations performed by the Engineer and its presence do not include supervision or direction of the actual work by the Contractor, its employees, or agents. Neither the presence of the Engineer nor any observations performed by the Engineer shall excuse the Contractor from meeting the soils and compaction requirements as specified or correcting any defect in its work.

## 3.7 COMPACTION

A. Fills, refills and backfills and the various areas listed below shall be compacted to not less than the following specified maximum dry densities as determined by ASTM D-1557.

B. Compaction Requirements

| Areas | | Minimum Degree of Compaction |
|---|---|---|
| 1) | Pavement Base and Subbase | 95% |
| 2) | Below Unpaved Areas | 95% |
| 3) | Base and Backfill Material | 95% |

C. Methods: The compaction guidelines given below are stated to provide minimum compaction standards only and in no way relieves the Contractor of its obligation to achieve the above specified degree of compaction by whatever additional effort is necessary.

D. All percentages of compaction specified herein shall be related to the maximum dry density at the optimum moisture content as established by ASTM Test Method D1557, according to ASTM Test Methods D1556, D2922 or D2167. Prior to placing, at least one representative sample of each of the fill materials proposed to be furnished for the earthwork operations to determine gradation and moisture density characteristics.

E. No rolling equipment shall be used to compact materials within twelve (12) feet of the vertical faces of any structures, walls or utility pipes. Plate vibratory tampers shall be used in these restricted areas and in other areas too confined to satisfactorily use rolling equipment.

F. Do not compact fully saturated or submerged soils.

## 3.8 GRADING

A. General
Perform all rough and finish grading required to attain the elevations shown on the drawings, to smoothly transition to existing grades, or as otherwise directed by the Engineer or required for a complete and proper job.

B. Rough Grading
Proper allowances shall be made for paving, or other finish surfaces. Rough grading shall be reasonably even and free from irregularities, and shall provide positive drainage away from structures without ditching or pools.

## 3.9 DUST, EROSION AND ENVIRONMENTAL CONTROLS

A. Mud & dust control shall be maintained constantly throughout the construction period by approved method. Water may be used for dust control and applied by sprinkling with water trucks with distributors for that purpose as required or directed by the Engineer to maintain dust control.

B. The Contractor shall be responsible for exercising every precaution to prevent erosion and siltation of lower elevations and existing drainage systems and watercourses throughout the construction period. All damage caused by inadequate erosion control measures shall be repaired at the Contractor's expense. Erosion control and siltation of lower elevations and existing drainage systems shall be effectively controlled by the construction and continual use of baled hay or straw, wood fiber tubes, or filter fabric barriers as shown on drawings and as directed by the Engineer.

C. All environmental controls shall be performed in accordance with all applicable rules and regulations of local, county and state agencies having jurisdiction.

- End of Section -

# SECTION 02373

# GEOTEXTILE

## PART 1 - GENERAL

### 1.1 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.

ASTM INTERNATIONAL (ASTM)

| | |
|---|---|
| ASTM D 4354 | Sampling of Geosynthetics for Testing |
| ASTM D 4355 | Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus |
| ASTM D 4491 | Water Permeability of Geotextiles by Permittivity |
| ASTM D 4533 | Trapezoid Tearing Strength of Geotextiles |
| ASTM D 4632 | Grab Breaking Load and Elongation of Geotextiles |
| ASTM D 4751 | Determining Apparent Opening Size of a Geotextile |
| ASTM D 4759 | Determining the Specification Conformance of Geosynthetics |
| ASTM D 4833 | Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products |
| ASTM D 4873 | Identification, Storage, and Handling of Geosynthetic Rolls and Samples |

### 1.2 SUBMITTALS

The following shall be submitted:

Product Data

Samples

Samples for quality assurance.

Certificates

Geotextile

A minimum of 7 days prior to scheduled use, manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line

full-width metal detectors and does not contain any needles. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

## 1.3 DELIVERY, STORAGE AND HANDLING

Delivery, storage, and handling of geotextile shall be in accordance with ASTM D 4873.

1.3.1 Delivery

The Engineer shall be notified a minimum of 24 hours prior to delivery and unloading of geotextile rolls. Rolls shall be packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. Geotextile damaged during storage or handling shall be repaired or replaced, as directed. Each roll shall be labeled with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and date manufactured.

1.3.2 Storage

Rolls of geotextile shall be protected from construction equipment, chemicals, sparks and flames, temperatures in excess of 160 degrees F, or any other environmental condition that may damage the physical properties of the geotextile.

1.3.3 Handling

Geotextile rolls shall be handled and unloaded with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

# PART 2 - PRODUCTS

## 2.1 RAW MATERIALS

2.1.1 Geotextile

Geotextile shall be a black nonwoven pervious sheet of polymeric material and shall consist of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Stabilizers and/or inhibitors shall be added to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Geotextiles shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

Geotextile shall be a black non-woven geotextile having a minimum weight of 12 oz per sq. yard (ASTM D5261), such as PROPEX GEOTEX 1291 or approved equal meeting the following GAI-LAP MARV at a 97% confidence level:

TABLE 1
MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE

| PROPERTY | UNITS | ACCEPTABLE VALUES | TEST METHOD |
|---|---|---|---|
| GRAB STRENGTH | LBS | 300 | ASTM D 4632 |
| SEAM STRENGTH | LBS | 250 | ASTM D 4632 |
| PUNCTURE | LBS | 200 | ASTM D 4833 |
| TRAPEZOID TEAR | LBS | 125 | ASTM D 4533 |
| APPARENT OPENING SIZE | U.S. SIEVE | 100 | ASTM D 4751 |
| PERMITTIVITY | SEC -1 | 0.8 | ASTM D 4491 |
| ULTRAVIOLET DEGRADATION | PERCENT | 70 AT 500 HRS | ASTM D 4355 |

2.1.2 Thread

Sewn seams shall be constructed with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

## 2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

The Manufacturer shall be responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. Documentation describing the quality control program shall be made available upon request. Manufacturing quality control sampling and testing shall be performed in accordance with the manufacturer's approved quality control manual. As a minimum, geotextiles shall be randomly sampled for testing in accordance with ASTM D 4354, Procedure A. Acceptance of geotextile shall be in accordance with ASTM D 4759. Tests not meeting the specified requirements shall result in the rejection of applicable rolls.

## PART 3 - EXECUTION

## 3.1 INSTALLATION

3.1.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile.

3.1.2 Placement

The Contractor shall notify the Engineer a minimum of 24 hours prior to installation of geotextile. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles.

## 3.2 SEAMS

3.2.1 Overlap Seams

Geotextile panels shall be continuously overlapped a minimum of 12 inches at all longitudinal and transverse joints. Where seams must be oriented across the slope, the upper panel shall be lapped over the lower panel. If approved, sewn seams may be used instead of overlapped seams.

3.2.2 Sewn Seams

Factory and field seams shall be continuously sewn on all slopes steeper than 1 vertical on 4 horizontal. The stitch type used shall be a 401 locking chain stitch or as recommended by the manufacturer. For seams that are field sewn, the seams shall be sewn using the same equipment and procedures as will be used for the production seams. Down slope seam strength shall meet the minimum requirements specified in Table 1. The thread at the end of each seam run shall be tied off to prevent unraveling. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with a minimum of 18 inches of overlap.

## 3.3 PROTECTION

The geotextile shall be protected during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Adequate ballast (e.g. sand bags, crushed stone) shall be used to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days after installation.

## 3.4 REPAIRS

Torn or damaged geotextile shall be repaired. Clogged areas of geotextile shall be removed. Repairs shall be performed by placing a patch of the same type of geotextile over the damaged area. The patch shall extend a minimum of 12 inches beyond the edge of the damaged area. Patches shall be fastened using approved

methods. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Geotextile rolls which cannot be repaired shall be removed and replaced. Repairs shall be performed at no additional cost to the Owner.

## 3.5 COVERING

Geotextile shall not be covered prior to inspection and approval by the Engineer. Cover stones shall not be dropped onto the geotextile from a height greater than 3 feet. No equipment shall be operated directly on top of the geotextile without approval of the Engineer.

-- End of Section --

# SECTION 02455

# STEEL H-PILES

## PART 1 GENERAL

### 1.1 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.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1 Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A 27 Standard Specification for Steel Castings, Carbon, for General Application

ASTM A 572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel

### 1.2 BASIS FOR CAPACITY

$R_u = 1.75 (E)^{1/2} \log(10N) – 100$

$R_u$ = ultimate pile resistance (kips)
E = rated hammer energy (ft-lb) based on ram stroke observed
N= number hammer blows at final penetration (blows per inch)

Allowable pile capacity shall be at least 65 tons. If ultimate capacity is determined by this equation alone, the ultimate capacity shall be at least 228 tons; if the contractor also performs a satisfactory WEAP analysis, the ultimate capacity can be reduced to 180 tons minimum; and if a PDA test is performed, the ultimate capacity may be 150 tons. Select and operate the pile hammer such that the acceptance blow criterion is between 1 and 15 blows per inch with a preferred target of 4 to 8 blows per inch. Adjust the ratted energy of the hammer to account for batter angle on the batter piles.

The contractor may add piles (uniformly distributed if it prefers more piles with lower capacity, meeting the equivalent horizontal and vertical capacity of the piles specified.

Include all costs incidental to providing steel H-piles in the lump sum contract price bid, including furnishing and driving piles, mobilization, cutting off piles at cutoff elevation, splices, retapping of piles to confirm pile capacity, redriving of heaved piles to the required tip elevation, and providing driving records.

## 1.3 SUBMITTALS

Pile steel certificate

Pile steel points, including attachment details

Submit descriptions of pile driving equipment at least 5 days prior to commencement of work. If any alternative capacity/layout or WEAP or PDA proposed, submit that at least 10 days prior.

Pile splices details if proposed

Pile driving records
Submit complete and accurate job pile driving records as specified in paragraph entitled "Records" of this section, within 15 calendar days after completion of driving.

# PART 2 PRODUCTS

## 2.1 MATERIALS

2.1.1 H-Piles
ASTM A 572, Grade 50; A 709, Grade 50 (50 ksi yield minimum). Provide pile tip reinforcements or cast steel points. Provide H-piles of the shape and sections shown.

2.1.2 Pile Splices
Full strength splices. ASTM A 36, ASTM A 572, Grade 50. Submit proposed method and procedure, including alignment procedure, welder name and qualifications.

2.1.3 Pile Points/Pile Shoes
ASTM A 27; A 148 for cast steel points. ASTM A 36, ASTM A 572, Grade 50 for pile tip reinforcements. Pile points suitable for end bearing on hard bedrock must be provided on all piles. Pile points/shoes for batter piles shall have “teeth” or equivalent for engaging the rock and minimizing “walking”.

# PART 3 EXECUTION

## 3.1 PILE DRIVING EQUIPMENT

Select the proposed pile driving equipment, including hammers and other required items, and submit complete descriptions of the proposed equipment in accordance with paragraph "Submittals." Final approval of the proposed equipment is subject to the satisfactory completion and approval of pile tests. Changes in the selected pile driving equipment will not be allowed after the equipment has been approved except as

specified and directed. No additional contract time will be allowed for Contractor proposed changes in the equipment.

