CONTRACT DOCUMENTS AND SPECIFICATIONS

for

Brewster Street Drainage Outfall

Bid #23-15

State of New Hampshire

John P. Bohenko, City Manager

Prepared by:

City of Portsmouth
Engineering Division
Public Works Department

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City of Portsmouth
Portsmouth, New Hampshire
Department of Public Works

Brewster Street Drainage Outfall

INVITATION TO BID

Sealed bid proposals, **plainly marked, Brewster Street Drainage Outfall,** Bid Proposal #23-15 **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 **March 23, 2015** at **2:00 PM**; at which time all bids will be publicly opened and read aloud.

This project consists of the installation of drainage pipes and concrete drainage structures in, under and along the railroad tracks and rail yard between the Brewster St neighborhood and the North Mill Pond. A portion of this project involves installing underneath active rail lines and other siding rail lines 150 linear feet of a 48" steel sleeve with a 36" carrier pipe by jacking. Also the installation of the balance of the 36" ductile iron carrier drain line by open cut method from the end of the jacking sleeve and carrier pipe to the outfall headwall. The work also includes new stormwater infrastructure on the end of Brewster Street and extending the drainage system both northerly and southerly for future stormwater infrastructure. In addition, the project includes a wetlands mitigation project along the shore of the North Mill Pond.

Work may begin at any time on or after **April 15, 2015**. The Project must be Substantially Complete by **July 15, 2015**. Final Completion of the project must be by **July 31, 2015**. Liquidated damages shall be assessed at $300.00 per day. Hours of work will be 7AM to 5 PM daily with the exception of the work hours during the sleeve jacking operations. Bidders must determine the quantities of work required and the conditions under which the work will be performed.

Specifications may be obtained at the City's website: http://www.cityofportsmouth.com/finance/purchasing.htm. Any questions regarding bidding should be directed to the Purchasing Coordinator at purchasing@cityofportsmouth.com, or (603) 610-7227. Any technical questions should be directed in writing to Dave Desfosses at djdesfosses@cityofportsmouth.com. Addenda to this project, if any, including written answers to questions, will not be provided directly to vendors, but will be posted by **1:00 PM, March 19, 2015** on the City of Portsmouth Website under the project heading.

Electronic copies of the plans and specifications may be obtained off of the City's webpage. Documents are not available for pickup.

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. Also, the City 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, NH.

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, if requested, subsequent to bid opening but prior to award.

Addenda to this bid document, if any, including written answers to questions, will be posted by March 6, 2015 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, technical 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 the rejection of his 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 is not listed with the New Hampshire Department of Transportation as a pre-qualified contractor under the classification of Road Construction;
- 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 conduct such investigations of the contractor's history, financial resources, and other qualifications as it deems necessary to determine whether bidder is qualified to do the work. Bidder may be asked to execute releases. Failure to execute a release upon request may result in disqualification.

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.

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.

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

Brewster Street Drainage Outfall

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 Director of Public Works. 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:

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
201.1	CLEARING AND GRUBBING: _____DOLLARS AND _____ CENTS.	A	0.10		
202.901	HEALTH AND SAFETY PLAN: _____DOLLARS AND _____ CENTS.	UNIT	1		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
202.902	IMPLEMENTATION OF THE HEALTH AND SAFETY PLAN: (Token) _____DOLLARS AND _____ CENTS.	HR	16		
202.903	PERSONAL PROTECTION LEVEL C UPGRADE: (Token) _____DOLLARS AND _____ CENTS.	HR	100		
202.904	MONITORING/HANDLING AND STOCKPILING OF CONTAMINATED SOIL: (Token) _____DOLLARS AND _____ CENTS.	CY	200		
202.91	TREATMENT OF CONTAMINATED GROUNDWATER: (Token) _____DOLLARS AND _____ CENTS.	GAL	1,000		
203.1	COMMON EXCAVATION: _____DOLLARS AND _____ CENTS.	CY	250		
203.2	ROCK EXCAVATION: (Token) _____DOLLARS AND _____ CENTS.	CY	15		
203.6	EMBANKMENT-IN-PLACE: _____DOLLARS AND _____ CENTS.	CY	400		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
206.2	ROCK STRUCTURE EXCAVATION: (Token) _____DOLLARS AND _____ CENTS.	CY	10		
209.1	GRANULAR BACKFILL: _____DOLLARS AND _____ CENTS.	CY	50		
214	FINE GRADING: _____DOLLARS AND _____ CENTS.	SY	200		
304.3	CRUSHED GRAVEL: _____DOLLARS AND _____ CENTS.	CY	65		
403.11	HOT BITUMINOUS PAVEMENT, MACHINE METHOD: _____DOLLARS AND _____ CENTS.	TON	30		
503	DEWATERING: _____DOLLARS AND _____ CENTS.	UNIT	1		
503.111	DEWATERING AND COFFERDAM AT HEADWALL: _____DOLLARS AND _____ CENTS.	UNIT	1		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
520.12	CLASS A CONCRETE, ABOVE FOOTINGS (F) _____DOLLARS AND _____ CENTS.	CY	10		
544	REINFORCING STEEL (F): _____DOLLARS AND _____ CENTS.	LBS	1,250		
570.5	DRY RUBBLE MASONRY HEADWALL (F): _____DOLLARS AND _____ CENTS.	CY	5		
585	STONE FILL: _____DOLLARS AND _____ CENTS.	CY	25		
603.72948	48" SLEEVE JACKED UNDER RAILROAD: _____DOLLARS AND _____ CENTS.	LF	150		
603.80218	18" SPE: _____DOLLARS AND _____ CENTS.	LF	283		
603.80224	24" SPE: _____DOLLARS AND _____ CENTS.	LF	30		
603.80236	36" SPE: _____DOLLARS AND _____ CENTS.	LF	20		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
604.007	CB POLY LINER: _____DOLLARS AND _____ CENTS.	EA	3		
604.12	CATCH BASIN 4': _____DOLLARS AND _____ CENTS.	EA	3		
604.31	SEWER MANHOLE: _____DOLLARS AND _____ CENTS.	EA	1		
604.32	SPECIAL DMH (12' x 6'): _____DOLLARS AND _____ CENTS.	EA	3		
604.324	DRAIN MANHOLE 4': _____DOLLARS AND _____ CENTS.	EA	1		
604.326	DRAIN MANHOLE 6': _____DOLLARS AND _____ CENTS.	EA	1		
604.394	WATER QUALITY UNIT/TANK UNIT B: _____DOLLARS AND _____ CENTS.	EA	1		
604.395	WATER QUALITY UNIT/TANK UNIT C: _____DOLLARS AND _____ CENTS.	EA	1		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
609.5	TRANSPORT & INSTALL USED STRAIGHT CURB FOR OUTFALL PROVIDED BY CITY: _____DOLLARS AND _____ CENTS.	LF	50		
611.05015	15" DI SINGLE PIPE: _____DOLLARS AND _____ CENTS.	LF	4		
611.05018	18" DI - TWIN PIPE: _____DOLLARS AND _____ CENTS.	LF	170		
611.05024	24" DI TRIPLE PIPE: _____DOLLARS AND _____ CENTS.	LF	57		
611.05036	36" DI PIPE: _____DOLLARS AND _____ CENTS.	LF	20		
611.05136	36" DI INSIDE CASING WITH CASING SUPPORTS AND SLEEVE ENCLOSURES: _____DOLLARS AND _____ CENTS.	LF	150		
611.35218	18" STEEL SEWER CASING: _____DOLLARS AND _____ CENTS.	LF	20		
612.30015	15" PVC SEWER PIPE SDR 35: _____DOLLARS AND _____ CENTS	LF	2		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
612.30012	12" PVC SEWER PIPE SDR 35: _____DOLLARS AND _____ CENTS.	LF	75		
612.60010	10" PVC SEWER PIPE SDR 35: _____DOLLARS AND _____ CENTS	LF	8		
612.30006	6" PVC SEWER PIPE SDR 35: _____DOLLARS AND _____ CENTS.	LF	16		
612.30020	GRAVITY SEWER MAINTAINING FLOW: _____DOLLARS AND _____ CENTS.	UNIT	1		
612.30025	CONNECTION TO EXISTING FACILITIES: _____DOLLARS AND _____ CENTS.	UNIT	3		
618.7	RAILROAD FLAGGERS: ESTIMATED @ $300 DOLLARS AND NO CENTS PER DAY.	DAY	20	$850	$17000.00 ALLOWANCE (No markup allowed on this item)
619.1	MAINTENANCE OF AREA INCLUDING DUST LAYING: _____DOLLARS AND _____ CENTS.	UNIT	1		

ITEM NO.	ITEM DESCRIPTION	UNIT	EST. QUANTITY	UNIT PRICE	TOTAL PRICE
645.2	MATTING FOR EROSION CONTROL: _____DOLLARS AND _____ CENTS.	SY	200		
645.51	HAY BALES FOR TEMPORARY EROSION CONTROL: _____DOLLARS AND _____ CENTS.	EA	42		
645.531	SILT FENCE: _____DOLLARS AND _____ CENTS.	LF	125		
645.7	SWPPP: _____DOLLARS AND _____ CENTS.	UNIT	1		
645.71	MONITORING SWPPP: _____DOLLARS AND _____ CENTS.	UNIT	1		
692	MOBILIZATION (TO INCLUDE COSTS FOR RAILROAD INSURANCE AND ALL R.R. PERMITS AND FEES): _____DOLLARS AND _____ CENTS.	UNIT	1		
695	WETLAND MITIGATION: _____DOLLARS AND _____ CENTS.	UNIT	1		

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 and/or easements and agreements from one or more impacted property owners are not received.

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: _____

By: _____
Signature

Company: _____ Title: _____

_____
Business Address

_____ Telephone: _____
City, State, Zip Code

We certify that the Company is currently pre-qualified with the State of New Hampshire for Road Construction.

By: _____ _____
Signature & Title Date

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.

In order to follow the City's sustainability practices, future bid invitations/specifications may be sent electronically. Please provide an email address as to where I could email future bid invitations/specifications of this type. Thank you in advance for your cooperation.

Email Address: _____

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.
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.
15. List subcontractors for the following categories whom you will use for the following (unless this work is to be done by your own organization, in which case please state).
    a. Sleeve Jacking and Boring: _____
    b. Wetland Mitigation: _____
    c. Paving: _____
    d. Cast-In-Place Concrete:_____
    e. Other: _____

STATEMENT OF BIDDERS QUALIFICATIONS (continued)

The City reserves the right to disallow <u>any</u> subcontractor including work proposed to be completed by the General Contractor.

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 Statements are 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

Brewster Street Drainage Outfall 23-15

THIS AGREEMENT made as of the ____ day of _____ in the year 2015, by and between the City of Portsmouth, New Hampshire (hereinafter call the Owner) and _____ (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 Director of Public Works 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 work shall be completed no later than JULY 31, 2015.**

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 **three hundred dollars ($300)** 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
General Requirements, Control of Work, Temporary Facilities, Measurement and Payment, Standard Specifications
8.5 Insurance Requirements
8.6 Standard and Technical Specifications
8.7 Drawings
8.8 Special Provisions
8.9 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 –

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.

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.

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.

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

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:

Brewster Street Drainage Outfall 23-15

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: _____

Brewster Street Drainage Outfall 23-15

TO: _____

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK IN ACCORDANCE

WITH THE AGREEMENT DATED _____AND ALL

WORK SHALL BE COMPLETED BY **JULY 31, 2015**.

CITY OF PORTSMOUTH, N.H.

_____

BY: Peter H. Rice, 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: $	Original Completion Date: July 31, 2015
Contract Price prior to this Change Order: $	Contract date prior to this Change Order:
Net Increase or Decrease of this Change Order: $	Net Increase or Decrease of this Change Order:
Contract Price with all approved Change Orders: $	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: **Brewster Street Drainage Outfall**

_____
(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:

Brewster Street Drainage Outfall

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 Engineer and to his satisfaction. The 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 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 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.

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 or flaggers as the 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

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 local power 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.

ADDITIONAL INSURED

All liability policies (including any excess policies used to meet coverage requirements) shall include the City of Portsmouth, New Hampshire and the owner(s) of private property the project work will be performed on, 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) Final Pay Quantity – See NHDOT Standard Specifications Section 109.

(q) 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 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 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 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 Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

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 and without regard to any of those NHDOT provisions that allow for an adjustment for changing fuel and asphalt prices.

SPECIAL CONDITIONS

PART 1 GENERAL

1. WORKING HOURS

The CONTRACTOR shall not begin work until after 07:00 hours and no construction activities shall be allowed after 17:00 hours without prior approval of the OWNER. All cleanup and rehabilitation work shall have been completed by this hour. No work shall be allowed on weekends or holidays, as described in the General Conditions and Supplemental General Conditions.

2. CHARACTER OF THE CONTRACTOR'S SUPERINTENDENT AND WORKERS

A. The CONTRACTOR'S superintendent shall conduct himself in a professional and responsible manner. If, in the opinion of the ENGINEER, the superintendent does not conducts him/herself in a manner that is professional and courteous, the ENGINEER may recommend to the OWNER to relieve the superintendent of his/her responsibilities and have him/her removed from the project. Upon written notice from the ENGINEER, the superintendent shall immediately be relieved of his/her responsibilities and removed from the project. If a superintendent change is to be made, work shall be terminated until qualifications of a new superintendent have been submitted and approved by the OWNER and ENGINEER. The superintendent that was removed from the site shall not be allowed to work on any other portion of work in this Contract without written approval of the ENGINEER. The OWNER and ENGINEER do not take any responsibility in conduct of the superintendent or the scheduling and completion of work.

B. Any person employed by the CONTRACTOR or by any subcontractor who, in the opinion of the ENGINEER, does not conduct him/herself in a proper and professional manner or is intemperate or disorderly shall, at written request of the ENGINEER, be removed immediately by the CONTRACTOR or subcontractor employing such person, and shall not be allowed to work on any other portion of work in this Contract without written approval of the ENGINEER.

3. SEQUENCE OF CONSTRUCTION

A. A work sequence plan and detailed project schedule shall be submitted and approved by the ENGINEER and the OWNER a minimum of 14 days prior to occurrence of the work.

4. OCCUPYING PRIVATE PROPERTY

A. The CONTRACTOR shall not enter upon nor occupy with men, equipment or materials, any property outside of the public highways or easements. The CONTRACTOR shall refer to the Appendix - Easements that relate to the agreements, understandings, and conditions that shall be adhered to by the CONTRACTOR during the prosecution of the work on this project.

B. The CONTRACTOR shall be responsible to repair damage to any private property to its original condition that occurs during project work at no additional cost to the OWNER.

5. PERMITS

A. This project required a Shoreland Permit by Notification, State of New Hampshire Wetlands Permit and an Army Corps Permit. Permit applications and permits are included in the Appendix. The CONTRACTOR shall be aware of all requirements of the permits and shall include the costs to implement any and all requirement in his/her bid.

B. Any additional permits including but not limited to SWPPP permits and local construction permits must be obtained and all fees paid by the CONTRACTOR. Permit compliance and fees shall be considered subsidiary to the CONTRACTOR'S BID.

6. PRE-CONSTRUCTION VIDEO AND INSPECTION

A. The CONTRACTOR shall hire a competent professional to inspect and document by written report and video the condition of all areas and structures within the easement area of this project. This information shall be submitted to the City, 14 days prior to the start of any construction activity on the site.

7. COORDINATION WITH PAN AM RAILROAD

A. This contract requires that the CONTRACTOR perform the following work within the Pan Am railroad property. This work includes installation of a 48" dia. Steel sleeve by jack and bore method. The Contractor must adhere to all of the requirements of Pan Am Railroad as identified in the railroad specifications and standards included in APPENDIX 3.

B. **The Contractor must provide a detailed jacking plan submission for review and approval that includes identifying means, methods, materials, equipment, dewatering, trench shoring and etc. The plan must be submittal with a NH PE seal.**

8. GROUNDWATER ANALYTICAL DATA

A. Appendix 4 includes groundwater analytical data for use by the CONTRACTOR. The CONTRACTOR shall review this information and consider the potential exposure and conditions of the project relating to execution of the work to fully comply with all Local, State, and Federal requirements.

END OF SECTION

TECHNICAL SPECIFICATIONS

As noted above, the Standard Technical Specifications for this project are the Standard Specifications for Road and Bridge Construction of the State of New Hampshire Department of Transportation and any Addenda shall apply.

Additional Technical Specifications and Special Provisions for this project are attached.

Included Technical Specifications:

SUMMARY OF WORK
DIG SAFE
SUBSURFACE CONDITIONS
APPLICATIONS FOR PAYMENT
CHANGE ORDER PROCEDURES
CONTRACT COORDINATION
WATER SYSTEM PROTECTION AND REPAIR
STANDARD AND CODE-MAKING ORGANIZATIONS
PRECONSTRUCTION/PROJECT MEETINGS
PROGRESS SCHEDULES
SUBMITTAL PROCEDURES
SCHEDULE OF VALUES
QUALITY CONTROL
TESTING AND LABORATORY SERVICES FOR SOIL AND CONCRETE
TEMPORARY FACILITIES
TEMPORARY CONTROLS
ENVIRONMENTAL PROTECTION
CONSTRUCTION CLEANING
TRANSPORTATION AND HANDLING
STORAGE AND PROTECTION
PRODUCT OPTIONS AND SUBSTITUTIONS
PROJECT RECORD DOCUMENTS
DEWATERING
EXCAVATION SUPPORT
SITE PREPARATION
SLOPE PROTECTION AND EROSION CONTROL
RAILROAD CROSSING
STORM DRAINS
MISCELLANEOUS WORK AND CLEAN UP
TIDAL WETLAND MITIGATION
PRECAST CONCRETE STRUCTURES AND WATER QUALITY UNIT STRUCTURES

SUMMARY OF WORK

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Description of Work.

B. Contract type.

C. Work sequence.

D. Use of premises.

1.02 DESCRIPTION OF WORK

A. Work of this Contract comprises general construction including, but not limited to, the installation of the new 48” steel sleeve and a 36” carrier pipe by jacking method under (6) six railroad tracks at the end of Brewster Street. Installation of a 36” ductile iron drain line by open cut method from the end of the jacking sleeve and carrier pipe to the outfall headwall. The work also includes new stormwater infrastructure on Brewster Street and extending northerly and southerly for future stormwater infrastructure. In addition, the project includes wetlands mitigation along the shore of the North Mill Pond.

1.03 CONTRACT TYPE

A. Construct the Work under a Unit Price contract.

1.04 WORK SEQUENCE

A. Operation of the utilities on Brewster Street during construction. Coordinate Progress Schedule and performance with OWNER during construction.

B. Do not close off usage of or access to existing facilities and roadways during construction.

C. The CONTRACTOR is responsible for coordination of all proposed improvements to complete the project within the required contract time.

1.05 USE OF PREMISES

A. CONTRACTOR shall limit use of premises for work, for storage, and for access, to allow:

1. OWNER occupancy on OWNER'S property.

2. Normal public use of public property, rights-of-way, etc.

3. Access to private property.

B. Coordinate use of premises under direction of ENGINEER.

C. Assume full responsibility for protection and safekeeping of products under this Contract.

D. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not used

END OF SECTION

DIG SAFE

PART 1 GENERAL

1.01 DESCRIPTION

A. Comply with all regulations and laws concerning excavation, demolition or explosive work and be advised of "Dig Safe" requirements and the requirements of New Hampshire RSA 374:55.

1.02 DIG SAFE

A. Within the State, "Dig-Safe" is the name of the Utility Underground Plant Damage Prevention Authority. They are located at 331 Montvale Ave., Woburn, MA 01801. Their phone number is 1-888-344-7233.

B. The CONTRACTOR must notify "Dig-Safe" of contemplated excavation, demolition, or explosive work in public or private ways, and in any Utility Company Right of Way or Easement.

C. This notification must be made at least seventy-two (72) hours prior to the work, but not more than thirty (30) days before the contemplated work. Such notice shall set forth the name of the street or the route number of said way and an accurate description of the location and nature of the proposed work.

D. "Dig-Safe" is required to respond to the notice within seventy-two (72) hours from the time said notice is received, by designating at the locus the location of pipes, mains, wires or conduits.

E. The CONTRACTOR shall not commence work until "Dig-Safe" has responded as noted above. The work shall then be performed in such a manner, and with reasonable precautions taken to avoid damage to utilities under the surface in said areas of work.

1.03 OTHER REQUIREMENTS

A. The CONTRACTOR shall also be required to contact the local water and sewer authorities to have those utilities marked out.

B. This notification must be made at least seventy-two (72) hours prior to the work, but not more than thirty (30) days before the contemplated work. Such notice shall set forth the name of the street or the route number of said way and an accurate description of the location and nature of the proposed work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SUBSURFACE CONDITIONS

PART 1 GENERAL

1.01 DESCRIPTION

A. Borings have been done in the locations referenced in Section 1.02. References are Boring numbers, (IE: B-1 through 6) as shown in the drawings.

1.02 ADDITIONAL INFORMATION

A. The CONTRACTOR must visit the site and acquaint himself with all existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site subsurface conditions.

B. BORING LOCATIONS are as shown of the Plans.

1.03 SOIL BORING LOGS

A. Soil boring logs have been included in Appendix 1. The CONTRACTOR is considered responsible to review the soil boring information.

1.04 QUALITY ASSURANCE

A. The ENGINEER shall observe the performance of the work in connection with excavating, filling and grading and shall confer with the CONTRACTOR'S representative as to the nature of the subsurface conditions as they are revealed. However, no deviations from the Contract Documents or foundation technical design requirements shall be made without specific and written directives or change orders being initiated by the ENGINEER.

PART 2 PRODUCTS

None this Section.

PART 3 EXECUTION

None this Section.

END OF SECTION

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of Applications for Payment.