3.1.1 Pile Driving Hammers
Provide impact or vibratory type pile driving hammers.

3.1.1.1 Impact Hammers
Provide impact pile hammers of the single-acting, double-acting, or differential-acting type. The size or capacity of hammers must be as recommended by the hammer manufacturer for the total pile weight and the character of the soil formation to be penetrated. Hammers must be capable of, and so demonstrated during the development of refusal criteria, hard driving in excess of 20 blows per inch. Obtain driving energy by use of a heavy ram and a short stroke with low impact velocity, rather than a light ram and a long stroke with high impact velocity. The ram or drop hammer weight shall be at least 2000 pounds. Position a pile cap or drive cap between the pile and hammer. Place hammer cushion or cap block between ram and the pile cap or drive cap. Hammer cushion or cap block must have consistent elastic properties, minimize energy absorption, and transmit hammer energy uniformly and consistently during the entire driving period. In accordance with paragraph "Submittals," submit the following information for each impact hammer proposed:

a. Make and model.

b. Ram weight (pounds).

c. Anvil weight (pounds).

d. Rated stroke (inches).

e. Rated energy range (foot-pounds).

f. Rated speed (blows per minute).

3.1.1.2 Vibratory Hammers
The use of vibratory hammers is permitted for initial pile installation, however use of an impact hammer is required to establish load bearing capacity. For each vibratory hammer proposed:

a. Make and model.

b. Eccentric moment (inch-pounds).

c. Dynamic force (tons).

d. Steady state frequency or frequency range (cycles per minute).

e. Vibrating weight (pounds).

f. Amplitude (inches).

g. Maximum pull capacity (tons).

h. Non-vibrating weight (pounds).

i. Power pack description.

3.1.2 Pile Driving Leads
Support and guide hammers with suspended leads, fixed extended leads or fixed underhung leads. Operate vibratory hammers free hanging without leads.

## 3.2 INSTALLATION

Inspect piles when delivered and when in the leads immediately before driving. Cut piles at cutoff grade by an approved method. Where cutoff is below existing surface, ground or mudline elevation, complete excavation, sheeting, and dewatering before driving pile to cutoff elevation.

3.2.2 Pile Driving Records
Use the preprinted forms attached at the end of this section, or equivalent, for recording pile driving data.

Compile and submit accurate records of the pile driving operations on the approved form in accordance with paragraph "Submittals." Include in driving records for each pile date driven, pile identification number, cross section shape and pile dimensions, location, deviations from design location, original length, ground elevation, top elevation, tip elevation, batter alignment, description of hammer used, number of blows required for each foot of penetration throughout the entire length of the pile and for each inch of penetration in the last foot of penetration, total driving time in minutes and seconds, and any other pertinent information as required or requested such as unusual driving conditions, interruptions or delays during driving, damage to pile resulting from driving, heave in adjacent piles, redriving, weaving, obstructions, predrilling, and depth and description of voids formed adjacent to the pile.

Additional data required to be recorded for impact hammers includes the rate of hammer operation, make, and size. Additional data required to be recorded for vibratory hammers includes hammer power pack description, make, size, horsepower applied to pile, and hammer operating frequency.

3.2.3 Pile Placement and Tolerances in Driving
Develop and submit a pile placement plan which shows the installation sequence and the methods proposed for controlling the location and alignment of piles Accurately place piles in the correct location and alignments, both laterally and longitudinally, and to the vertical or batter lines indicated. Establish a permanent base line to provide for inspection of pile placement by the Engineer during pile driving operations prior to driving job piles and maintain during the installation of the job piles.

A final lateral deviation from the correct location at the cutoff elevation of not more than 4 inches will be permitted for vertical and battered piles. Manipulation of piles will not be permitted. A variation of not more than 0.25 inch per foot of pile length from the vertical for vertical piles will be permitted. A final variation in rotation of the pile about the center line of the web of not more than 5 degrees is permitted. A vertical deviation of not more than 1/4 inches from the correct cutoff elevations (top of top plate) shown is permitted. Inspect piles for heave. Redrive heaved piles to capacity. Maintain the correct relative position of all piles by the use of templates or by other approved means. Piles damaged or not located properly or exceeding the maximum limits for rotation, lateral and vertical deviation, or variation in alignment must be pulled and new piles redriven, or provide additional piles, at a location directed at no additional cost to the owner.

3.2.3.1 Survey Data

After the driving of each pile group is complete and before superimposed concrete is placed, provide the Engineer with an as-driven survey showing actual location and top elevation of each pile. Do not proceed with placing concrete until the Engineer has reviewed the survey and verified the safe load for the pile group driven. Present a survey in such form that it gives deviation from plan location in two perpendicular directions and elevations of each pile to nearest half inch.

3.2.4 Pile Driving

Notify the Engineer 2 days prior to the date pile driving is to begin. Do not drive piles within 100 feet of concrete less than 4 days old. Drive piles with hammers of the same model and manufacturer, same energy and efficiency, and using the same driving system. Operate hammers at all times at the speed and under the conditions recommended by the manufacturer. Where heave is anticipated, the sequence of installation must be such that pile heave is minimized by starting pile driving at the center of the group and proceeding outward and by driving vertical piles prior to driving battered piles where practicable. Prior to driving and with the pile head seated in the hammer, check each pile to ensure that it has been aligned correctly and that the orientation of the web about the centerline is as shown. Once pile driving has begun, keep conditions such as alignment and batter constant. A pile that can not be driven to the required depth because of an obstruction, as indicated by a sudden unexplained change in blow count and drifting, must be pulled and redriven or cut off and abandoned, whichever is directed. After piles are driven, cutoff square as required at the indicated cutoff elevation. Backfill any voids around piles or abandoned holes for pulled piles with sand or crushed stone and compact to the same density as the surrounding soil.

3.2.4.1 Splicing Piles

When approved, provide splices of the full penetration butt weld type. Use only one splice per length of pile. Construct splices to maintain the true alignment and position of the pile sections. Splices must develop the full strength of the pile in both bearing and bending. Non-destructive testing of pile splices by the Contractor will not be required unless visual inspection by the Engineer indicates significant anomalies.

3.2.4.2 Jetting
Jetting of piles is not be permitted.

3.2.4.3 Predrilling
Predrilling or spudding is permitted if obstruction are encountered. Discontinue predrilling/spudding where the pile tip is approximately 5 feet above the anticipated pile tip elevation. Drive pile the final 5 feet of penetration. Predrilling/spudding equipment and method must be approved by the Engineer prior to commencing predrilling/spudding operation.

3.2.4.4 Heaved Piles
When driving piles in conditions of relatively close spacing, perform observations to detect heave of adjacent piles. Backdrive heaved piles to original refusal blow count without additional cost to the Owner.

3.2.4.5 Pulled Piles
Pull and replace piles damaged or impaired for use during driving with new piles, or cut off and abandon and drive new piles as directed without additional cost to the Owner. The Engineer may require that any pile be pulled for inspection. Replace piles pulled as directed and found to be damaged with new piles at the Contractor's expense.

3.2.4.6 Welding
AWS D1.1. Pile points shall be welded to the piles as recommended by the manufacturer, but no less than a continuous 5/16” fillet weld across the flanges. Pile splices shall be correctly aligned and full penetration welded.

## PART 4-PAYMENT

## 4.1 BASIS OF BIDS

H- Piles
Base bids on the number, capacity and size of piles as indicated (or equivalent). The Contractor is responsible for ordering adequate lengths of piles, based on the subsurface test boring data provided and test pile driving required. Adjustment in contract price will not be made for cutting off piles, for any portion of a pile remaining above the cutoff elevation, or for broken, damaged, or rejected piles. The Contractor shall drive test piles at the location to aid in more precisely determining the pile lengths needed and the test piles will be accepted as production piles if in the correct locations and driven to the required capacity, as specified.

-- End of Section --

PILE DRIVING LOG

**CONTRACT NO._____ CONTRACT NAME_____**
**CONTRACTOR_____ TYPE OF PILE_____**
**PILE LOCATION_____ PILE SIZE: BUTT/TIP: _____ LENGTH_____**
**GROUND ELEVATION_____ CUT OFF ELEVATION_____**
**PILE TIP ELEVATION_____ VERTICAL (_____) BATTER 1 ON (_____)**
**SPLICES ELEVATION_____ COMPANY_____**
**HAMMER: MAKE & MODEL_____ WT. RAM_____**
**STROKE_____ RAM RATED ENERGY_____**
**DESCRIPTION & DIMENSIONS OF DRIVING CAP_____**
**CUSHION MATERIALS & THICKNESS_____**
**INSPECTOR_____**
**"DEPTH" COLUMN OF PILE DRIVING RECORD REFERENCED TO:**
**_____ CUT-OFF ELEVATION**
**TIME: START DRIVING_____ FINISH DRIVING_____ DRIVING TIME_____**
**INTERRUPTIONS (TIME, TIP ELEV. & REASON)_____**

DRIVING RESISTANCE

| DEPTH FT. | NO. OF BLOWS | DEPTH FT. | NO. OF BLOWS | DEPTH FT. | NO. OF BLOWS |
|---|---|---|---|---|---|
| 0 | _____ | 18 | _____ | 36 | _____ |
| 1 | _____ | 19 | _____ | 37 | _____ |
| 2 | _____ | 20 | _____ | 38 | _____ |
| 3 | _____ | 21 | _____ | 39 | _____ |
| 4 | _____ | 22 | _____ | 40 | _____ |
| 5 | _____ | 23 | _____ | 41 | _____ |
| 6 | _____ | 24 | _____ | 42 | _____ |
| 7 | _____ | 25 | _____ | 43 | _____ |
| 8 | _____ | 26 | _____ | 44 | _____ |
| 9 | _____ | 27 | _____ | 45 | _____ |
| 10 | _____ | 28 | _____ | 46 | _____ |
| 11 | _____ | 29 | _____ | 47 | _____ |
| 12 | _____ | 30 | _____ | 48 | _____ |
| 13 | _____ | 31 | _____ | 49 | _____ |
| 14 | _____ | 32 | _____ | 50 | _____ |
| 15 | _____ | 33 | _____ | 51 | _____ |
| 16 | _____ | 34 | _____ | 52 | _____ |
| 17 | _____ | 35 | _____ | 53 | _____ |

**DRIVING RESISTANCE IN BLOWS PER INCH FOR LAST FOOT OF PENETRATION:**

**DEPTH_____ FT TO DEPTH_____ FT**

**1"___2"___3"___4"___5"___6"___7"___8"___9"___10"___11"___12"___**

**ELEV._____ ELEV._____**

**REMARKS_____**

**CUT OFF ELEVATION: FROM DRAWING _____**

**TIP ELEVATION = GROUND ELEVATION - DRIVEN DEPTH = _____**

**DRIVEN LENGTH = CUT OFF ELEVATION - TIP ELEVATION = _____**

# SECTION 02510

# BITUMINOUS PAVEMENT

## PART 1.0 - GENERAL

### 1.1 REFERENCES

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section. Reference NH DOT Standard Specifications for Roads & Bridges.

B. The Contract Drawings indicate and show limits of construction for this project. These specifications specify material and work requirements for this project. Both are complimentary to each other, and both shall be followed to properly complete the work. In case of conflict the drawings shall govern.

### 1.2 SCOPE OF WORK

A. This work shall include the removal of existing bituminous pavement by sawcutting areas of existing pavement areas and removing all bituminous and base material to the pavement subbase, then replacing with new pavement and base courses as indicated on the drawings.

### 1.3 EQUIPMENT

A. Equipment used for sawing bituminous concrete pavement shall be a gasoline powered wet blade pavement saw. Cutting type roller blades will not be allowed. Existing bituminous concrete shall be carefully removed so as not to disturb the existing pavement to remain.