1.02 FORMAT

A. Application for Payment included at the end of this section or alternate form approved by ENGINEER.

B. For each item, by specification section number and title, provide a column for listing:

1. Item Number.
2. Description of Work.
3. Scheduled Value.
4. Previous Applications.
5. Work in Place.
6. Stored Materials.
7. Authorized Change Orders.
8. Total Work Completed.
9. Materials Stored to Date of Application.
10. Percentage of Completion.
11. Balance to Finish.
12. Retainage.

For specification sections covering more than one production or work item, list each item separately as a sub-listing to the section.

C. Submit format to be used to ENGINEER for review and approval a minimum of ten (10) days prior to the first Application for Payment.

D. For items bid as unit price items, follow bid schedule for listing component items.

1.03 PREPARATION OF APPLICATIONS

A. Review application with Resident Project Representative (RPR).

B. Type required information and execute certification by signature of authorized officer.

C. Submit each payment application to the ENGINEER for approval and submission to OWNER for payment.

D. Use data on accepted Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored materials.

E. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount the same as for an original item of Work.

F. Prepare Application for Final Payment as specified in the Contract Closeout Procedures section.

1.04 SUBMITTAL PROCEDURES

A. Submit six (6) copies of each Application for Payment on a monthly basis at times to be established at the Preconstruction Conference.

B. Applications for Payment submitted more frequently than on a monthly basis will not be considered.

1.05 SUBSTANTIATING DATA

A. When ENGINEER requires substantiating information, submit data justifying line item amounts in question.

B. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.06 PAYMENTS BY OWNER

A. The OWNER has the right to pay directly subcontractors, laborers, workmen, mechanics, material supplier and furnishers of machinery and parts thereof, equipment, power tools and all supplies, for costs incurred in the furtherance of the performance of this Contract, for which the CONTRACTOR has failed to pay, after written claim to the OWNER.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

APPLICATION FOR PAYMENT NO._____

To: CITY OF PORTSMOUTH, NEW HAMPSHIRE (OWNER)
From:_____(CONTRACTOR)
Contract: BREWSTER STREET DRAINAGE OUTFALL PROJECT
Project: BREWSTER STREET DRAINAGE OUTFALL PROJECT
OWNER's Contract No._____. ENGINEER's Project No.: 195112923
For Work accomplished through the date of: _____.

1.	Original Contract Price:	$_____
2.	Net change by Change Orders and Written Amendments (+ or -):	$_____
3.	Current Contract Price (1 plus 2):	$_____
4.	Total completed and stored to date:	$_____
5.	Retainage (per Agreement):	
	10% of completed Work: $_____	
	10% of stored material: $_____	
	Total Retainage:	$_____
6.	Total completed and stored to date less retainage (4 minus 5):	$_____
7.	Less previous Application for Payments:	$_____
8.	**DUE THIS APPLICATION (6 MINUS 7):**	$_____

Accompanying Documentation:

CONTRACTOR'S Certification:

The undersigned CONTRACTOR certifies that (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied on account to discharge CONTRACTOR's legitimate obligations incurred in connection with Work covered by prior Applications for Payment numbered 1 through _____ inclusive; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to OWNER indemnifying OWNER against any such Lien, security interest or encumbrance); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and not defective.

Dated_____ _____
CONTRACTOR

By:_____

State of _____
County of _____
Subscribed and sworn to before me this ____
day of _____ , _____

_____
Notary Public
My Commission expires: _____

Payment of the above AMOUNT DUE THIS APPLICATION is recommended.

Dated _____ _____
ENGINEER

By: _____

Bid Proposal #23-15

Application No._____ Date:_____

ITEM	UNIT PRICE	ESTIMATED QUANTITY	SCHEDULE OF VALUES AMOUNT	QUANTITY COMPLETED	AMOUNT	%	MATERIAL STORED	AMOUNT COMPLETED AND STORED
1.	$		$		$		$	$
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								
21.								
22.								
23.								
24.								
25.								
26.								
27.								
28.								
29.								
30.								
TOTAL								

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Promptly implement change order procedures.

1. Provide full written data required to evaluate the time and associated costs of changes.
2. Maintain detailed records of work done on a time-and-material/ force account basis.
3. Provide full documentation to ENGINEER.

B. Designate in writing the member of CONTRACTOR'S organization:

1. Who is authorized to accept changes in the work.
2. Who is responsible for informing others in the CONTRACTOR'S employ of the authorization of changes in the work.

C. OWNER will designate in writing the person who is authorized to execute Change Orders.

1.02 DEFINITIONS

A. Change Order: Formal change to the Contract.

B. Work Directive Change: A written order to the CONTRACTOR, signed by OWNER and ENGINEER, which amends the Contract Documents as described, and authorizes CONTRACTOR to proceed with a change which affects the Contract Price or the Contract Time, for inclusion in a subsequent Change Order.

C. Field Order: The ENGINEER may issue, as required, a written order, instructions, or interpretations, signed by ENGINEER making minor changes in the Work not involving a change in Contract Price or Contract Time.

1.03 PRELIMINARY PROCEDURES

A. OWNER or ENGINEER may initiate changes by submitting a proposal request to CONTRACTOR. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress. Request will include:

1. Detailed description of the change, products, and location of the change in the Project.
2. Supplementary or revised Drawings and Specifications.
3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.
4. A specific period of time during which the requested price will be considered valid.

B. CONTRACTOR may initiate changes by submitting a written notice to ENGINEER, containing:

1. Description of the proposed changes.
2. Statement of the reason for making the changes.
3. Statement of the effect on the Contract Price and the Contract Time.
4. Statement of the effect on the work of subcontractors or other contractors.
5. Documentation supporting any change in Contract Price and/or Contract Time, as appropriate.

1.04 WORK DIRECTIVE CHANGE

A. In lieu of proposal request, OWNER and ENGINEER may issue a Work Directive Change ordering the

CONTRACTOR to proceed with a change for subsequent inclusion in a Change Order.

B. The Work Directive Change will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Price and/or Contract Time.

C. OWNER and ENGINEER will sign and date the Work Directive Change as authorization for the CONTRACTOR to proceed with the changes.

D. CONTRACTOR may sign and date the Work Directive Change to indicate agreement with the terms therein.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data including labor, equipment, overhead and profit to allow ENGINEER to evaluate the quotation.

B. On request provide additional data to support time and cost computations:

1. Labor required.
2. Equipment required.
3. Products required.
    a. Recommended source of purchase and unit cost.
    b. Quantities required.
4. Taxes, insurance and bonds.
5. Credit for work deleted from Contract, similarly detailed and documented.
6. Overhead and profit in accordance with the Specification.
7. Justification for any change in Contract Time. Justification shall include a revised project schedule identifying the impact of the change.

C. Support each claim for additional costs, and for work done on a time-and-material basis, with documentation as required for a lump-sum proposal, plus additional information:

1. Name of the OWNER'S authorized agent who ordered the work, and date of the order.
2. Dates and times work was performed, and by whom.
3. Time record, summary of hours worked, and hourly rates paid (Certified Payroll).
4. Receipts and invoices for:
    a. Equipment used, listing dates and times of use, and hourly rates.
    b. Products used, listing of quantities and receipted bills.
    c. Subcontractor’s billings and description of work performed.

D. Document requests for substitutions for Products as specified in the Product Option and Substitution section.

1.06 PREPARATION OF CHANGE ORDERS

A. ENGINEER will prepare each Change Order.

B. Form: Change Order: Form included herein.

C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.

D. Change Order will provide an accounting of the adjustment in the Contract Price and/or Contract Time.

1.07 LUMP-SUM OR FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. ENGINEER'S proposal request and CONTRACTOR'S responsive proposal as mutually agreed between OWNER and CONTRACTOR.

2. CONTRACTOR'S proposal for a change, as recommended by ENGINEER.

B. OWNER will sign and date the Change Order as authorization for the CONTRACTOR to proceed with the changes.

C. CONTRACTOR shall sign and date the Change Order to indicate agreement with the terms therein.

1.08 UNIT PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:

1. ENGINEER'S definition of the scope of the required changes.

2. CONTRACTOR'S proposal for a change, as recommended by ENGINEER.

3. Measurement of completed work.

B. The amounts of the unit prices to be:

1. Those stated in the Agreement.

2. Those mutually agreed upon between OWNER and CONTRACTOR.

C. When quantities of each of the items affected by the Change Order can be determined prior to start of the Work:

1. OWNER will sign and date the Change Order as authorization for CONTRACTOR to proceed with the changes.

2. CONTRACTOR shall sign and date the Change Order to indicate agreement with the terms therein.

D. When quantities of the items cannot be determined prior to start of the Work:

1. OWNER and ENGINEER will issue a Work Directive Change directing CONTRACTOR to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.

2. At completion of the change, ENGINEER will determine the cost of such work based on the unit prices and quantities used. CONTRACTOR shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.

3. ENGINEER will sign and date the Change Order to establish the ENGINEER'S recommended change in Contract Price and in Contract Time.

4. OWNER will sign and date the Change Order as authorization.

5. CONTRACTOR shall sign and date the Change Order to indicate agreement with the terms therein.

1.09 TIME AND MATERIAL WORK DIRECTIVE CHANGE AND CHANGE ORDER

A. OWNER and ENGINEER will issue a Work Directive Change directing CONTRACTOR to proceed with the changes.

B. At completion of the change, CONTRACTOR shall submit itemized accounting and supporting data as provided in paragraph 1.05 Documentation of Proposals and Claims.

C. ENGINEER will recommend the allowable cost of such work.

D. ENGINEER will sign and date the Change Order to establish the ENGINEER'S recommended change in Contract Price and in Contract Time.

E. OWNER will sign and date the Change Order as authorization.

F. CONTRACTOR shall sign and date the Change Order to indicate their agreement therewith.

1.10 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Price.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise sub-schedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

CONTRACT COORDINATION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The GENERAL CONTRACTOR shall be responsible for coordination of Work required by the Contract.

1.02 DESCRIPTION

A. Coordinate scheduling, submittals, and work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.

1.03 MEETINGS

A. In addition to project meetings specified in Preconstruction/Project Meetings, hold coordination meetings and pre-installation conferences with personnel and subcontractors to assure coordination of Work.

1.04 COORDINATION OF SUBMITTALS

A. Schedule and coordinate submittals as specified.

B. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing equipment in service.

C. Coordinate requests for substitutions from all subcontractors to assure compatibility of space, of operating elements, and effect on work of other sections.

1.05 COORDINATION OF CONTRACT CLOSEOUT

A. Coordinate completion and cleanup of work in preparation for Substantial Completion.

B. After OWNER occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, in a manner that minimizes disruption of OWNER'S activities.

C. Assemble and coordinate closeout submittals specified.

1.06 COORDINATION WITH OTHER CONTRACTORS

A. Cooperate with other contractors working within the same site or on adjacent sites.

B. Coordinate the Work of this Contract with other contractors so as not to interfere with or hinder the progress or completion of the work being performed by other contractors.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

WATER SYSTEM PROTECTION AND REPAIRS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Coordinating construction with the OWNER.
B. Locating water mains and services.
C. Protecting existing water system.
D. Maintaining water system repair materials inventory.
E. Repairing broken water mains.
F. Repairing broken water services.
G. Backfilling around water mains and services.