### 1.4 MATERIALS

A. Hot bituminous concrete: 1.5” Wearing Course NH DOT Type F; 2.5” Base Course NH DOT Type B.

B. Granular base material shall be 6” min. compacted Crushed Gravel NH DOT 304.3 or 304.4.

### 1.5 CONSTRUCTION

A. The existing bituminous concrete shall be removed completely from within the specified areas, sawcut to the full depth of the wearing course.

B. Material removed during this operation shall be properly disposed of off-site.

C. No permanent pavement shall be placed over backfill/base until compaction has been completed.

D. The contractor will be required to hose clean or sweep all road surfaces after backfilling and before any surfacing is done.

E. Base material shall be approved granular base having a minimum thickness as indicated on the drawings.

F. The existing edges of all pavement along the line of the excavation shall be saw cut back from exposed edges thereof, a sufficient distance to form a sharp, clean, straight edge. The minimum lateral cutback from top of excavation will be one (1) foot. The cut back pavement will be carefully removed.

G. A bituminous concrete surface shall be constructed to match the compacted thicknesses specified. The edges of abutting bituminous surfacing shall be painted with an emulsion to assure a satisfactory, watertight bond between the two materials.

H. The bituminous pavement courses shall be rolled thoroughly using rollers weighing approximately ten (10) tons, but not heavy enough to damage existing pavement.

- End of Section -

# SECTION 02800

# SITE IMPROVEMENTS

## PART 1- GENERAL

### 1.1 REFERENCES

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section.

B. The Contract Drawings indicate and show limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work.

### 1.2 DESCRIPTION OF WORK

A. Work Included: The Contractor shall provide the labor, materials and equipment necessary to complete the Work of this Section including incidental site work.

### 1.3 SUBMITTALS

A. Railing system shop drawing, coating system, anchoring system, shimming procedure.

B. Cleat catalog cut

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Railing

Ornamental Railing System shall be 42” high industrial grade, surface mounted, 2-rail balustrade with picket/baluster panel configuration as shown, galvanized with hot dip galvanized steel system with compatible black finish, using the ColorGalv10 system by Duncan Galvanizing of Everett MA 1-800-638-1011, or approved equal.

Under the deduct price line item in the bid form, provide a deduct price for substitution of an alternative railing coating system per section 09968.

Rails, panels, posts, base plates and anchor bolts shall be fabricated to withstanding at minimum the loads specified in IBC 2006 at or below allowed stresses. Anchor bolts shall be stainless steel wedge anchors (1/2”x7” min.) installed into epoxy resin with 4” minimum embedment into the rock.

B. Cleats

18” ductile cast iron cleats, hot dip galvanized. Install with two ¾” dia. stainless steel anchor bolts in epoxy resin, minimum 5” embedment.

## PART 3 - EXECUTION

## 3.1 GENERAL

3.1.1 Railings

A. Provide railing system in accordance as specified with connections, including post base anchorage, to comply with IBC 2006 pedestrian guard code. Posts and panels shall be plumb to within 1/8” in 2 feet tolerance. All joints shall be true and smooth, with no incorrect fit gaps and with no burrs, sharp edges or protruding fasteners. Repair any coating damage in accordance with the coating manufacturer recommendations such that it matches and is consistent with the adjacent coating.

B. The area under each base plate shall be fully grouted with nonshrink grout with any exposed grout edges neatly toweled.

C. Install drain, drain support concrete and piping as indicated with self draining sump bedded in crushed stone and the piping routed through the wall concrete and stonework. Pipe end shall be held back 3” from the exterior stone surface to minimize pipe appearance, but with no flow blockage obstructions.

D. South Mill St: Provide a plumb 6” diameter sleeve through the cobble stones/slab to a depth of 1.5 feet at a final location to be selected by the Owner for a sign post. Neatly fit cobble stones and cobble chinking around the sleeve consistent with the surrounding cobble stone surface.

- End of Section -

# SECTION 03300

# CONCRETE

## PART 1 - GENERAL

### 1.1 REFERENCES

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

ACI INTERNATIONAL (ACI)

| | |
|---|---|
| ACI 301 | Structural Concrete |
| ACI 304R | Measuring, Mixing, Transporting, and Placing Concrete |
| ACI 304.2R | Placing Concrete by Pumping Methods |
| ACI 305R | Hot Weather Concreting |
| ACI 306.1 | Cold Weather Concreting |
| ACI 308 | Curing Concrete |
| ACI 309R | Consolidation of Concrete |
| ACI 315 | Details and Detailing of Concrete Reinforcement |
| ACI SP-2 | ACI Manual of Concrete Inspection |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM A 615 | Deformed and Plain Billet-Steel Bars for Concrete Reinforcement |
| ASTM A 706 | Low-Alloy Steel Deformed Bars for Concrete Reinforcement |
| ASTM C 31 | Making and Curing Concrete Test Specimens in the Field |
| ASTM C 33 | Concrete Aggregates |
| ASTM C 39 | Compressive Strength of Cylindrical Concrete Specimens |
| ASTM C 94 | Ready-Mixed Concrete |
| ASTM C 150 | Portland Cement |
| ASTM C 260 | Air-Entraining Admixtures for Concrete |
| ASTM C 920 | Elastomeric Joint Sealants |
| ASTM C 989 | Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars |
| ASTM C 1107 | Packaged Dry, Hydraulic-Cement Grout (Nonshrink) |
| ASTM C 1240 | Silica Fume for Use in Hydraulic-Cement Concrete and Mortar |

## 1.2 DEFINITIONS

a. "Blending size" is an aggregate that complies with the quality requirements in ASTM C 33 and paragraph entitled "Aggregates" and as modified herein and can be blended with coarse and fine aggregate to produce a well graded combined grading.

b. "Cementitious material" as used herein shall include portland cement, pozzolan, fly ash, ground granulated blast-furnace slag, and silica fume.

c. "Design strength" (f'c) is the specified compressive strength of concrete to meet structural design criteria.

d. "Mixture proportioning" is a description of the proportions of a concrete mixture that were selected to enable it to meet the performance durability requirements, constructability requirements, and the initial and life-cycle cost goals.

e. "Mixture proportions" is the concrete supplier's by-mass proportions to replicate the mixture design.

f. "Pozzolan" is a silicious or silicious and aluminous material, which in itself possesses little or no cementitious value but will, in finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing cementitious properties.

g. "Field test strength" (fcr) is the required compressive strength of concrete to meet structural and durability criteria. Determine (fcr) during mixture proportioning process.

## 1.3 SUBMITTALS

Submit the following:

Design Data

Mixture design – structural concrete

Mixture design – porous concrete pavement

QAQC Plan

Quality assurance/quality control plan to ensure the approved mix design meets the specifications and is delivered to site per those requirements.

## 1.4 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory, as though the word "shall" had been substituted for the words "should" or "could" or "may," wherever they appear. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Engineer.

## 1.5 DELIVERY, STORAGE, AND HANDLING

Do not deliver concrete until, forms, reinforcement, embedded items, and reinforcement connections are in place and ready for concrete placement. ACI 301 and ASTM A 934 for job site storage of materials. Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

1.5.1 PLACING CONCRETE

Concrete shall be deposited by shute, bucket or concrete pump so not to cause segregation. The methods and equipment used shall be subject to approval.

## 1.6 QUALITY ASSURANCE

1.6.1 Concrete Mixture Design

At least 4 days prior to concrete placement, submit proportions for a concrete mixture for each strength and type of concrete. Submit a complete list of materials proposed including type; brand; source and amount of cement, aggregate, fly ash, (or slag pozzolans), silica fume, ground slag; and applicable reference specifications. Submit additional data regarding concrete aggregates if the source of aggregate changes. Submittal shall clearly indicate where each mixture will be used when more than one mix design is submitted.

# PART 2 - PRODUCTS

## 2.1 CONCRETE

2.1.1 Structural Concrete: Durability and Strength

Provide a NHDOT standard AA3 concrete mix with a maximum water/cement ration of 0.40 and 5 to 9% air content, and 28-day design strength to produce concrete of minimum design strength (f'c) of 4000 psi.

2.1.2 Porous Concrete Pavement

Porous pavement shall consist of clean 3/8” stone aggregate, Type II Portland cement and water. Batch in proportions of 4 parts stone aggregate to 1 part

Portland cement by weight. Add only enough water to create a “wet-looking” cement paste and thoroughly mix to evenly distribute the paste and break up any cement balls. Alternatively the parking area pavement may use 3” of 3/8” aggregate porous concrete over 3” of 3/4” aggregate porous concrete.

## 2.2 MATERIALS

2.2.1 Cement

| ASTM C 150 Portland | ASTM C 595 Blended | |
|---|---|---|
| Type I | Type IP or IS | For general use in construction. |
| Type II | Type IP(MS) or Type IS(MS) Type II (LA) Type II (LH) | For general use in construction where concrete is exposed to moderate sulfate or alkali action or where moderate heat of hydration is required. ASTM C 595 (blended hydraulic cements): add the suffix MS or MH where either moderate sulfate resistance or moderate heat of hydration, respectively, is required. |
| Type III | None | For use when high early strength is required. |

ASTM C 150, Type II and/or ASTM C 595, Type IP(MS) or IS(MS) and ASTM C 1157, Type MS blended cement except as modified herein. The tricalcium aluminate ($C_3A$) content shall not be less than 4 percent to provide protection for the reinforcement and shall not be more than 10 percent to obtain concrete that is resistant to sulfate attack. Blended cements shall consist of a mixture of ASTM C 150 cement and one of the following materials: ASTM C 618 pozzolan or fly ash, or ASTM C 989 ground granulated blast-furnace slag. Use one manufacturer for each type of cement, ground slag, fly ash, and pozzolan.

2.2.1.1 Fly Ash and Pozzolan

ASTM C 618, Type F, except that the maximum allowable loss on ignition shall be 6 percent for Types F. Add with cement, if selected.

2.2.1.2 Ground Iron Blast-Furnace Slag

ASTM C 989, Grade 120, if selected.

2.2.1.3 Silica Fume

ASTM C 1240, if selected.

2.2.2 Water

Water shall comply with the requirements and Table 2 optional requirements of ASTM C 94 and the chloride and sulfate limits in accordance with ASTM D 512

and ASTM D 516. Mixing water shall not contain more than 500 parts per million of chlorides as Cl and not more than 100 parts per million of sulfates as $SO_4$. Water shall be free from injurious amounts of oils, acids, alkalies, salts, and organic materials.

2.2.3 Aggregates

ASTM C 33, except as modified herein.

a. The combined aggregates in the mixture (coarse, fine, and blending sizes) shall be well graded from the coarsest to the finest with not more than 18 percent nor less than 8 percent, unless otherwise permitted, of the combined aggregate retained on any individual sieve with the exceptions that the No. 50 may have less than 8 percent retained, sieves finer than No. 50 shall have less than 8 percent retained, and the coarsest sieve may have less than 8 percent retained. Use blending sizes where necessary, to provide a well graded combined aggregate. Reports of individual aggregates shall include standard concrete aggregate sieve sizes including 1 1/2 inches, one inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, and No. 100.

b. Provide aggregates for exposed concrete from a consistent source, ASTM C 227. Do not provide aggregates that react deleteriously with alkalies in cement. Refer to appendix, paragraph entitled "Test Method C227" of ASTM C 33 for expansion limits. Provide aggregate containing no deleterious material properties as identified by ASTM C 295.

c. Where a size designation is indicated, that designation indicates the nominal maximum size of the coarse aggregate. The largest feasible nominal maximum size aggregate specified in ASTM C 33, Class 4S shall be used. However, nominal maximum size of aggregate shall not exceed any of the following: three-fourths of the minimum cover for reinforcing bars, three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

d. Aggregate may contain materials deleteriously reactive with alkalies in the cement, if cement contains less than 0.60 percent alkalies (percent $Na_2O$ plus .658 percent $K_2O$). Provide a material such as fly ash, slag, or silica fume as specified to be effective in preventing harmful expansion due to alkali-aggregate reaction by ASTM C 441.

e. Where historical data is used, provide aggregates from the same sources having the same size ranges as those used in the concrete represented by historical data.

f. Marine aggregate may be used when conforming to ASTM C 33 and if it originates from the up-current side of the land mass and it has

been washed by the fresh water so that the total chloride and sulfate content of the concrete mixture does not exceed the limits defined herein.

2.2.4 Nonshrink Grout

A non-metallic non-shrink (no volume decrease) grout obtaining a minimum 28 day compression strength of 5,000 psi, conforming to ASTM C 1107. The grout shall be formulated consistent with the surface orientation and application.

2.2.5 Admixtures

a. Provide chemical admixtures that comply with the requirements shown below and in accordance with manufacturer's recommendations, and appropriate for the climatic conditions and the construction needs. Do not use calcium chloride or admixtures containing chlorides from other than impurities from admixture ingredients.

b. Provide minimimal concentrations of corrosion-inducing chemicals as shown in Table 2 below. For concrete that may be in contact with prestressing steel tendons, the concentration shall not exceed 60 percent of the limits given in Table 2. For the concentration in grout for prestressing ducts, do not exceed 25 percent of the limits in Table 2.

Table 2 - Limits on Corrosion-Inducing Chemicals

| Chemical* | Limits, Max. Percent** | Test Method |
|---|---|---|
| Chlorides | 0.10 | ASTM D 512 |
| Fluorides | 0.10 | ASTM D 1179 |
| Sulphites | 0.13 | ASTM D 1339 |
| Nitrates | 0.17 | ASTM D 3867 |

* Limits refer to water-soluble chemicals

** Limits are expressed as a percentage of the mass of the total cementitious materials.

c. The total alkali content shall not increase the total sodium-oxide equivalent alkali content of the concrete by more than 0.5 lb/yd3.

2.2.5.1 Air Entraining Admixture

Provide air entraining admixtures conforming to ASTM C 260.

2.2.5.2 Accelerating

ASTM C 494, Type C, if selected.

2.2.5.3 Retarding

ASTM C 494, Type B, D, or G, if selected.

2.2.5.4 Water Reducing

ASTM C 494, Type A, E, or F.

2.2.5.5 High Range Water Reducer (HRWR)

ASTM C 494, Type F and ASTM C 1017.

2.2.6 Materials for Forms

Provide wood, plywood, plastic lumber or steel. Use plywood or steel forms where a smooth form finish is required. Form material shall be sufficiently flat and rigid to meet specified construction tolerances.

2.2.7 Reinforcement

2.2.7.1 Reinforcing Bars

ACI 301 unless otherwise specified. ASTM A 615. ASTM A 706 for bars to be welded. All thread rebar shall also conform to ASTM A 615, grade 60 and shall have a maximum yield strength less than 100 ksi.

2.2.7.2 Mechanical Reinforcing Bar Connectors

ACI 301. Provide 125 percent minimum yield strength of the reinforcement bar.

2.2.8 Materials for Curing Concrete

2.2.8.1 Impervious Sheeting

ASTM C 171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap non-woven geotextile.

2.2.8.2 Pervious Sheeting

AASHTO M182.

## PART 3 - EXECUTION

### 3.1 PREPARATION FOR PLACING

Before commencing concrete placement, the following shall be performed. Surfaces to receive concrete shall be clean and free from frost, ice, mud, aquatic growth and water. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or mechanical damage shall be at the placing site, in proper working condition and in sufficient amount for the entire placement. When hot, windy conditions during concreting appear probably, equipment and material shall be at the placing site to provide windbreaks, shading fogging, or other action to prevent plastic shrinkage cracking or other damaging drying of the concrete.

3.1.1 Foundations

3.1.1.1 Concrete on Earth Foundations

Earth (subgrade, base, or subbase courses) surfaces upon which concrete is to be placed shall be clean, damp, and free from debris, frost, ice, mud, aquatic growth and standing or running water. Prior to placement of concrete, the foundation shall be well drained and shall be satisfactorily graded and uniformly compacted. Dewater as necessary.

3.1.2 Porous Concrete Pavement

Porous concrete pavement shall be finished flat and true to consistent grade and specified finish elevations (max tolerance single dip or crest 3/8" per 10') without lips or steps more than 1/8". Place over the specified 12" of compacted crushed gravel base.

## 3.2 FORMS

ACI 301. Set forms mortar-tight and true to line and grade. Below grade plywood forms or shoring/sheeting used as forms may be left in place. After placing concrete, forms shall remain in place for at least 4 days. Prevent concrete damage during form removal.

Forms may be removed earlier than specified if high early strength concrete is used and that the concrete has reached sufficient strength to allow form removal without concrete damage.

## 3.3 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI 301. Remove rust, scale, oil, grease, clay, or foreign substances from reinforcing that would reduce the bond.

3.3.1 Reinforcement Supports

Place reinforcement and secure with chairs, spacers, or plastic hangers (no uncoated steel within 3 inches of any exposed surface). Support reinforcement on the ground with plastic lumber, concrete block material below the bottom of concrete elevation.

3.3.2 Splicing

As indicated. For splices not indicated, ACI 301. Do not splice at points of maximum stress. Lap splice #4 bars 20"; #6 bars 29".

3.3.3 Cover

Concrete cover for reinforcement shall be 3 inches to main reinforcing bars; 2 inches to stirrups, unless otherwise noted. Placement tolerance shall be per ACI 347R and ACI 117.

3.3.4 Construction & Control Joints

Locate joints as approved by the Engineer to least impair strength. Continue reinforcement across joints unless otherwise indicated. Concrete surfaces at construction joints shall be rough (1/2" roughness) to enhance bond and shear friction.

## 3.4 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C 94, ACI 301, and ACI 304R, except as modified herein. Furnish mandatory batch tickets imprinted with mix identification, batch size, batch design and measured weights, moisture in the aggregates, and time batched for each load of ready mix concrete.

3.4.1 Mixing

ASTM C 94 and ACI 301. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 85 degrees F. Reduce mixing time and place concrete within 60 minutes if the air temperature is greater than 85 degrees F except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes. Additional water may be added, if both the specified maximum slump and water-cementitious material ratio are not exceeded. Field addition of water must be allowed for in the mix design. When water is added, an additional 30 revolutions of the mixer at mixing speed is required. If time of discharge exceeds time required by ASTM C 94 concrete shall be rejected. If the entrained air content falls below the specified limit the concrete shall be rejected. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch.

3.4.2 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

## 3.5 PLACING CONCRETE

Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation; in uncovered areas during periods of precipitation; or in standing water unless otherwise approved. Prior to placing concrete, remove dirt, construction debris, water, snow, and ice from within the forms. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other or lifts for vertical construction.

3.5.1 Vibration

Comply with the requirements of ACI 309R and ASTM A 934 using vibrators with a minimum frequency of 9000 vibrations per minute (VPM). Use only high cycle or high frequency vibrators. Motor-in-head 60 cycle vibrators may not be used. Provide a spare vibrator at the casting site whenever concrete is placed. Insert and withdraw vibrators approximately 18 inches apart. Penetrate at least

8 inches into the previously placed lift with the vibrator when more than one lift is required. Extract the vibrator using a series of up and down motions to drive the trapped air out of the concrete and from between the concrete and the forms.

3.5.2 Pumping

ACI 304R and ACI 304.2R. Pumping shall not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment shall not exceed 2 inches. Do not use pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of coarse aggregate to 33 percent of the diameter of the pipe. Maximum size of well rounded aggregate shall be limited to 40 percent of the pipe diameter. Discharge horizontally from pump hoses to avoid segregations and loss of air content. Take samples for testing at the discharge end. Air content tested at the pump hose discharge shall be within the specified limits.

3.5.3 Cold Weather

ACI 306.1. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover and insulate concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 5 degrees F in any one hour and 50 degrees F per 24 hours after heat application. Silica fume may be included in the mix design to allow faster strength gain in cold conditions.

## 3.6 SURFACE FINISHES

3.6.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than three square inch surface area or 0.75 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with nonshrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects which affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair.

3.6.2 Not Against Forms (Top Surfaces)

Finish surfaces not otherwise specified with a screed finish.

3.6.3 As-Cast Form

Provide form facing material producing a smooth, hard, uniform texture on the concrete. Support forms as necessary to meet required tolerances.

## 3.8 CURING AND PROTECTION

a. ACI 301 and ACI 308 unless otherwise specified. Prevent concrete from drying by misting surface of concrete and/or sheeting. Begin curing immediately following final set (typically within 1 hour). Avoid damage to concrete from vibration created by pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, by rain or running water, adverse weather conditions, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period.

Moist cure concrete using potable water for a minimum of 2 days. Begin curing within one hour of finishing. Protect concrete from premature drying, freezing, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval by the Engineer.

Concrete shall be cured for at least 2 days, or until it has reached 80% of the design strength, before transporting or applying loads.

## 3.9 FIELD QUALITY CONTROL

3.9.1 Evaluation of Mixture Designs (structural concrete)

a. Test the fresh concrete as follows:
For strength, cast 4 by 8 inch or 6 by 12 inch cylinders in accordance with ASTM C 31.

3.9.2 Sampling

a. ASTM C 172. Collect samples of fresh concrete to perform tests specified. ASTM C 31 for making test specimens.

b. Identify samples so taken in a manner that they can be segmented from other tests. Obtain at least one sample from each truck and perform one set of test samples.

3.9.3 Testing

3.9.3.1 Compressive Strength Tests

ACI 214 tests for strength - conduct strength tests of concrete during construction in accordance with the following procedures:

a. Mold and cure six cylinders from each sample taken in accordance with ASTM C 31. Prevent evaporation and loss of water from the specimen.

b. Test cylinders in accordance with ASTM C 39. Test one cylinder at 3 days, one cylinders at 7 days, one cylinder at 14 days, two cylinders at 28 days, and hold one cylinder in reserve. These time periods may be adjusted depending on the rate of strength gain of the concrete, as needed to confirm adequate strength for additional concrete loading. The compressive strength test results for acceptance shall be the average of the compressive strengths from the two specimens tested at 28 days. If one specimen in a test shows evidence of improper sampling, molding or testing, discard the specimen and consider the strength of the remaining cylinder to be the test result. Loads shall not be applied concrete beam until it has reached 4000 psi compressive strength.

c. If the average of any three consecutive strength test results is less than the specified strength (f'c) or the minimum test strength (fcr) for durability, whichever is higher, by more than 500 psi, take a minimum of three core samples in accordance with ASTM C 42, from the in-place work represented by the low test results. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with nonshrink grout.

d. Strength test reports shall include location in the work where the batch represented by a test was deposited, batch ticket number, time batched and sampled and water added on the job. Reports of strength tests shall include detailed information of storage and curing of specimens prior to testing.

e. Final reports shall be provided within 7 days of test completion.