1.02 REFERENCE STANDARDS

A. ANSI A21.4/AWWA C104 - Cement-Mortar Lining for Ductile-Iron and Grey-Iron Pipe and Fittings for Water.
B. ANSI A21.10/AWWA C110 - Grey-Iron and Ductile-Iron Fittings, 3 Inch Through 48 Inch, for Water and Other Liquids.
C. ANSI A21.11/AWWA C111 - Rubber-Gasket Joints for Ductile-Iron and Grey-Iron Pressure Pipe and Fittings.
D. ANSI A21.51/AWWA C151 - Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds for Water and Other Liquids.
E. ANSI A21.53/AWWA C153 - Ductile Iron Compact Fittings, 3 Inch through 12 Inch, for Water and Other Liquids.
F. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
G. AWWA C504 - Rubber-Seated Butterfly Valves.
H. AWWA C509 - Resilient Seated Gate Valves, 3 Through 12 NPS, for Water and Sewage Systems.
I. AWWA C515 – Reduced Wall Resilient Seated Gate Valves for Water Supply Service
J. AWWA C550 – Protective Epoxy Coatings for Valves and Hydrants
K. AWWA C515- Reduced Wall, Resilient Seated Gate Valves For Water Supply Service.
L. AWWA C550 - Protective Interior Coatings for Valves and Hydrants.

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with Section 01340 - Shop Drawings, Product Data, and Samples.

1.04 LOCATING AND PROTECTING EXISTING WATER SYSTEM

A. The existing water system in the construction areas shall be protected at all times during construction.
B. The location of the water system shown on the plans is based on available existing information. The OWNER does not warrant this information to be correct and it shall be the responsibility of the CONTRACTOR to properly locate all water mains and services prior to construction.

1.05 NOTICE OF WATER MAIN AND SERVICE BREAKS

A. Upon breaking or damaging an existing water main or service the CONTRACTOR shall immediately notify the ENGINEER and/or the OWNER. The ENGINEER will coordinate with OWNER to identify which valves shall be closed to isolate the break.
B. No part of water system shall be without water service unless authorized by the OWNER.

PART 2 PRODUCTS

2.01 ACCEPTABLE MATERIALS AND MANUFACTURERS

A. All materials and equipment to repair the existing water distribution system shall conform to the requirements of the City.
B. All water system components provided under this work shall comply with the City of Portsmouth standard specifications for water systems.

PART 3 EXECUTION

3.01 GENERAL

A. All broken and disturbed water mains and house services shall be repaired immediately. All materials and methods of repair shall be in accordance with these specifications.
B. If repairs cannot be made in a timely fashion, the CONTRACTOR shall install temporary water service to all affected water system users at no additional cost to the OWNER.

3.02 EXCAVATION NEAR WATER MAINS AND SERVICES

A. The CONTRACTOR shall exercise extreme care when excavating near existing water utilities.
B. Protect all utilities by bracing, shoring, underpinning, and other methods to prevent pipes from shifting and settling.
C. When backfilling around the existing services or pipes the CONTRACTOR shall use materials and compaction in accordance with NHDOT Standard Specifications. All material around pipes shall be thoroughly tamped to support pipe.
D. As the excavation approaches pipe, digging by machinery shall be discontinued and the excavation shall be done by means of hand tools. Such manual excavation shall be included in the work to be done under items involving normal excavation.

3.03 REPAIR OF BROKEN WATER MAINS

A. If a water main is broken, the CONTRACTOR shall carefully excavate around the break to determine the extent of repairs required. All repairs must be approved by the ENGINEER.
B. All repair sleeves, clamps and couplings shall be installed in accordance with manufacturer's instructions. If a section of pipe must be replaced, it shall be neatly cut at least two feet on either side of visible damage and shall be replaced with a section of new ductile iron pipe and couplings.
C. The repair shall be inspected for visible leaks before backfilling. No backfilling shall be done until the repair is approved by the ENGINEER.
D. Backfilling around the repair shall be in accordance with NHDOT Standard Specifications.

3.04 REPAIR OF BROKEN WATER SERVICES

A. If a water service is broken, the CONTRACTOR shall excavate to the main corporation to determine if the corporation has been disturbed.
B. If the corporation has been disturbed, the CONTRACTOR shall replace the corporation with a service saddle (if required), corporation, copper pipe and shall connect to the existing service at a point acceptable to the ENGINEER. A gooseneck shall be installed in the copper service pipe.
C. Where required, the CONTRACTOR shall furnish and install a new curb stop and box in a location acceptable to the ENGINEER.
D. The ENGINEER shall approve all repairs prior to backfilling.
E. Backfilling shall be in accordance with NHDOT Standard Specifications.

3.05 CASTINGS

A. All water main valve and curb boxes shall be located and adjusted to finished grade after backfilling and prior to final paving.

END OF SECTION

STANDARD AND CODE-MAKING ORGANIZATIONS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Acronyms used in Contract Documents for Reference Standards.

B. Source of Reference Standards.

1.02 QUALITY ASSURANCE

A. The date of the standard is that in effect as of the Bid date.

B. Reference standards shall not act to increase the ENGINEER'S or OWNER'S responsibility or authority over that specified under the Bidding and Contract Requirements.

1.03 SCHEDULE OF REFERENCES

This list is provided for informational purposes.

AA	Aluminum Association 900 19th Street, N.W., Suite 300 Washington, DC 20006
AABC	Associated Air Balance Council 1518 K Street, N.W. Washington, DC 20005
AAMA	Architectural Aluminum Manufacturers Association 2700 River Road, Suite 118 Des Plains, IL 60018
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, N.W. Washington, DC 20001
ACA	American Chain Association 152 Rollins Avenue, Suite 208 Rockville, MD 20852
ACI	American Concrete Institute P.O. Box 19150 Detroit, MI 48219
ADC	Air Diffusion Council 230 North Michigan Avenue Chicago, IL 60611

AGMA	American Gear Manufacturers Association 1500 King Street, Suite 201 Alexandria, VA 22314
AGC	Associated General Contractors of America 1957 E Street, N.W. Washington, DC 20006
AHA	American Hardboard Association 520 N. Hicks Road Palatine, IL 60067
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AIA	The American Institute of Architects 1735 New York Avenue, NW Washington, DC 20006
AISC	American Institute of Steel Construction, Inc. 400 N. Michigan Avenue, 8th Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
AITC	American Institute of Timber Construction 333 W. Hampden Avenue Englewood, CO 80110
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute, Inc. 1430 Broadway New York, NY 10018
AOAC	Association of Official Agricultural Chemists 1111 N. 19th Street, Suite 210 Arlington, VA 22209
APA	American Plywood Association P.O. Box 11700 Tacoma, WA 98411
ARI	Air-Conditioning and Refrigeration Institute 1501 Wilson Blvd. Arlington, VA 22209

ASAE	American Society of Agricultural Engineers 2950 Niles Road St. Joseph, MI 49085
ASCE	American Society of Civil Engineers 345 East 47th Street New York, NY 10017-2398
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASPA	American Sod Producers Association 1855-A Hicks Road Rolling Meadows, IL 60008
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWI	Architectural Woodwork Institute 2310 South Walter Reed Drive Arlington, VA 22206
AWPA	American Wood Preservers Association P.O. Box 849 Stevensville, MD 21666
AWPB	American Wood Preservers Bureau P.O. Box 5283 Springfield, VA 22150
AWS	American Welding Society 550 NW LeJeune Road, N.W. P.O. Box 351040 Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
BOCA	Building Officials and Code Administrators International, Inc. 4051 West Flossmoor Road Country Club Hills, IL 60477

CDA	Copper Development Association Greenwich Office Park 2 Box 1840 Greenwich, CT 06836
CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Road, Suite 203 McLean, VA 22101
CLFMI	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue, N.W., Suite 700 Washington, DC 20036
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
CSI	Construction Specifications Institute 601 Madison Street Alexandria, VA 22314
DFPA	Douglas Fir Plywood Association
DHI	Door and Hardware Institute 7711 Old Springhouse Road McLean, VA 22102
DIPRA	Ductile Iron Pipe Research Association 245 Riverchase Parkway East Suite 0 Birmingham, AL 35244
DOC	United States Department of Commerce National Bureau of Standards Gaithersburg, MD 20899
EJCDC	Engineer's Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association 25 N. Broadway Tarrytown, NY 10591
ETL	Electrical Testing Laboratories, Inc. Industrial Park Cortland, NY 13045
FGMA	Flat Glass Marketing Association 3310 Harrison White Lakes Professional Building Topeka, KS 66611

FM	Factory Mutual Engineering Corporation Standards Laboratories Department 1151 Boston-Providence Turnpike Norwood, MA 02062
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association 1603 Orrington Avenue, Suite 1210 Evanston, IL 60201
IEEE	Institute of Electrical and Electronics Engineers 345 East 47th Street New York, NY 10017
IMI	International Masonry Institute 823 15th Street, N.W. Washington, DC 20005
MDPW	Commonwealth of Massachusetts Department of Public Works 100 Nashua Street Boston, Ma 02114
MBMA	Metal Building Manufacturers Association 1230 Keith Building Cleveland, OH 44115
MFMA	Maple Flooring Manufacturers Association 60 Revere Drive, Suite 500 Northbrook, IL 60062
MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
ML/SFA	Metal Lath/Steel Framing Association Division 600 S. Federal Street, Suite 400 Chicago, IL 60605
NAAMM	National Association of Architectural Metal Manufacturers 600 S. Federal Street, Suite 400 Chicago, IL 60605
NBHA	National Builder's Hardware Association

NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
NCMA	National Concrete Masonry Association P.O. Box 781 Herndon, VA 22070
NEMA	National Electrical Manufacturers' Association 2101 L Street, N.W. Washington, DC 20037
NFPA	National Fire Protection Association Batterymarch Park Quincy, MA 02269
NFPA	National Forest Products Association 1250 Connecticut Avenue, N.W. Washington, DC 20036
NHDES	New Hampshire Department of Environmental Services 6 Hazen Drive Concord, NH 03301
NHDOT	New Hampshire Department of Transportation John O. Morton Building Concord, NH 03301
NRCA	National Roofing Contractors Association 6250 River Road Rosemount, IL 60018
NSWMA	National Solid Wastes Management Association 1730 Rhode Island Avenue, N.W. Suite 1000 Washington, D.C. 20036
NTMA	National Terrazzo and Mosaic Association 3166 Des Plaines Avenue, Suite 132 Des Plaines, IL 60018
OSHA	Occupational Safety and Health Administration 1 Aster Place Room 3445 1515 Broadway New York, NY 10036
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
PCI	Prestressed Concrete Institute 175 W. Jackson Blvd. Chicago, IL 60604

PS	Product Standard U. S. Department of Commerce Washington, DC 2020
RD	U.S. Department of Agriculture Rural Development Montpelier, VT 05602
RIS	Redwood Inspection Service 591 Redwood Highway, Suite 3100 Mill Valley, CA 94941
RCSHSB	Red Cedar Shingle and Handsplit Shake Bureau 515 116th Avenue, N.E., Suite 275 Bellevue, WA 98004
SAE	Society of Automotive Engineers 400 Commonwealth Drive Warrendale, PA 15096
SDI	Steel Deck Institute P.O. Box 9506 Canton, OH 44711
SDI	Steel Door Institute c/o A.P. Wherry and Associates, Inc. 712 Lakewood Center North 14600 Detroit Avenue Cleveland, OH 44107
SIGMA	Sealed Insulating Glass Manufacturers Association 111 East Wacker Drive Chicago, IL 60601
SJI	Steel Joist Institute 1205 48th Avenue North, Suite A Myrtle Beach, SC 29577
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association P.O. Box 70 Merrifield, VA 22116
SPIB	Southern Pine Inspection Bureau 4709 Scenic Highway Pensacola, FL 32504
SSPCSteel	Structures Painting Council 4400 Fifth Avenue Pittsburgh, PA 15213

SSSA	Soil Science Society of America 677 S. Segoe Road Madison, WI 53711
TAS	Technical Aid Series Construction Specifications Institute 1150 Seventeenth Street, N.W. Washington, DC 20036
TCA	Tile Council of America, Inc. P.O. Box 326 Princeton, NJ 08540
UL	Underwriters' Laboratories, Inc. 333 Pfingsten Road Northbrook, IL 60062
UNI-B	Uni-Bell PVC Pipe Association 2655 Villa Creek Drive, Suite 150 Dallas, TX 75234
WCLIB	West Coast Lumber Inspection Bureau Box 23145 Portland, OR 97223

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

PRECONSTRUCTION/PROJECT MEETINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. CONTRACTOR participation in preconstruction conferences.