3.9.4 Standard Molded and Cured Strength Specimens

When the averages of all sets of three consecutive compressive strength test results equal or exceed the design compressive strength (f'c) or the required field test strength (fcr) whichever is higher, and no individual strength test falls below the specified compressive strength (f'c) or the required field durability strength (fcr) by more than 500 psi, whichever is higher.

3.9.5 Non-Destructive Tests

Non-destructive tests may be used when permitted to evaluate concrete where standard molded and cured cylinders have yielded results not meeting the criteria.

3.9.6 Core Tests

When the average compressive strengths of the representative cores are equal to at least 85 percent of the design strength (f'c) or the required average test strength (fcr), whichever is higher, and if no single core is less than 75 percent of the specified strength (f'c) or the required average field test strength (fcr), whichever is higher, strength of concrete is satisfactory.

-- End of Section --

# SECTION 04400

# STONE MASONRY

## PART 1- GENERAL

### 1.1 REFERENCES

A. Refer to other divisions of these specifications, other sections in this division, and drawings for related work, which may affect the work of this section.

B. The Contract Drawings indicate and show limits of construction for this project. These specifications specify material and work requirements for this project. Both are complementary to each other, and both shall be followed to properly complete the work.

### 1.2 DESCRIPTION OF WORK

A. Work Included: The Contractor shall provide the labor, materials and equipment necessary to complete the Work of this Section, including but not limited to the following:
1. Wall work including stonework, footings and backing concrete work, weep drains, scupper drains and parking space drain.

B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. SECTION 02200 – EARTHWORK
2. SECTION 02800 – SITE IMPROVEMENTS
3. SECTION 03300 – CONCRETE

### 1.3 SUBMITTALS

Stone samples if importing stone.

### 1.4 QUALITY ASSURANCE

A. The Contractor shall provide a qualified stone mason to supervise the selection, fitting, working and placement of all stonework meeting these specifications and the intent of the project. If the Contractor is not an experienced in stone masonry, it shall employ a stone mason to supervise stone placements and ensure quality stonework construction.

### 1.5 DELIVERY AND STORAGE

Store stone at the site in a safe and stable manner. Stone shall not be stacked more than 2 stones high. Provide construction fencing and/or jersey barriers fully

around the stock pile area and sufficient signage to warn the public to stay away and off the stored stone.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Stone
All stone shall be hard durable angular igneous rock, (granite, diorite or similar) with a shape consistent with building a stable rubble stone wall, with at least 3 relatively flat surfaces and preferably a slab or block form. The stone shall be free of oil, grease, paint or other bond inhibiting deposits. The salvaged granite wall stones stock piled at the City Harvard St yard are available for contractor use on this wall, however the contractor is responsible for loading, transporting, unloading the stone and any preparation or cleanup of the stones as required (including any steel insert cutoff).

Stones with cracks or soft seams shall be considered as separate blocks, assuming that frost action will eventually open the cracks. Rounded stones will not be accepted. Stones shall be at least 5 inches wide at the narrowest point and wall stone (excluding chinking stone), shall be a minimum of 2 cubic feet in volume. Face cap stones shall be at least 6 cubic feet, excluding chinking. Exposed faces shall be selected and placed to show the straightest, flattest face(s) free of defects to the extent possible. Cap stones shall be selected to be free of longitudinal cracks, and have a relatively flat top surface with no more than 2 inches of vertical variation upon final placement.

Stone from the existing walls to be reused shall be cleaned to enhance concrete bond, including removal of seaweed/marine growth before setting, by high pressure water blasting or equivalent.

B. Chinking Stone
Chinking stone shall be of the same quality as the wall stone and be selected to best match the size and shape of the voids/gaps beings filled. The Contractor shall provide and maintain an adequate supply of chinking stone at the work site to allow for stone size and shape selection.

C. Cobble stone
Hard durable split block shape granite, gray color, size 8x4 or 9x5. If used cobble stones are provided it shall be clean and free of pavement and paint and shall not be mixed with new cobble stones.

D. Incidental Mortar/Concrete
Field mixed mortar/concrete for filling voids, leveling cap stones or other small quantity incidental concrete, consisting of 1.5 parts Type II Portland cement, 2 parts clean sand, and 3 parts coarse aggregate. Alternatively, the Contractor may use premixed bags of concrete and mortar (which utilize Type II or Type IS cement).

E. Granite Curbing
Hard durable split granite curbing, gray color, size 5x16.

## PART 3 - EXECUTION

The wall construction shall be as indicated on the drawings, with neat tight stone placement. Exposed stones shall be selected and placed to show the straightest, flattest face(s), free of defects to the extent possible. The vertical joints between stones shall be staggered at least 8 inches, between adjacent courses, so as to provide optimum interlocking. Only stone shall be exposed along the top and faces of the wall – footing and backing concrete shall not be visible above mean lower low water or above the exposed soil level. Stones shall not protrude more than 2" beyond adjacent stones at the joints and all working of exposed stone shall be by chipping (no exposed saw cut or grinder surfaces and no exposed drill holes over 1/2" diameter).

The stones shall be shaped and fit together to be stable in a dry set condition, however they may be mortar set and shall be supported with bonded cast-in-place concrete backing. The back side of stones shall be brush coated with a Portland cement/water slurry mixed to a pancake batter consistency, within 1 hour prior to placing the concrete backing. All stones shall be solidly placed and interlocked and any stone placement that allows a stone to rock or move by hand or foot pressure shall be reset. Contractor is responsible to control the concrete placements (lift heights) and/or provide temporary shoring such that the facing stones do not move or crack mortar joints during concrete placement. Stone facing shall be adequately placed or braced to allow backing concrete consolidation with a vibrator. Concrete surfaces between lifts shall be kept rough and irregular to ensure a good high friction bonded surface between lifts. Stonework shall be adequately fit and chinked such that backing concrete is not visible from the outside of the wall.

The wall cap stones in the area of the cobble stones shall have at least one transverse rebar from the concrete slab epoxy resin anchored into a drill hole in each cap stone – holes shall be dust free, clean and a minimum of 4" deep prior to anchoring the rebar.

Weep hole drain pipes and scupper drain pipes shall be fit within stone to stone joints, including whatever stone shaping, drilling is required. Pipes shall be recessed at least 1" behind the exterior stone surfaces, but with free drainage openings. Weep drain pipes shall be Tee connected to a longitudinal collection pipe of the same size bedded in the crushed stone wall backfill. Weep pipes/collection pipes shall be perforated with 3/8" dia. drill holes through both walls at a maximum of 8" on center.

Cobble stones shall be mortar set in a bond configuration parallel with the wall with pointed tight joints between 1/4” and 3/4” below the finished surface. The cobble stones surface shall be a flat surface flush with the top of the granite curbing and 2” below the top the wall cap stones. Saturate the concrete slab for at least 12 hours before mortar setting cobble stones.

Granite curb shall be set on compacted crushed gravel base with 6” thick concrete at the toe below pavement level. Set curbing for a typical uniform 7” high reveal above the pavement, except for the end returns that meet the wall cap where the reveal will be gradually increased to meet the wall cap reveal height.

- End of Section -

# SECTION 04410

# STONE RIPRAP & REVETMENT

## PART 1 - GENERAL

### 1.1 REFERENCES

SECTION 02373 GEOTEXTILE

### 1.2 SUBMITTALS

Submit the following:

Quarry stone source information. Indicate type of stone and include current photographs representative of the intended stone for this project with adequate scale to show the stone sizes. Stone supply shall be subject to inspection and approval by the Engineer as meeting specification prior to utilization.

### 1.3 DELIVERY, STORAGE, AND HANDLING

Handle delivered stone materials carefully to avoid damage to the property, including bulkhead, railings and pavements. Utilize an aggregate/sand bed to protect pavement during stone dumping and unloading.

### 1.4 QUALITY ASSURANCE

The Contractor is responsible to oversee all stone deliveries and placements to ensure all stone installed meets project specifications.

## PART 2 - PRODUCTS

### 2.1 STONE

The material used for the revetment shall be rough quarry stone free of cracks, joints, weak seams or other defects. Stone shall be hard, durable, and of such quality that it will not disintegrate on exposure to ice, seawater, wave action or weathering. It shall also be chemically stable, capable of withstanding freezing and thawing, and suitable in all other respects for the intended use. A potential stone supply shall have stone with less than 30% loss in an LA Abrasion Test (ASTM C 535); however the stone source will also be subjected to inspection by the Contractor and the Engineer to confirm the large stone is also free of weakness and defects. Disputed quality stones will be subjected to a 10 foot stone on stone drop test with the disputed stone being dropped onto a similar size or larger stone, at no additional cost to the Owner. See Contract Drawings for sizes and additional requirements. Armor stone shall be angular and roughly rectangular/block-like in shape. Rounded stones are not acceptable and thin wedge like stones are only acceptable as chinking stones. Potentially acceptable stone includes granite, diorite, basalt, quartzite, gneiss, syenite. The following rock is unlikely to be approved; schist, gabbro, pegmatite, shale, slate, sandstone, limestone.

2.1.1 Slope Revetment

Toe Stones: Minimum 3'x3'x3' (2.5 ton min., 3 ton average)
Slope Armor Stones: Minimum 3'x3'x2' (1.5 ton min., 2 ton average)
Slope Underlayer Stone: 4" to 12" with 6" average

## PART 3 - EXECUTION

### 3.1 PLACING

Before commencing stone placement, remove debris, including glass, steel, concrete and other materials which might damage the geotextile. Provide adequate ballast on generally horizontal geotextile and proper fastening on sloping and vertical geotextile to secure it in the intended locations until the stone work is complete. Provide crushed stone bedding over geotextile (minimum necessary) if sharp pointed or sharp edge armor or underlayer stone is being placed with a sharp edge/point toward the geotextile.

The rock riprap and revetment shall be placed by equipment on the surfaces and to the depths and dimensions specified. The rock shall be delivered and placed in such a manner that will insure that the stone work in-place will be dense and compact mass with the largest armor stones uniformly distributed and firmly in contact with the smaller stones and chinking (quarry spalls) filling the voids between the larger rock. Hand placement of revetment chinking stone shall be completed to insure a final surface which is tight and solid and with no voids greater than six inches (6") across present between rocks. Rock will be placed starting at the lowest elevation of a toe as shown on the drawings. Chinking stones exposed on the finished surface shall be a minimum of 12" stones and shall be stable and firmly wedged into joints.

Each revetment armor stone shall be carefully set on the stones below and adjacent, and shall follow the slope lines as shown. Adjacent stones shall be selected for size and shape and laid in contact and fit as close as possible so as to produce a reasonable minimum of voids. Individual stones shall be placed in a manner to provide maximum interlocking. Stones shall not rock or tip and shall have at least three distributed points of bearing on stones below. Stones shall be tested for rocking or tipping prior to placement of the next row of stones.

When setting stone around the existing drain outfall, use large armor stone without chinking at the pipe outfall to provide adequate void spaces for storm drain outflow and hand access for future debris removal.

Provide a step stone approximately 9"H x 11"W x 6'L on the revetment crest at one location to be selected by the owner. Set this stone in a mortar bed with chinking shim stones, level in both directions.