B. CONTRACTOR participation in progress meetings.

1.02 PRECONSTRUCTION CONFERENCE

A. ENGINEER will schedule preconstruction conference within fifteen (15) days after Notice of Award.

B. Attendance: OWNER, ENGINEER, Railroad Representative(s), state and/or federal agency representatives, local authorities and CONTRACTOR.

C. Agenda:

1. Submittal of executed bonds and insurance certificates.
2. Execution of Contract.
3. Distribution of Contract Documents.
4. Submittal of list of subcontractors, list of products proposed for installation, schedule of values, and progress schedule.
5. Designation of responsible personnel.
6. Submittal of list of products proposed for substitution.
7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, change orders, and Contract closeout procedures.
8. Scheduling and critical work sequencing.
9. Coordination with other contracts and/or work.
10. Use of premises by OWNER and CONTRACTOR.
11. Construction facilities and controls provided by CONTRACTOR.
12. Construction facilities and controls provided by OWNER.
13. Field engineering.
14. Preconstruction Survey.
15. Major equipment deliveries and priorities.
16. Project inspection.
17. Labor requirements.
18. Rights-of-way and easements.
19. Winter maintenance.
20. Security and housekeeping procedures.
21. Payments to CONTRACTOR.
22. Procedures for testing.
23. Procedures for maintaining record documents.
24. Requirements for start-up of equipment.

25. Inspection and acceptance of equipment put into service during construction period.
26. Substantial completion of Work.
27. Final completion of Work.
28. Project Safety

1.03 PROGRESS MEETINGS

A. ENGINEER will schedule and administer progress meetings at least once per month throughout progress of the Work.

B. ENGINEER will make physical arrangements for meetings, prepare agenda, notify CONTRACTOR as to whether Subcontractor's or supplier's representatives should attend, preside at meetings, record minutes, and distribute copies of minutes to participants within two (2) weeks after meeting.

C. Attendance: CONTRACTOR'S Superintendent or authorized representative, representatives of major subcontractors and suppliers; ENGINEER; and other representatives as appropriate to agenda topics for each meeting.

D. Tentative Agenda:

1. Review of Work progress.
2. Review of progress schedule.
3. Delivery schedules.
4. Submittals.
5. Pending changes and substitutions.
6. Permit compliance.
7. Subcontractor's progress.
8. Other items affecting progress of Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

PROGRESS SCHEDULES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of construction Progress Schedules and periodic updating.

1.02 FORMAT

A. Prepare Schedules as a horizontal bar chart or network with separate bar or node for each major portion of Work or operation, identifying first work day of each week and identifying each portion of the Work that is critical to timely project completion. All project scheduling shall be prepared using critical path method analysis.

B. Sequence of Listings: The chronological order of the start of each item of Work.

C. Scale and Spacing: Provide space for notations and revisions.

D. Sheet Size: Multiple of 22 x 34 inches.

1.03 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction and total activity duration.

B. Identify each item by major specification section number.

C. Specifically identify activity predecessors (ie. which activities must be completed before following activity can start).

D. Identify work of separate stages or separate floors, and other logically grouped activities.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the last day of each month.

F. Provide separate schedule of submittal dates for shop drawings, product data and samples, and dates reviewed submittals will be required from ENGINEER. Show decision dates for selection of finishes.

G. Coordinate content with the Schedule of Values.

H. CONTRACTORS shall not engage in float manipulations which have the net effect of sequestering float time. Examples of networking techniques disallowed under this provision includes such strategies as extending time duration estimates, and scheduling items required for final completion as though they were prerequisites to substantial completion.

I. Schedule must identify length of work week; length of work day; and anticipated holidays.

1.04 REVISIONS TO SCHEDULES

A. Indicate progress of each activity to date of submittal, and projected completion date of each activity.

B. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

C. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

1.05 SUBMITTALS

A. Submit initial schedules at the preconstruction conference. After review, resubmit required revised data within ten (10) days.

B. Submit revised progress schedules for review and approval, at a minimum, with each application for payment, or whenever, in the ENGINEER'S opinion, sufficient progress slippage warrants a more timely

update.

C. Submit six (6) copies; three (3) copies which will be retained by ENGINEER; the other three (3) copies will be returned to the CONTRACTOR.

1.06 DISTRIBUTION

A. Distribute copies of reviewed schedules to job site file, subcontractors, suppliers, and other concerned entities.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.

B. Shop drawings.

C. Samples.

1.02 SUBMITTAL PROCEDURES

A. Transmit each submittal with Owner's Representative accepted form.

B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project, and deliver to Owner's Representative at business address. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Owner's Representative review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

1.03 OWNER'S REPRESENTATIVE'S ACTION

A. The Owner's representative will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:

1. Final Unrestricted Release: Where marked "Reviewed," the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.

2. Final-But-Restricted Release: When marked "Reviewed as Modified" the Work may proceed provided it complies with the Owner's Representative's notations or corrections on the submittal and complies

with the requirements of the Contract Documents. Acceptance of the Work will depend upon these compliances.

3. Returned for Resubmittal: When marked "Revise & Re-Submit" or “Not Reviewed”, the Work covered by the submittal (purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay, in accordance with the Owner’s Representative's notations stating the reasons for returning the submittal.

1.04 SHOP DRAWINGS

A. Shop Drawings: Submit to Owner’s Representative for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional Owner’s Representative responsible for designing components shown on shop drawings.

1. Include signed and sealed calculations to support design.
2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit number of opaque reproductions Contractor requires, plus two (2) copies Owner’s Representative will retain.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in the Specification.

1.05 SAMPLES

A. Samples: Submit to Owner's Representative for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Samples which can be conveniently mailed shall be sent directly to the Owner's representative, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted

E. All other samples shall be delivered at the field office of the Project Representative with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval shall be mailed to the Owner's representative.

F. If a sample is rejected by the Owner's representative, a new sample shall be resubmitted in a manner specified herein above. This procedure shall be repeated until the sample is approved by the Owner's representative.

G. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications.

H. Submit number of samples specified in individual specification sections; Owner's Representative will retain one sample.

I. Samples will not be used for testing purposes unless specifically stated in specification section.

J. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents purposes described in Project Record Documents.

PRODUCTS - Not Used

PART 2 EXECUTION - Not Used

END OF SECTION

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of schedule of values.

1.02 FORMAT

A. Type schedule on AIA Document G703 or alternate form approved by ENGINEER.

B. Follow table of contents of Contract Documents for listing component parts. Identify each line item by number and title of major specification section.

C. If Project is bid as unit price, follow bid item schedule for listing component parts.

1.03 CONTENT

A. List estimated installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.

B. For each major subcontract, list products and operations of that subcontract as separate line items.

C. Coordinate listed items with Progress Schedule.

D. For lump sum contracts, component listing shall each include a directly proportional amount of CONTRACTOR'S overhead, profit and bonds and insurance costs. Mobilization costs shall also be distributed in amounts directly proportional to each listing value.

E. For items on which payments will be requested for stored products, list sub-values for cost of stored products.

F. The sum of values listed shall equal total Contract Price.

G. If Project is bid as unit price contract, follow bid item schedule for listing completed work of component parts.

H. Unbalanced schedule of values will not be acceptable and, when discovered, will be returned for adjustment to reflect actual costs.

1.04 SUBMITTAL

A. Submit six (6) copies of schedule ten (10) days prior to first Application for Payment.

1.05 SUBSTANTIATING DATA

A. When ENGINEER requires substantiating information, submit data justifying line item amounts in question. Only those line item amounts which the CONTRACTOR can justify to the ENGINEER'S satisfaction will be acceptable.

B. Provide six (6) copies of data with cover letter.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

QUALITY CONTROL

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. General quality control.

B. Manufacturers' field services.

1.02 QUALITY CONTROL, GENERAL

A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.03 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances, more rigid standards, or more precise workmanship are specified.

B. Perform work using persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.04 MANUFACTURERS' INSTRUCTIONS

A. When required by individual specification section, Product Data, and Samples, submit manufacturer's printed instructions, in the quantity required for product data, for delivery, storage, assembly, installation, startup, adjusting, and finishing, as appropriate.

B. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from ENGINEER before proceeding.

1.05 MANUFACTURERS' CERTIFICATES

A. As required by individual specification sections, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.06 MOCKUPS

A. When required by individual specifications section, erect complete, full-scale mockup of assembly at Project site. Remove mockup at completion, when approved by the ENGINEER.

1.07 MANUFACTURERS' FIELD SERVICES

A. Manufacturers' representative shall submit written report to ENGINEER listing observations, tests and corrective measures.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

TESTING LABORATORY SERVICES FOR SOILS AND CONCRETE

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The CONTRACTOR shall hire a 3rd-party testing laboratory consultant in obtaining samples and performing testing.

B. Pay soils testing laboratory consultant for all costs incidental to and for testing and retesting.

C. Pay for all concrete and soil testing and retesting required on this project.

1.02 DESCRIPTION

A. The Contractor will obtain and the ENGINEER must approve an independent concrete and soils testing laboratory consultant as proposed by the CONTRACTOR to perform concrete and soils sampling and testing.

B. The CONTRACTOR shall pay for all services performed by the independent testing laboratory consultant for the following:

1. All soil testing and retesting on this project.

2. All concrete testing and retesting on this project.

C. The CONTRACTOR shall pay for all services performed under paragraph 1.02 B within thirty (30) days of receipt of invoice for additional services from the independent testing laboratory consultant.

1.03 ADDITIONAL RESPONSIBILITIES

A. Provide access to all work for testing purposes.

B. Coordinate in obtaining concrete cylinders for testing by laboratory personnel.

C. Cooperate with laboratory personnel performing ACI field testing of concrete and other testing as required by the ENGINEER.