-- End of Section --

# SECTION 05120

# STRUCTURAL STEEL

## PART 1 - GENERAL

### 1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

| | |
|---|---|
| AISC M013 | Detailing for Steel Construction |
| AISC M016 | ASD Manual of Steel Construction |
| AISC M017 | Connections |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM A123 | (Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products |
| ASTM A153 | Zinc Coating (Hot-Dip) on Iron and Steel Hardware |
| ASTM A193 | Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications |
| ASTM A194 | Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both |
| ASTM F436 | Hardened Steel Washers |

AMERICAN WELDING SOCIETY (AWS)

| | |
|---|---|
| AWS D1.1 | Structural Welding Code - Steel |

### 1.2 SUBMITTALS

Submit the following:

Certificates
Steel

Bolts, threaded rod, nuts, railing materials

## PART 2 - PRODUCTS

### 2.1 STEEL

2.1.1 High-Strength Structural Steel
2.1.1.1 Low-Alloy Steel
ASTM A572 Grade 50; or A709 Grade 50, unless otherwise specified. Plate ASTM A36. Rod ASTM A108. Pipe ASTM A53.

### 2.2 STRUCTURAL STEEL ACCESSORIES

2.3.1 Welding Electrodes and Rods
AWS D1.1 E70XX low hydrogen for all structural welds. E60XX electrodes are permitted for non-structural seal welds.

2.3.2 Threaded rod, anchor bolts, nuts, washers
1. Bolts, threaded rod, anchor bolts, nuts, washers – stainless steel

### 2.3 GALVANIZING

ASTM A123 or ASTM A153, as applicable, unless specified otherwise galvanize after fabrication where practicable. All hot dip galvanized metals shall be touched up after installation or welding with standard cold galvanizing zinc coating.

### 2.4 FABRICATION

2.4.1 Coated Surfaces
Surfaces to receive epoxy coatings shall be cleaned and prepared in accordance with the manufacturer's recommendations.

## PART 3 - EXECUTION

### 3.1 ERECTION

After final positioning of steel members, provide full bearing under base plates and bearing plates using nonshrink grout. Place nonshrink grout in accordance with the manufacturer's instructions.

### 3.2 CONNECTIONS

Bolts, nuts, and washers shall be clean of dirt and rust, and threads lubricated with anti-seize coating prior to installation.

Any welded splices in steel members shall be full penetration groove welds.

## 3.3 WELDING

AWS D1.1, except use only E70XX low hydrogen electrodes. Grind exposed welds smooth as indicated. E60XX electrodes are permitted only for non-structural seal welds.

## 3.4 FIELD QUALITY CONTROL

3.4.1 Welds

AWS D1.1.

3.4.1.1 Visual Inspection

All welds shall be subject to review by the Engineer and if any weld does not appear in compliance with AWS D1.1, the contractor may be required to furnish the services of AWS-certified welder and/or AWS-certified welding inspector for inspection, testing, repair and verification at the contractors expense.

3.4.1.2 Nondestructive Testing

AWS D1.1. If more than 20 percent of welds made by a welder contain defects identified by visual observation and/or testing, then all welds made by that welder shall be tested by radiographic or ultrasonic testing, as approved by the Engineer. Retest defective areas after repair.

-- End of Section --

# SECTION 09968

# COATING OF STEEL STRUCTURES

## PART 1 - GENERAL

### 1.1 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

| | |
|---|---|
| ASTM D 1186 | Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base |
| ASTM E 376 | Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods |

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

| | |
|---|---|
| SSPC SP 1 | Solvent Cleaning |
| SSPC SP 3 | Power Tool Cleaning |
| SSPC SP 10 | Near-White Blast Cleaning |

### 1.2 DESCRIPTION OF WORK

Coating and touch up of all steel members/ structures installed or provided, except for underwater buried steel, stainless steel or hot dip galvanized metals.

### 1.3 SUBMITTALS

Submit the following:

Coating system product data, including manufacturer recommended surface preparation and installation procedures.

## 1.4 ENVIRONMENTAL CONDITIONS

Start work only when ambient and curing temperatures are within limits of coating manufacturer's recommendations and at least 5 degrees F above dew point temperature.

## 1.5 SAFETY AND HEALTH PRECAUTIONS

Materials listed in this section contain coal tar pitch volatiles, which are toxic. Follow safety procedures as recommended by manufacturer. Work in a well ventilated area. Provide, and require workers to use, impervious clothing, gloves, face shields (8 inch minimum), and other appropriate protective clothing necessary to prevent eye and skin contact with coating materials. Keep coatings away from heat, sparks and flame. Contractor is responsible for federal, state and local requirements for the purchase, transportation and application of specific coating products, including clean-up solvents if used.

# PART 2 - PRODUCTS

## 2.1 COATING SYSTEMS

2.1.1 Coating

Provide catalyst components for coatings specific for resin components. Use thinners which are compatible with the coating.

2.1.1.1 Zinc-Rich Primer/ Epoxy or Urethane Intermediate Coat/ Aliphatic Polyurethane Topcoat

Provide a pre-qualified coating system from the NEPCOAT QPL A or B, or equal. Coating thicknesses shall be as qualified and consistent with manufacturer’s recommendations.

# PART 3 - EXECUTION

## 3.1 CLEANING AND PREPARATION OF SURFACES

3.1.1 Solvent Cleaning

SSPC SP 1. Remove visible oil, grease, and drawing and cutting compounds by solvent cleaning.

3.1.2 Cleaning and Profiling

SSPC SP3 & SP 10. After solvent cleaning, complete surface preparation by near-white blast cleaning and power tool cleaning. Remove residual dust from blasted surface by blowing with dry, oil-free air, vacuuming, or sweeping. Provide surface profile of at least 2 1/2-mil thickness. Ease sharp edges prior to coating.

3.1.3 Touch Up and Weld Cleaning

SSPC SP1 solvent cleaning, plus mechanical surface grinding SSPC SP3 to remove sharp edges, oxidation/corrosion, welding slag and weld spatter.

## 3.2 PROPORTIONING AND MIXING OF COATING SYSTEM

3.2.1 Proportioning & Mixing of Coating SystemSystem

Per coating manufacturer's recommendations.

## 3.3 COATING APPLICATION

3.3.1 Application Method for Coating System

Unless otherwise specified by manufacturer's recommendations, do not allow drying time between coats to exceed 72 hours. Under conditions of direct sunlight or elevated ambient temperatures of 90 degrees F or greater, limit intercoat drying period to a maximum of 24 hours.

3.3.2 Repair of Defects

Repair detected coating holidays, thin areas, and exposed areas damaged prior to or during installation by surface treatment and application of additional coating or by manufacturer's recommendations.

3.3.3 Dry Film Thickness

Provide total system minimum dry film thickness in accordance with the NEPCOAT QPL and manufacturers recommendations. Measure using a magnetic gauge.

## 3.4 SURFACES TO BE COATED

3.4.1 Steel (excludes buried steel piles & rebar)

Prepare and coat all steel.

## 3.5 FIELD TESTS

Conduct testing in presence of Engineer.

3.5.1 Dry Film Thickness

After repair of holidays, measure dry film thickness using a magnetic dry film thickness gauge in accordance with ASTM D 1186 and ASTM E 376. Re-measure after an additional coat is applied, and add it to meet minimum thickness requirements.

-- End of Section --

# APPENDIX A

**Subsurface Test Borings**

**RECORD OF SUBSURFACE EXPLORATION BY STANDARD PENETRATION TEST**

Boring No.: **Test Boring B1B** Prepared by: **Waterfront Engineers LLC**

Project: **South Mill St Seawall Replacement, Portsmouth** Date of Boring: **May 14, 2009**

Drilling Company: **Miller Engineering & Testing, Inc.** Engineer: D. Mellor

| DESCRIPTION | DEPTH | BLOWS PER 6" | N | BEARING CAPACITY* | REMARKS |
|---|---|---|---|---|---|
| SURFACE 3" BIT. PAVEMENT | | 5,15 | | | |
| YELLOW BROWN SAND F-M, TRACE GRAVEL | | 15, 20 | 30 | | STONE IN TIP |
| | | | | | RIPRAP 2.5'-4' |
| YELLOW BLACK FILL SILTY GRAVEL | 5' | 8,7 | | | |
| | | 4,3 | 11 | | |
| YELLOW BLACK FILL SILTY GRAVEL | | 3,3 | | | |
| YELLOW SILTY FINE SAND | | 15,16 | 18 | | REFUSAL NO RECOV |
| AUGERED TO SOLID REF 9.5' | 10' | | | | |
| WATER IN HOLE AT 6' AT 10:45AM | | | | | |
| | 15' | | | | |
| | 20' | | | | |
| | 25' | | | | |
| | 30' | | | | |
| | 35' | | | | |
| | 40' | | | | |
| | 45' | | | | |
| | 50' | | | | |
| | 55' | | | | |

* Approximate bearing capacity by pocket penetrometer on disturbed split spoon sample, tons/sf

**RECORD OF SUBSURFACE EXPLORATION BY STANDARD PENETRATION TEST**

Boring No.: **Test Boring B2B** Prepared by: **Waterfront Engineers LLC**

Project: **South Mill St Seawall Replacement, Portsmouth** Date of Boring: **May 14, 2009**

Drilling Company: **Miller Engineering & Testing, Inc.** Engineer: D. Mellor

| DESCRIPTION | DEPTH | BLOWS PER 6" | N | BEARING CAPACITY* | REMARKS |
|---|---|---|---|---|---|
| SURFACE 2" BIT. PAVEMENT | | 7,15 | | | |
| YELLOW BROWN SAND & GRAVEL | | 16,19 | 31 | | RIPRAP |
| | | 14,5 | | | |
| | | 6,5 | 11 | | |
| FILL BROWN GRAY SILTY SAND TRACE GRAVEL | | 8,10 | | | |
| | 5' | | | | |
| FILL BROWN GRAY SILTY SAND TRACE BRICK | | 12,12 | 22 | | |
| FILL BROWN GRAY FINE SAND | | 16,13 | | | |
| | | 23,23 | 36 | | STONE IN TIP |
| YELLOW BROWN SAND & GRAVEL | | 19,13 | | | |
| | 10' | | | | |
| 1" TILL IN SPOON TIP | | 13,27 | 26 | | |
| AUGER REFUSAL 11.0' | | | | | |
| | 15' | | | | |
| | 20' | | | | |
| | 25' | | | | |
| | 30' | | | | |
| | 35' | | | | |
| | 40' | | | | |
| | 45' | | | | |
| | 50' | | | | |
| | 55' | | | | |

* Approximate bearing capacity by pocket penetrometer on disturbed split spoon sample, tons/sf