D. Provide labor and facilities to allow access to work to be tested, to obtain and handle samples at the site or at the source of products to be tested, to facilitate tests and inspections and for storage of test samples.

E. The following concrete test equipment shall be furnished by the CONTRACTOR:

1. Concrete curing box.

a. The concrete curing box shall be of standard commercial quality. One (1) or more boxes shall be supplied to meet the specimen requirements of the project.

b. The curing box shall maintain an internal water temperature of seventy degrees Fahrenheit (70^{o} F) $\pm$ ten degrees Fahrenheit (10^{o} F) and one hundred percent (100%) humidity.

2. Steel "contractor's" wheelbarrow.

3. Square point hand shovel with "D" handle.

F. SCHEDULE OF INSPECTIONS AND TESTS

1. Discuss schedule at the preconstruction conference.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

TEMPORARY FACILITIES

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Provide temporary facilities required which shall include, but are not necessarily limited to, the following:

1. Utilities, such as water for construction use, electricity and telephone
2. Sanitary facilities

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.01 ELECTRICITY

A. CONTRACTOR shall be responsible for arranging for, providing, installing and maintaining electrical power required for construction purposes and shall pay for all power used.

3.02 WATER

A. The OWNER will allow the CONTRACTOR to use water for construction purposes as long as it is not wasted. If the CONTRACTOR is wasting the water, the OWNER will revoke the free water privilege.

3.03 TELEPHONE

A. Not Required.

3.04 SANITARY FACILITIES

A. CONTRACTOR shall provide and maintain portable toilets. Portable toilets shall be installed in conformance with applicable laws, codes and regulations.

B. CONTRACTOR shall maintain facilities in a clean, operable and sanitary condition.

3.05 MAINTENANCE

A. Maintain all temporary facilities as long as they are required for the safe and proper completion of the work.

3.06 REMOVAL

A. Remove temporary materials, equipment, services and construction prior to final completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of two (2) feet; grade site as indicated. Restore existing facilities used during construction to specified or to original condition.

END OF SECTION

TEMPORARY CONTROLS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Providing and maintaining methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at the construction site and related areas under CONTRACTOR'S control. Removal of physical evidence of temporary facilities at completion of the Work.

1.02 ASBESTOS CONTROL

A. The CONTRACTOR shall manage asbestos containing material in a manner consistent with all Local, State and Federal regulations and provide temporary controls to protect worker safety on site, and prevent asbestos containing material and dust from migrating into public and private property.

1.03 DUST CONTROL

A. Provide positive methods and apply dust control materials such as calcium chloride or water to minimize raising dust from construction operations, and provide positive means to prevent dust from dispersing into the atmosphere.

B. The CONTRACTOR shall sweep the road as directed by the ENGINEER before any calcium chloride is applied. The CONTRACTOR shall have calcium chloride on site at all times.

1.04 WATER CONTROL

A. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper disposal.

B. Provide, operate and maintain pumps and equipment of adequate capacity to control surface and water.

C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas in accordance with local, state and federal regulations.

1.05 RODENT CONTROL

A. Provide rodent control as necessary to prevent infestation of construction or storage area. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.

B. Use rodenticide in full accordance with the manufacturer's printed instructions and recommendations, and local, state and federal regulations.

1.06 DEBRIS CONTROL

A. Maintain all areas under CONTRACTOR'S control free of debris.

B. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and haul routes.

1. Provide containers for deposit of debris.

2. Prohibit overloading of trucks to prevent spillages on access and haul routes. Provide periodic inspection of traffic areas and enforce requirements.

3. Schedule weekly collection and disposal of debris to prevent accumulation.

C. Schedule periodic collection and disposal of debris. Provide additional collections and disposals of debris whenever the periodic schedule is inadequate to prevent accumulation. Debris and stockpiled material shall be removed from the work area by the end of each day.

D. If the ENGINEER determines that the site is not adequately free of extraneous debris, the ENGINEER may order the CONTRACTOR to clean the site or have the site cleaned by others, the cost of which shall be borne by the CONTRACTOR.

1.07 POLLUTION CONTROL

A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

B. Provide equipment and personnel to perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids. Excavate and dispose of any contaminated earth in accordance with local, state and federal regulations, and replace with suitable compacted fill and topsoil.

C. Take all appropriate measures to prevent harmful substances from entering surface waters and groundwater. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants.

1. Prevent toxic concentrations of chemicals.

2. Prevent harmful dispersal of pollutants into the atmosphere.

1.08 EROSION CONTROL

A. Plan and execute construction work by methods to control surface drainage to prevent erosion and sedimentation.

1. Minimize areas of exposed bare soil.

2. Provide temporary control measures such as berms, dikes and drains.

B. Periodically inspect earthwork to detect any evidence of the start of erosion. Apply corrective measures as required to control erosion.

C. Construct sediment basins, diversion ditches, hay bale dikes or such other erosion control devices to control runoff from any area subject to erosion during construction. All such precautionary measures including, but not limited to, construction of sediment basins, diversion ditches, benches, berms or hay bale dikes or laying fiber matting on slopes until vegetation is established, shall be at no extra cost to the OWNER.

D. Comply with all local, state and federal permits and requirements.

E. Provide Hay Bales around all catch basins and culverts in or downhill of the construction area. Hay bales and cost of cleaning catch basins and culverts shall be paid for by the CONTRACTOR.

F. The CONTRACTOR shall keep all trenches stabilized during non-working hours. The CONTRACTOR shall place approved crushed gravel in the trench every night. The CONTRACTOR shall furnish and install crushed stone or other approved material in the trench to stabilize it as directed by the ENGINEER.

1.09 TRAFFIC SAFETY

A. Schedule construction and place excavated material so that vehicular and pedestrian traffic may be maintained at all times. The CONTRACTOR shall be responsible for obtaining required state and local highway opening/curb cut permits prior to commencing construction of work in a highway.

B. Traffic shall be protected by barricades, warning and advance warning signs. The placement and materials shall be in general compliance with the U.S. Department of Transportation's Manual on Uniform Traffic Control Devices, latest edition, and be subject to the approval of the OWNER and ENGINEER. If the CONTRACTOR'S operations cause traffic hazards, he shall repair the road surface, provide temporary ways, erect barricades or fences and/or take other safety measures in accordance with local, state and federal regulations.

C. The CONTRACTOR shall provide experienced uniformed traffic officers as directed by the ENGINEER.

D. The trenches and manholes shall be backfilled with approved material every night, as directed by the ENGINEER. The CONTRACTOR is responsible for furnishing and installing material necessary for stabilizing the roadway at the end of each day as approved by the ENGINEER.

1.10 STORAGE AND PROTECTION

A. Material

1. All loose granular material, pipes and other commonly used material shall be stored off the roadway but within the Right-Of-Way of the roadway. Lighted barriers shall be placed around the said material to make them visible to vehicular traffic.

B. Equipment

1. All equipment shall be stored off the roadway but within the Right-Of-Way of the roadway. Lighted barriers shall be placed around the vehicles to make them visible to vehicular traffic.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to cross country areas, river crossings and areas adjacent to wetlands, unless otherwise specifically stated.

C. The project area is an environmentally sensitive area. Shoreland Permit, Wetlands Permit and Army Corp. Permits have been obtained and copies of each permit is included as an Appendix item within this document. The CONTRACTOR must be fully aware of the requirements of each permit and must fully comply with all permit conditions.

1.02 NOTIFICATION

A. The ENGINEER will notify the CONTRACTOR in writing of any non-compliance with the foregoing provisions. The CONTRACTOR shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the CONTRACTOR or his authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the CONTRACTOR fails to act promptly, the ENGINEER may order stoppage of all or part of the work until satisfactorily corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the CONTRACTOR as a result of time lost due to any stop orders shall be made unless it was later determined that the CONTRACTOR was in compliance.

1.03 IMPLEMENTATION

A. Prior to commencement of work, the CONTRACTOR shall meet with representatives of the ENGINEER to develop mutual understandings relative to compliance of the environmental protection program.

PART 2 PRODUCTS

None Used

PART 3 EXECUTION

3.01 AREAS OF CONSTRUCTION ACTIVITY

A. Insofar as possible, the CONTRACTOR shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that, which existed prior to work under this contract.

3.02 PROTECTION OF WATER RESOURCES

A. The CONTRACTOR shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or harmful materials. It is the CONTRACTOR'S responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.03 PROTECTING AND MINIMIZING EXPOSED AREAS

A. The CONTRACTOR shall limit the area of land that is exposed and free from vegetation during construction. In areas where the period of exposure will be greater than two (2) months, temporary vegetation, mulching or other protective measures should be provided as specified.

B. The CONTRACTOR shall take account of the conditions of the soil where temporary cover crop will be used to insure that materials used for temporary vegetation are adaptive to the sediment control. Materials to be used for temporary vegetation shall be approved by the ENGINEER.

3.04 LOCATION OF STORAGE MATERIAL

A. The location of the CONTRACTOR'S storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared, and shall require written approval of the ENGINEER. Plans showing storage facilities for equipment and materials shall be submitted for approval of the ENGINEER.

B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of twenty-five (25) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled hay or straw around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.

C. The ENGINEER may designate a particular area or areas where the CONTRACTOR may store materials used in his operations.

3.05 PROTECTION OF LANDSCAPE

A. Except in areas marked on the plans to be cleared, the CONTRACTOR shall not deface, injure, or destroy trees or shrubs nor remove or cut them without special authority. No ropes, cables or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the ENGINEER. The CONTRACTOR shall in any event be responsible for any damage resulting from such use.

B. Where, in the opinion of the ENGINEER, trees may possibly be defaced, bruised, injured, or otherwise damaged by the CONTRACTOR'S equipment or by his blasting or other operations, the ENGINEER may direct the CONTRACTOR to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the CONTRACTOR'S equipment or operations shall be restored as nearly as possible to its original condition at the expense of the CONTRACTOR. The ENGINEER will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.

3.06 DISCHARGE OF DEWATERING OPERATIONS

A. Any water that is pumped and discharged from the trench and/or excavation as part of the CONTRACTOR'S water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

B. The pumped water shall be filtered through baled hay, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. The sediment shall be cleared from the channel periodically.

3.07 DUST CONTROL

A. During the progress of the work, the CONTRACTOR shall conduct his operations and maintain the area of his activities including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the ENGINEER decides that it is necessary to use calcium chloride for more effective dust control, the CONTRACTOR shall furnish and spread the material, as directed.

3.08 SEPARATION OF TOPSOIL

A. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed. The topsoil shall be stored in an area acceptable to the ENGINEER and adequate measures shall be employed to prevent erosion of said material.

3.09 REPLACEMENT OF TOPSOIL IN CROSS COUNTRY ROUTES

A. The CONTRACTOR shall replace, back to its original locations and depths, that topsoil, which has been separated according to the provisions described above.

3.10 BALED HAY OR STRAW

A. To trap sediment and to prevent sediment from clogging drainage systems, baled hay or straw shall be used where shown on the drawings and as directed by the ENGINEER. Care shall be taken to keep them from breaking apart. The bales should be staked to prevent overturning, flotation, or displacement. All deposited sediment shall be removed periodically.

3.11 SILT FENCE

A. Where indicated on the drawings or where directed by the ENGINEER, the CONTRACTOR shall erect and maintain a temporary silt fence. The silt fence shall be used specifically to contain sediment from runoff water and to minimize environmental damage caused by construction.

B. The silt fence shall be wire-bound wood-roll fence securely erected within the work area limits as shown on the plans. The fence shall be 4 feet high and the unpainted picket of 3/8-inch by 1-1/2-inch wide dimensions shall be bound together an approximate distance of 2-inches apart by at least 13-gauge galvanized steel wire. The CONTRACTOR shall place bales of hay or straw alongside the fence and secure them in place. The trapped sediment shall be periodically removed.

C. If in the opinion of the ENGINEER the silt fence is not providing adequate sediment control, the ENGINEER shall direct the CONTRACTOR to provide additional measures such as covering the fence with either burlap or a plastic filter fabric or other methods to adequately control erosion.

END OF SECTION

CONSTRUCTION CLEANING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Cleaning and disposal of waste materials, debris, and rubbish during construction.

1.02 DESCRIPTION

A. Maintain areas under CONTRACTOR'S control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Provide covered containers for deposit of debris and rubbish. Regularly dispose of accumulations of materials on a weekly basis.

C. Regularly clean interior areas to provide suitable conditions for finish work.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 CLEANING

A. Remove debris and rubbish from pipe, manholes, wetwells, and other closed or remote spaces, prior to closing the space.

B. Completely clean all interior and exterior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.

C. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

3.02 DISPOSAL

A. Remove waste materials, debris, and rubbish from site periodically and dispose of off-site in accordance with applicable local, state and federal regulations.

B. Maintain disposal area in an orderly manner; prevent runoff into waterways or onto adjacent properties.

END OF SECTION

TRANSPORTATION AND HANDLING

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Providing expeditious transportation and delivery of undamaged products to project site, and on a schedule to avoid delay of the Work or work of other contractors.

B. Providing equipment and personnel at the site to unload and handle products in a manner to avoid damage to products.

1.02 DELIVERY

A. Arrange deliveries of products in accordance with construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with work, OWNER'S use of premises and conditions at site.

C. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.

D. Partial deliveries of component parts of equipment shall be clearly marked to identify the equipment, to permit easy accumulation of parts and to facilitate assembly.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PRODUCT HANDLING

A. Immediately upon delivery, inspect shipment to assure:

1. Product complies with requirements of Contract Documents and reviewed submittals.
2. Quantities are correct.
3. Containers and packages are intact, labels are legible.
4. Products are properly protected and undamaged.

B. Expedite replacement of damaged products.

C. Provide equipment and personnel necessary to handle products, including those provided by OWNER, by methods to prevent soiling or damage to products or packaging.

D. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.

E. Handle products by methods to prevent bending or overstressing.

F. Lift heavy components only at designated lifting points.

END OF SECTION

STORAGE AND PROTECTION

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Providing secure storage and protection for products to be incorporated into the Work, and maintaining and protecting products after installation and until completion of the Work.

1.02 STORAGE

A. Store and protect products immediately on delivery. Store in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Materials shall only be stored at and around the wastewater treatment facility as approved by the ENGINEER and OWNER. Under no circumstances is the CONTRACTOR to store materials on private property or within the public right-of-way unless approved by the OWNER and ENGINEER.

C. Store products subject to damage by elements in substantial weather tight enclosures.

1. Maintain temperatures within ranges required by manufacturer's instructions.
2. Provide humidity control for sensitive products, as required by manufacturer's instructions.
3. Store unpacked products on shelves, in bins or in neat piles, accessible for inspection.

D. Exterior Storage:

1. Provide substantial platforms, blocking or skids to support fabricated products above ground and to prevent soiling or staining. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
3. Provide surface drainage to prevent flow or ponding of rainwater.
4. Prevent mixing of refuse or chemically injurious materials or liquids.

E. Arrange storage in manner to provide easy access for inspection.

1.03 MAINTENANCE OF STORAGE

A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Surfaces of products exposed to elements are not adversely affected. Any weathering of products, coatings and finishes is unacceptable under requirements of Contract Documents.

B. Mechanical and electrical equipment which requires servicing during long term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package. Comply with manufacturer's instructions on scheduled basis.

C. Any product damaged because of improper storage or protection shall be unacceptable for installation and shall be removed from the site.

1.04 PROTECTION AFTER INSTALLATION

A. Provide protection of installed products to prevent damage from subsequent operations. Remove protection when no longer needed, prior to completion of Work.

B. Control traffic to prevent damage to equipment and surfaces.

C. Provide coverings to protect finished surfaces from damage.

1. Cover projections, wall corners, and jambs, sills and soffits of openings, in areas used for traffic and for passage of products in subsequent work.

2. Protect finished floors and stairs from dirt and damage:

a. In areas subject to foot traffic, secure heavy paper, sheet goods, or other materials in place.

b. Lay planking or similar materials in place to support movement of heavy products.

c. Store products on wood sheathing.

D. Waterproofed surfaces and roofs.

1. Prohibit use of surfaces for traffic of any kind, and for storage of any products.

2. When some activity must take place in order to carry out the Contract, obtain recommendations of installer for protection of surface.

a. Install recommended protection, remove on completion of that activity.

b. Restrict use of adjacent unprotected areas.

E. Lawns and Landscaping: Prohibit traffic of any kind across planted lawn and landscaped areas unless such traffic is approved by the ENGINEER. Damaged lawns and landscaped areas shall be restored to their original condition by the CONTRACTOR at no expense to the OWNER.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. CONTRACTOR'S options in selection of products.

B. Products list.

C. Requests for substitution of products.

1.02 CONTRACTOR OPTIONS

A. Products Specified by Reference Standards or by Description Only: Submit data substantiating that product meets those standards.

B. Products Specified by Naming One or More Manufacturers with a Substitution Paragraph: Submit a request for substitution for products of any manufacturer not specifically named.

1.03 PRODUCTS LIST

A. At preconstruction conference submit three (3) copies of a list of major products which are proposed for installation, including name of manufacturer. The CONTRACTOR will not be allowed a substitution for products not identified on this list.

B. Tabulate products by specification section number, title, and paragraph number.

C. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

D. ENGINEER will not reply to this list of major products. All acceptance or rejection and comments by the ENGINEER will be reserved until submittal of product data for conforming products or products proposed for substitution.

1.04 LIMITATIONS ON SUBSTITUTIONS

A. Many sections of these specifications are based on specific manufacturer recommendations. Use of these recommendations does not and is not intended to exclude equal equipment of other manufacturers. The specifications serve only as a guide to minimum quality and performance.

1.05 REQUESTS FOR SUBSTITUTIONS

A. Requests for substitutions not made in strict conformance with this paragraph will be unacceptable and will be rejected by the ENGINEER without review.

B. Submit separate request for each substitution using the form included at the end of this Section. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.

C. Identify product by specification sections and paragraph numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and suppliers as appropriate.

D. Attach product data.

E. List similar projects using product, dates of installation, and names of ENGINEER and OWNER.

F. Give itemized comparison of proposed substitution with specified product, listing variations, and reference to Specification section and paragraph numbers.

G. Give quality and performance comparison between proposed substitution and the specified product.

H. Give cost data comparing proposed substitution with specified product, and amount of net change to Contract Price.

I. List availability of maintenance services and replacement materials.

J. State effect of substitution on construction schedule, and changes required in other work or products.

K. A substitute product may be considered equal to the product identified in the Specifications if (1) it is at least equal in quality, durability, appearance, strength and design; (2) it will perform at least equally the function imposed by the general design for the work being contracted for or the material being purchased; and (3) it conforms substantially, even with deviations, to the detailed requirements for the product in said Specifications.

1.06 REDESIGN

A. Redesign of any portion of the work affected by the substitution and coordination of installation of the substitution shall be the responsibility of the CONTRACTOR. There shall be no increase in Contract Price for redesign due to substitution of products.

1.07 CONTRACTOR REPRESENTATION

A. Submission of a request for substitution constitutes a representation that CONTRACTOR has investigated proposed product and has determined that it is equal to or superior in all respects to specified product. The ENGINEER, however, will make such determination based on the CONTRACTOR'S request under paragraph 1.05.

B. CONTRACTOR shall provide as a minimum, the same warranty for substitution products as for specified product.

C. CONTRACTOR shall coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.

D. CONTRACTOR waives claims for additional costs related to substitution which may later become apparent.

1.08 SUBMITTAL PROCEDURES

A. After preconstruction conference, submit six (6) copies of request for substitution.

B. ENGINEER will respond to CONTRACTOR'S requests for substitutions with reasonable promptness.

C. ENGINEER will notify CONTRACTOR, in writing, of decision to accept or reject requested substitution.

D. For accepted products, submit shop drawings, product data, and samples.

E. Submit with request such drawings as are necessary to define the redesign necessary to accommodate product substitution. Drawings shall be stamped by a professional engineer registered in the State where the work under this Contract is located, and for the engineering disciplines affected by the substitution.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 INSTALLATION

A. Installation of substitutions shall not be done unless written acceptance of ENGINEER has been given.

SUBSTITUTION REQUEST FORM

Date:_____

1. Name of product to be substituted:_____

2. Name of product requested as substitute:_____

3. Specification Section Reference _____

   Drawing Number Reference:_____

4. Attach Product Data to this form.

5. List similar projects using this product:

	Project	Date of Installation	ENGINEER	Owner
i.	_____	_____	_____	_____
ii.	_____	_____	_____	_____
iii.	_____	_____	_____	_____

6. Attach itemized comparison by Specification Paragraph.

7. State effect of substitution on:

   i. Construction Schedule:_____

   ii. Project Cost:_____

   iii. Changes Required in Other Work: _____

   _____

8. Contractor Representations:

   i. CONTRACTOR has complied with the Product Options and Substitutions section in its entirety.

   ii. CONTRACTOR has investigated proposed substitution and has determined that it is equal or superior to the product specified.

iii. CONTRACTOR will provide same warranty as required for the specified product, as a minimum.

iv. CONTRACTOR will coordinate installation of substitution through completion.

v. CONTRACTOR waives all claims for additional costs related to substitution which may later become apparent.

vi. CONTRACTOR agrees to pay all reasonable fees of the ENGINEER and other consultants in making an evaluation of this substitution request whether such request is ultimately accepted or not.

9. Certification:

Signed _____

Title _____

Company _____
(Contractor)

END OF SECTION

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. Maintaining and submitting record documents and samples.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Maintain at the site for OWNER one record copy of:

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Accepted shop drawings, product data, and samples.
6. Field test records.
7. Inspection certificates.
8. Manufacturer's certificates.
9. Inspection videos and photographs

B. Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage for record documents and samples.

C. Label and file record documents and samples in accordance with section number listings in Table of Contents of this Specification. Label each document "PROJECT RECORD" in neat, large, printed letters.

D. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.