**RECORD OF SUBSURFACE EXPLORATION BY STANDARD PENETRATION TEST**

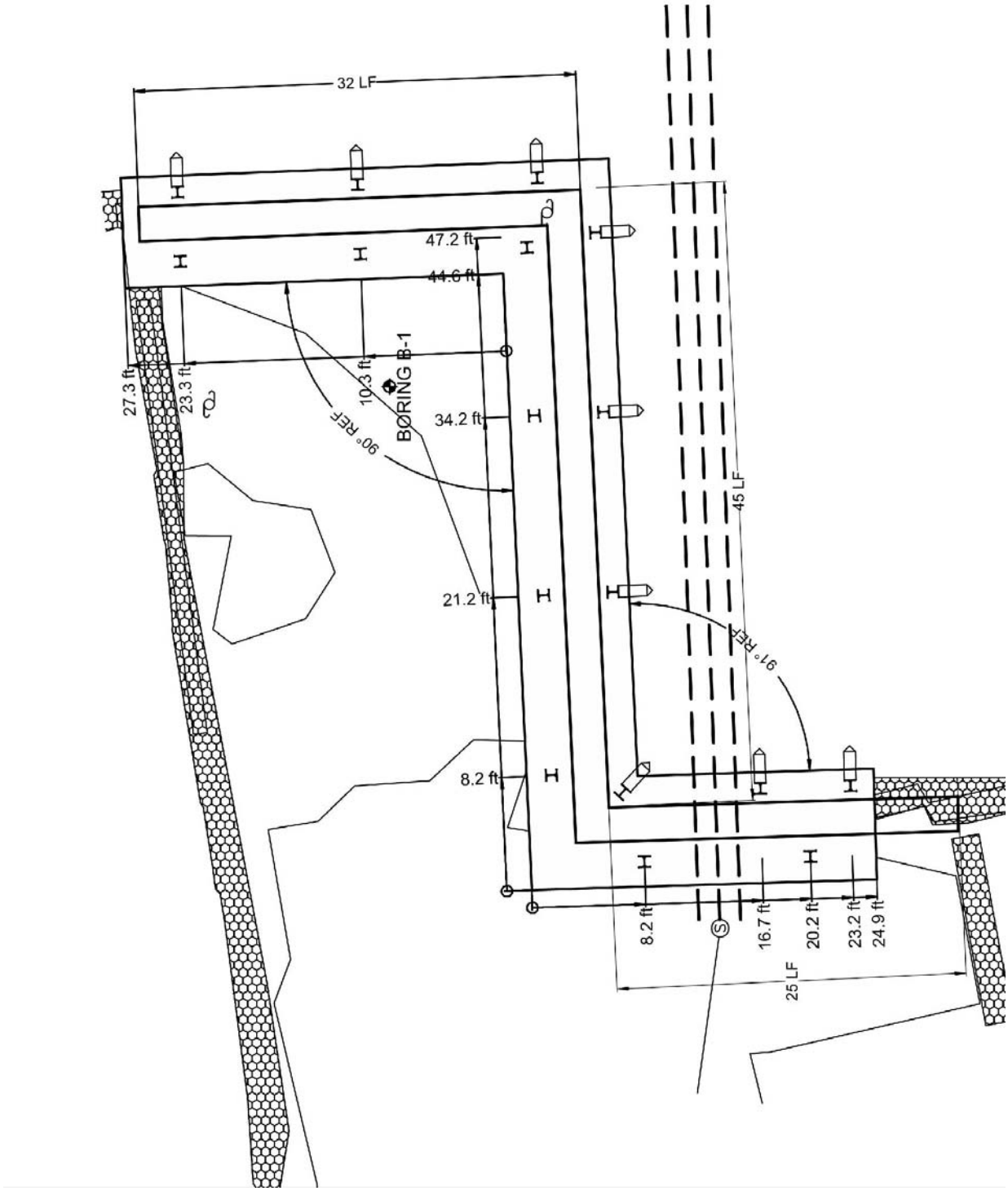
Boring No.: **Test Boring B3C** Prepared by: **Waterfront Engineers LLC**

Project: **South Mill St Seawall Replacement, Portsmouth** Date of Boring: **May 14, 2009**

Drilling Company: **Miller Engineering & Testing, Inc.** Engineer: D. Mellor

| DESCRIPTION | DEPTH | BLOWS PER 6" | N | BEARING CAPACITY* | REMARKS |
|---|---|---|---|---|---|
| SURFACE 1.5" BIT. PAVEMENT | | 10,10 | | | |
| YELLOW FILL SILTY FINE SAND TRACE GRAVEL | | 7,2 | 17 | | |
| YELLOW FILL SANDY SILT, TRACE CINDERS | | 2,2 | | | |
| YELLOW SILTY CLAY | | 2,2 | 4 | 0.5 TSF | |
| | | 1,1 | | 1.2 TSF | YELLOW CLAY |
| | 5' | | | | |
| DARK GRAY SILTY SAND | | 3,3 | 4 | | |
| GRAY SILTY FINE SAND | | 3,1 | | | |
| | | 7,4 | 8 | | PUSHING COBBLE |
| YELLOW GRAY SILTY FINE SAND TRACE ORGANICS | | | | | |
| 4" YELLOW SILT TIP | | 7,9 | | 0.7 TSF | |
| | 10' | | | | |
| YELLOW SILT | | 9,7 | 18 | | |
| YELLOW FINE SAND | | 9,19 | | | REF 12.75' |
| YELLOW TILL | | 18, REF | 37 | | |
| WEATHERED SHALE | | | | | |
| SOUND ROCK REF 14.5' | 15' | | | | |
| WATER IN HOLE 8.5' AT 9:30AM | | | | | |
| | 20' | | | | |
| | 25' | | | | |
| | 30' | | | | |
| | 35' | | | | |
| | 40' | | | | |
| | 45' | | | | |
| | 50' | | | | |
| | 55' | | | | |

* Approximate bearing capacity by pocket penetrometer on disturbed split spoon sample, tons/sf


32 LF
47.2 ft
44.6 ft
27.3 ft
23.3 ft
10.3 ft
BØRING B-1
90° REF
34.2 ft
45 LF
21.2 ft
97° REF
8.2 ft
8.2 ft
16.7 ft
20.2 ft
23.2 ft
24.9 ft
25 LF

## RECORD OF SUBSURFACE EXPLORATION BY STANDARD PENETRATION TEST

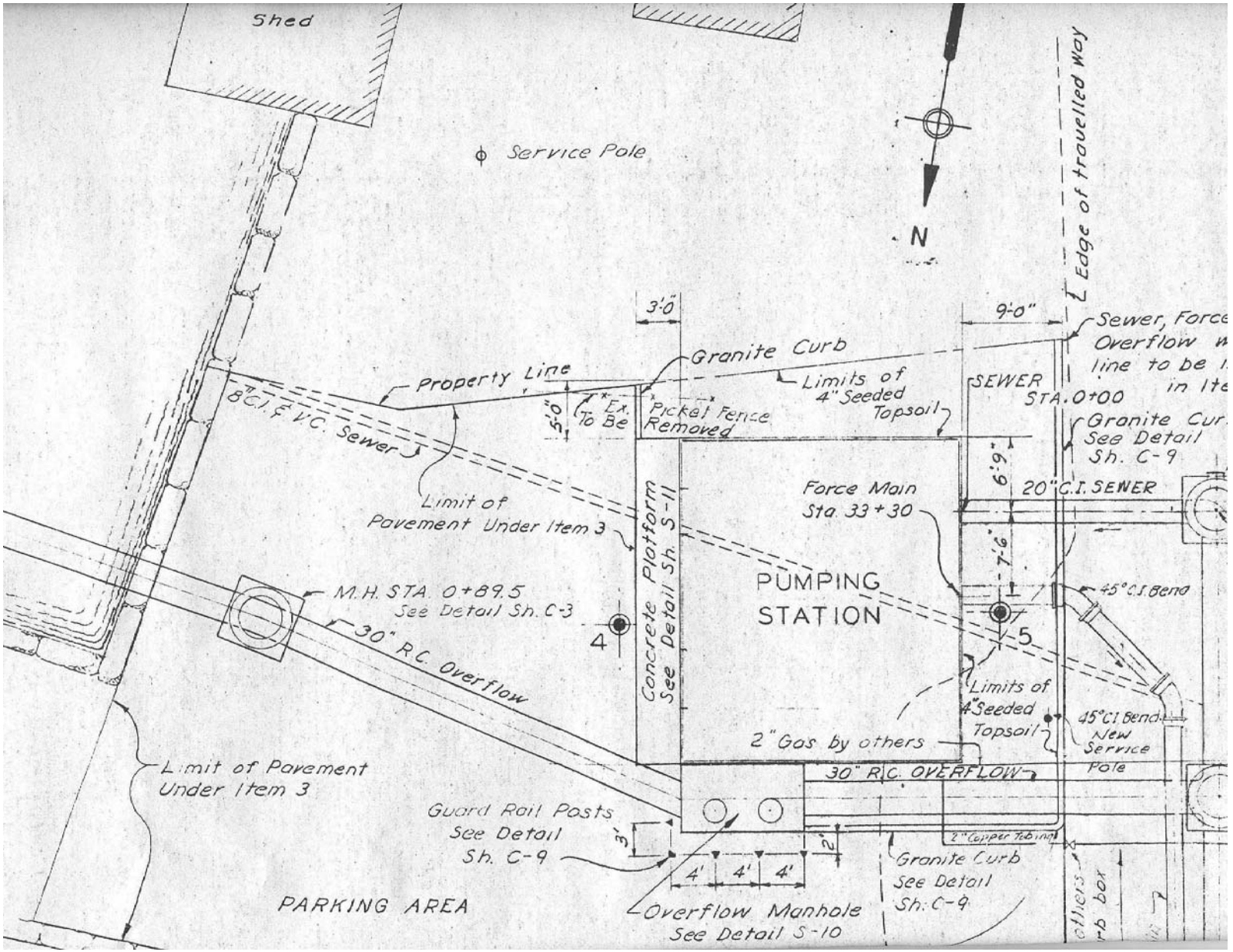
Boring No.: **Test Boring B1 (outer)** Prepared by: **Waterfront Engineers LLC**

Project: **Mechanic St Seawall Replacement, Portsmouth** Date of Boring: **May 14, 2009**

Drilling Company: **Miller Engineering & Testing, Inc.** Engineer: D. Mellor

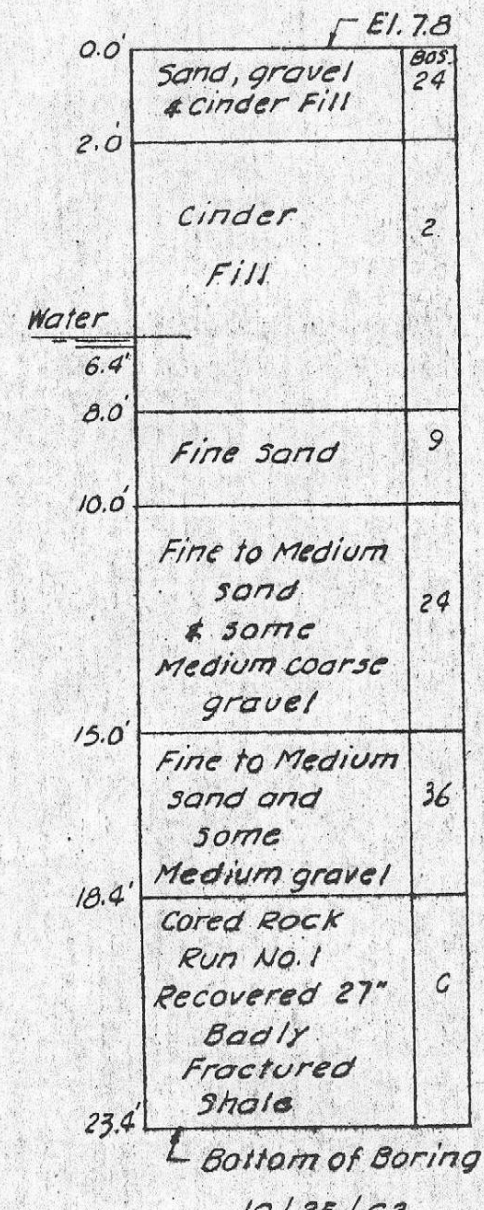
| DESCRIPTION | DEPTH | BLOWS PER 6" | N | BEARING CAPACITY* | REMARKS |
|---|---|---|---|---|---|
| SURFACE GRAVEL | | 7,10 | | | STONE IN TIP |
| BROWN GRAY GRAVEL & CRUSHED STONE | | 11,5 | 21 | | |
| FILL GRAY SILTY SAND TRACE ASH COAL | | 5,2 | | | |
| | | 3,3 | 5 | | |
| | 5' | 5,9 | | | |
| FILL BRICK CINDERS GRAVEL | | 11,8 | 20 | | |
| | | 28,5 | | | |
| BLACK FILLORGANICS WOOD SHELL FRAGMENTS | | 2,2 | 7 | | SALT MARSH ORG |
| GRAY FINE SAND | | | | | |
| | | 1,2 | | | |
| | 10' | 1,10 | 3 | 1 TSF | WOOD IN TIP |
| DARK GRAY SILTY FINE SAND | | 2,13 | | | |
| ORGANICS TRACE WOOD | | 54,15 | ? | 0.3 TSF | PUSHING STONE? |
| GRAY & YELLOW SILTY CLAY WITH FINE SAND LENSES | | 1,1 | | 0.25 TSF | |
| | 15' | | | | |
| SOFT GRAY BLUE CLAY | | 1,1 | 2 | | |
| | | WOR 24" | 0 | | |
| | | WOR,WOH | | | |
| | 20' | WOH,1 | 0 | | |
| | | WOH,3 | | | |
| GRAY SILTY FINE SAND | | 8,8 | 11 | | |
| | | WOR,3 | | | |
| | | 7,7 | 10 | | |
| | 25' | | | | |
| | | 10,15 | | | |
| GRAY FINE SAND TRACE COARSE SAND | | 18,21 | 33 | | |
| | | 9,14 | | | |
| | 30' | | | | |
| TILL YELLOW GRAY | | 27,14 | 41 | | |
| | | | | | TOP WEATHERED ROCK |
| | 35' | | | | |
| | 40' | | | | |
| | 45' | | | | |
| | 50' | | | | |
| | 55' | | | | |

* Approximate bearing capacity by pocket penetrometer on disturbed split spoon sample, tons/sf


Shed
Service Pole
N
℄ Edge of travelled way
3'0"
9'0"
Granite Curb
Property Line
Limits of 4" Seeded Topsoil
SEWER STA. 0+00
Sewer, Force
Overflow
line to be
in Ite
Granite Cur
See Detail Sh. C-9
5'0"
Ex. To Be Picket Fence Removed
8" C.I.F.V.C. Sewer
Limit of Pavement Under Item 3
Force Main Sta. 33+30
20" C.I. SEWER
6'9"
7'6"
Concrete Platform See Detail Sh. S-11
PUMPING STATION
M.H. STA. 0+89.5 See Detail Sh. C-3
4
5
45° C.I. Bend
30" R.C. Overflow
Limits of 4" Seeded Topsoil
45° C.I. Bend New Service Pole
2" Gas by others
30" R.C. OVERFLOW
Limit of Pavement Under Item 3
Guard Rail Posts See Detail Sh. C-9
3'
2'
2" Copper Tubing
4'
4'
4'
Granite Curb See Detail Sh. C-9
PARKING AREA
Overflow Manhole See Detail S-10

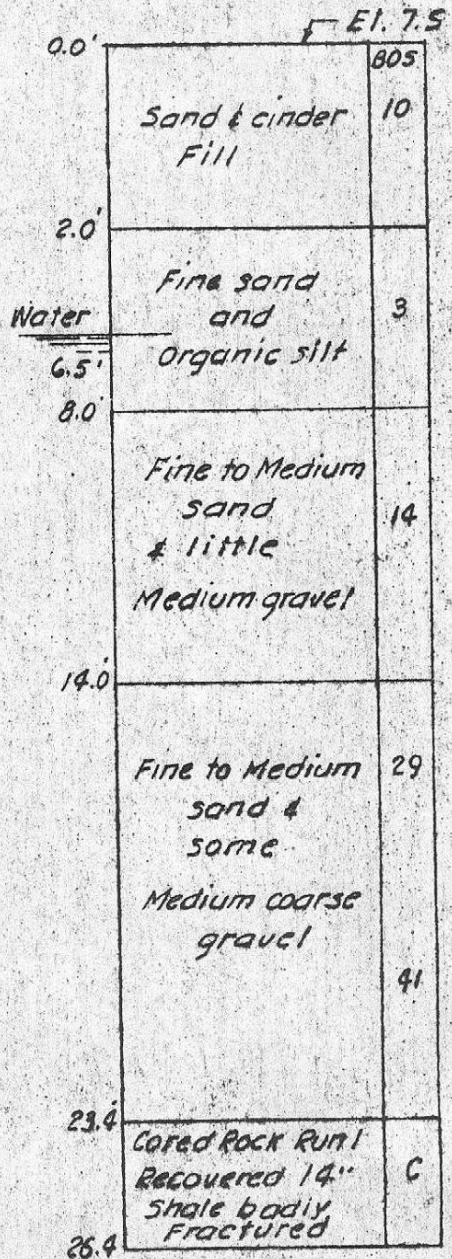
# BORINGS

## NO. 4




10/25/62

## NO. 5




10/26/62

# APPENDIX B

## Environmental Permit

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

WETLANDS AND NON-SITE SPECIFIC PERMIT 2009-01720

| | |
|---|---|
| Permittee: | City of Portsmouth - Department of Public Works<br>680 Peverly Hill Road<br>Portsmouth, NH 03801 |
| Project Location: | South Mill Street, Portsmouth<br>Portsmouth Tax Map/Lot No. 102 / ROW |
| Waterbody: | Piscataqua River & Atlantic Ocean |

NOTE - CONDITIONS

APPROVAL DATE: 04/24/2010 EXPIRATION DATE: 04/24/2015

Issued upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued. This permit shall not be considered valid unless signed as specified below.

**PERMIT DESCRIPTION:** Repair in-kind 134 linear feet of existing cut granite seawall and adjacent developed upland tidal buffer zone city street; total impact 1,800 square feet. Waive Env-Wt 304.04, Setback From Property Lines

**THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:**

1. All work shall be in accordance with plans by Watermark Engineers LLC dated 7/20/2009, as revised by DES on 7/28/2009.
2. Any further alteration of areas on this property that are within the jurisdiction of the DES Wetlands Bureau will require a new application and further permitting by the Bureau.
3. Existing stones which have fallen shall be used for repair. No additional stones other than cap stones or duplicate replacement stones that do not extend the footprint of the existing structure.
4. This permit does not allow dredging for any purpose.
5. Appropriate siltation/erosion/turbidity controls shall be in place prior to construction, shall be maintained during construction, and remain in place until the area is stabilized. Silt fence(s) must be removed once the area is stabilized.
6. Construction equipment shall be inspected daily for leaking fuel, oil and hydraulic fluid prior to entering surface waters or wetlands.
7. Faulty equipment shall be repaired prior to entering jurisdictional areas.
8. The contractor shall have appropriate oil spill kits on site and readily accessible at all times during construction and each operator shall be trained in its use.
9. All refueling of equipment shall occur outside of surface waters or wetlands.
10. Work shall be done during low tide.

**GENERAL CONDITIONS THAT APPLY TO ALL DES WETLANDS PERMITS:**

1. A copy of this permit shall be posted on site during construction in a prominent location visible to inspecting personnel;
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others;
3. The Wetlands Bureau shall be notified upon completion of work;
4. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits that may be required (see attached form for status of federal wetlands permit);
5. Transfer of this permit to a new owner shall require notification to and approval by the Department;
6. This permit shall not be extended beyond the current expiration date.
7. This project has been screened for potential impacts to known occurrences of rare species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have received only cursory inventories, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species.
8. The permittee shall coordinate with the NH Division of Historic Resources to assess and mitigate the project's effect on historic resources.

APPROVED:

Dori Wiggin, East Region Supervisor
DES Wetlands Bureau

**BY SIGNING BELOW I HEREBY CERTIFY THAT I HAVE FULLY READ THIS PERMIT AND AGREE TO ABIDE BY ALL PERMIT CONDITIONS.**

OWNER'S SIGNATURE (required) CONTRACTOR'S SIGNATURE (required)

DES Web site: www.des.nh.gov
222 International Drive, Suite 175, Portsmouth, New Hampshire 03801
Telephone: (603) 559-1500 • Fax: (603) 559-1510 • TDD Access: Relay NH 1-800-735-2964

The State of New Hampshire

**DEPARTMENT OF ENVIRONMENTAL SERVICES**

**Thomas S. Burack, Commissioner**

**WETLANDS AND NON-SITE SPECIFIC PERMIT 2009-01686**

**NOTE - WITH CONDITIONS**

| | |
|---|---|
| **Permittee:** | **City of Portsmouth - Department of Public Works**<br>**680 Peverly Hill Road**<br>**Portsmouth, NH 03801** |
| **Project Location:** | **Mechanic & Gates Streets, Portsmouth**<br>**Portsmouth Tax Map/Lot No. 103 / 30** |
| **Waterbody:** | **Piscataqua River** |

**APPROVAL DATE:** 04/24/2010 **EXPIRATION DATE:** 04/24/2015

Based upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued. This permit shall not be considered valid unless signed as specified below.

**PERMIT DESCRIPTION:** Repair in kind 102 linear feet of existing cut granite seawall and adjacent developed upland tidal buffer zone; city street; total impact 1,200 square feet.

**THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:**

1. All work shall be in accordance with plans by Waterfront Engineers LLC dated 7/20/2009, as received by DES on 7/20/2009.
2. Any further alteration of areas on this property that are within the jurisdiction of the DES Wetlands Bureau will require a new application and further permitting by the Bureau.
3. Existing stones which have fallen shall be used for repair. No additional stones other than cap stones or duplicate replacement stones that do not extend the footprint of the existing structure.
4. This permit does not allow dredging for any purpose.
5. Appropriate siltation/erosion/turbidity controls shall be in place prior to construction, shall be maintained during construction, and remain in place until the area is stabilized. Silt fence(s) must be removed once the area is stabilized.
6. Construction equipment shall be inspected daily for leaking fuel, oil and hydraulic fluid prior to entering surface waters or wetlands.
7. Faulty equipment shall be repaired prior to entering jurisdictional areas.
8. The contractor shall have appropriate oil spill kits on site and readily accessible at all times during construction and each operator shall be trained in its use.
9. All refueling of equipment shall occur outside of surface waters or wetlands.
10. Work shall be done during low tide.

**GENERAL CONDITIONS THAT APPLY TO ALL DES WETLANDS PERMITS:**

1. A copy of this permit shall be posted on site during construction in a prominent location visible to inspecting personnel;
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others;
3. The Wetlands Bureau shall be notified upon completion of work;
4. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits that may be required (see attached form for status of federal wetlands permit);
5. Transfer of this permit to a new owner shall require notification to and approval by the Department;
6. This permit shall not be extended beyond the current expiration date.
7. This project has been screened for potential impacts to known occurrences of rare species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have received only cursory inventories, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species.
8. The permittee shall coordinate with the NH Division of Historic Resources to assess and mitigate the project's effect on historic resources.

APPROVED: _____
Dori Wiggin, East Region Supervisor
DES Wetlands Bureau

**BY SIGNING BELOW I HEREBY CERTIFY THAT I HAVE FULLY READ THIS PERMIT AND AGREE TO ABIDE BY ALL PERMIT CONDITIONS.**

_____ _____
OWNER'S SIGNATURE (required) CONTRACTOR'S SIGNATURE (required)

DES Web site: www.des.nh.gov
222 International Drive, Suite 175, Portsmouth, New Hampshire 03801
Telephone: (603) 559-1500 • Fax: (603) 559-1510 • TDD Access: Relay NH 1-800-735-2964