E. Keep record documents and samples available for inspection by ENGINEER.

1.03 RECORDING

A. Record information on a set of blue line drawings.

B. Record information on videotape with copies provided to the OWNER.

C. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:

1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.
3. Field changes of dimensions and details.
4. Changes made by modifications.

5. Details not on original Contract Drawings.

6. References to related shop drawings and modifications.

D. Specifications: Legibly mark each item to record actual construction, including:

1. Manufacturer, trade name and catalog number of each product actually installed, particularly optional items and substitute items.

2. Changes made by addenda or modifications.

E. Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records, required by individual Specification sections.

1.04 SUBMITTALS

A. At Contract closeout, deliver record documents and samples as specified in Section 01701, to ENGINEER for use in the preparation of Project Record Drawings.

B. Transmit with cover letter in duplicate, listing:

1. Date.

2. Project title and number.

3. CONTRACTOR'S name, address, and telephone number.

4. Number and title of each Record Document.

5. Signature of CONTRACTOR or authorized representative.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

DEWATERING

PART 1 GENERAL

1.01 SYSTEM PERFORMANCE REQUIREMENTS

A. Dewatering shall include all necessary control and disposal of groundwater on a continual basis during construction.

B. Dewatering shall include the lowering of the groundwater table to relieve any hydrostatic head that could cause a decrease in the stability of the excavated subgrade. It shall also include the intercepting of seepage which could otherwise emerge from the slope or sides of excavations which could cause a decrease in the stability of the excavated subgrade or the slopes or sides of the excavations.

C. Dewatering shall be performed during construction to temporarily protect against the following:

1. The loss of any material beneath the excavated subgrade or from the slopes or sides of the excavations or the movement of any fine particle materials from the soil.
2. Any increased vertical or lateral loads on the excavation support systems.
3. Any disturbance, rupture, instability, boiling or heaving of the bottom of excavated subgrade during:
    a. Excavation.
    b. Placement of foundation or bedding materials.
    c. Construction of slabs, footings, pipes, conduits, under-drains and any other structures.
    d. Backfilling operations.

1.02 ADDITIONAL PROVISIONS

A. Provide, operate and maintain any dewatering system required to lower and control groundwater levels and groundwater hydrostatic pressure during the construction of the Work as required by this Section and the Contract Documents. The CONTRACTOR shall assume full responsibility and expense for the adequacy of the dewatering system with no additional time for performance.

B. Remove and dispose of water resulting from activities described in paragraph 1.02 A. Provide siltation settling basins for all discharges from dewatering systems. Submit plan of settling basins and discharge facilities for review by ENGINEER prior to dewatering system installation.

C. Remove dewatering systems and equipment when no longer required.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 EXECUTION

A. The dewatering system shall be capable of developing an excavated subgrade relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade and which will provide the

necessary groundwater control for the proper performance required for completion of the Work.

B. The dewatering system shall not cause damage to newly constructed or existing properties, buildings, utilities and other work due to the loss of support from incompletely drained soils or from removal of soil particles resulting from the dewatering system operation.

C. Dewatering facilities shall be located where they will not cause interference with work performed by others.

D. If the dewatering system utilized by the CONTRACTOR causes or threatens to cause damage to new or existing facilities, the dewatering system shall be modified at no additional cost to the OWNER. The CONTRACTOR shall be responsible for, and shall repair all damage caused by the dewatering system operation at no additional cost to the OWNER and at no additional time for performance.

E. Dispose of subsurface water collected in a manner which conforms to all applicable local and state ordinances, statutes and laws.

F. Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, excavated subgrade at all times as required for proper performance of the Work.

G. Provide dewatering necessary to maintain the groundwater table at a minimum of two (2) feet below the bottom elevation of trench bedding during placement and compaction of trench backfill.

3.02 JOB CONDITIONS

A. Erosion Control: Provide adequate protection from erosion from any of the dewatering operations utilized during the course of the construction. Any damage, disruption or interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the CONTRACTOR, at no cost to the OWNER.

B. Treatment of Dewatering Operations Discharges: Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed, at no additional cost to the OWNER.

END OF SECTION

EXCAVATION SUPPORT

PART 1 GENERAL

1.01 WORK INCLUDED

A. Designing, furnishing, installing, maintaining and removing excavation support systems for the following:

1. Submittal of an Engineered Shoring Plan for the (2) Drilling and Receiving Pits and interconnection excavations. The plan shall be stamped by a Licensed NH Structural Professional Engineer.
2. Excavation.
3. Trench excavation.

1.02 REFERENCE STANDARDS

A. ASTM A328 - Steel Sheet Piling.

B. NFPA - National Forest Products Association.

1.03 SYSTEM DESCRIPTION

A. The construction of the excavation support systems shall include soldier piles, lagging, trench boxes, wood sheeting and steel sheeting, including bracing members such as walers, struts, shores and tieback anchors and all other system members.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wood: Tongue and groove; #3 common Douglas Fir or Hemlock; or Utility Grade Southern Pine; NFPA grading.

B. Steel: ASTM A328.

C. Trench Boxes: Fabricated steel.

PART 3 EXECUTION

3.01 EXECUTION

A. The CONTRACTOR shall be totally responsible for the means and methods of excavation and for the design and construction of the excavation support systems.

B. The support system shall be designed to support the maximum loads that will occur during construction.

C. Excavation support systems shall be constructed so as to be able to support all vertical and lateral loads and other surcharge loads imposed on the system during construction including earth pressures, utility loads and other surcharges and construction loads in order to provide safe construction of the permanent structures and prevent movement and/or damage to adjacent soil, buildings, structures and utilities.

D. Do not brace to concrete unless authorized by the ENGINEER, and then only if concrete has reached its design strength as determined by compressive test of representative concrete cylinders which have been cured on site for a period of at least 14 days.

E. Do not embed any part or portion of excavation support system in the Work. Do not construct sleeves or

openings in the structures to permit bracing through the structures unless authorized by the ENGINEER.

F. The CONTRACTOR shall not perform excavations in unstable earth. Stabilize all earth materials behind support walls before excavation is allowed to proceed.

G. The CONTRACTOR shall monitor all excavations and provide a means of determining movement of adjacent soil, buildings, structures and utilities.

H. Where movement or damage is observed, the CONTRACTOR shall immediately cease excavation operations and correct such deficiency in the excavation support system that allowed for movement or damage and repair all damage at no additional cost to the OWNER and at no additional time for performance.

I. The CONTRACTOR shall be responsible for, and shall repair all damage resulting from his excavations and at no additional cost to the OWNER and at no additional time for performance.

J. During construction, the CONTRACTOR shall be responsible for meeting all requirements and standards of OSHA (Occupational Safety and Health Administration).

3.02 SHEETING LEFT-IN-PLACE

A. Cut off all sheeting left-in-place at least three feet below the ground surface, whether such sheeting is ordered left in place by the ENGINEER or is left in place for the convenience of the CONTRACTOR.

END OF SECTION

SITE PREPARATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Review and implement all environmental permit requirements.

B. Remove topsoil and stockpile suitable material for later reuse. Remove excess or unsuitable topsoil from site.

C. Excavate subsoil and stockpile suitable material for later reuse. Remove excess or unsuitable topsoil from site.

D. Grade and rough contour site.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Identify known below grade utilities. Stake and flag locations.

C. Identify and flag above grade utilities.

D. Request as-built information from ENGINEER. Review and locate existing utilities. Maintain and protect existing utilities to remain which pass through work area.

E. Upon discovery of utility or concealed conditions which affect the conduct of the work of this section, notify ENGINEER.

F. Protect trees, shrubs, lawns, and other features remaining as portion of final landscaping.

G. Protect bench marks, existing structures, fences, roads, sidewalks and paving and curbs.

H. Protect above or below grade utilities which are to remain.

I. Repair damage to the above at no additional cost to the OWNER.

3.02 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded and stockpile on site. Remove excess topsoil not being reused from site.

B. Stockpile topsoil to depth not exceeding eight (8) feet. Cover to protect from erosion.

C. Topsoil suitable for reuse shall be in conformance with the Specifications.

3.03 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be re-landscaped or re-graded and stockpile on site and remove excess subsoil not being reused from site.

B. Stockpile subsoil to depth not exceeding eight (8) feet.

C. When excavation through roots is necessary, perform work by hand and cut roots with a sharp axe.

D. Subsoil suitable for reuse shall be in conformance with the Specifications.

3.04 TOLERANCES

A. Top Surface of Subgrade: Plus or minus one (1) inch.

3.05 MEASUREMENT AND PAYMENT

A. Subsidiary of all bid items.

END OF SECTION

SLOPE PROTECTION AND EROSION CONTROL

PART 1 GENERAL

1.01 WORK INCLUDED

A. Planning and executing measures to prevent and control soil erosion.

B. Furnishing, installing and maintaining erosion control materials.

1.02 SUBMITTALS

A. Submit plans and details showing specific slope protection and erosion control measures to be taken for each phase of the construction. Plans and details shall conform to the applicable SMTC of manuals and requirements for soil erosion and sediment control on construction sites.

1.03 PROJECT CONDITIONS

A. Schedule temporary seeding, mulching and other erosion control measures to take place as soon as possible.

B. When temporary seeding cannot be accomplished to have established or visible growth by October 15, the disturbed areas shall be covered with 6 inches of mulch for the winter.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hay Bales: Securely tied baled hay at least 14 inches by 18 inches by 30 inches long.

B. Mulch Material: Select mulch material for erosion control that will best meet the site conditions from the following:

1. Hay or Straw - Shall be dry, free of mold and weed seeds.

2. Wood Chips - Shall be dry, free of soil and other foreign material.

C. Mulch Anchoring: When mulch must be held in place, one of the following mulch anchoring materials shall be used:

1. Asphalt Emulsion – Types RS-1, RS-2, MS-2 or SS-1 in compliance with ASTM D977.

2. Mulch Netting (paper, twine, plastic, or plastic and wood fiber).

D. Fertilizer: Complete fertilizer 10-20-20 (standard product) Class A

10-20-20 (standard product) Class B.

E. Lime: Ground limestone containing not less than 95% total carbonates (calcium or magnesium).

F. Temporary Seed Mixture: When it is impractical to establish permanent protective vegetation on disturbed earth by October 15, use "Conservation Mix" or the following seed mixture for areas outside of Construction Traffic:

Kind of Seed	Lbs per Acre
Switchgrass (Blackwell or Shelter)	4.0
Big bluestem (Niagara or Kaw)	4.0
Little bluestem (Camper or Blaze)	2.0

Sand lovegrass (NE-27 or Blaze)	1.5
Birdsfoot trefoil (Viking)	2.0

G. Inoculum specific to Birdsfoot trefoil must be used with this mixture. If seeding by hand, a sticking agent such as milk or cola shall be used to stick inoculum to the seed. If seeding with hydroseeder, use four (4) times the recommended amount of inoculum.

H. Permanent Seed Mixture: See NHDOT Standard Specifications.

PART 3 EXECUTION

3.01 GENERAL CONSTRUCTION SEQUENCE TO MINIMIZE EROSION

A. Erect hay bale dikes and/or silt fences as shown on Drawings and as may be required in the field to protect property, waterways, wells and springs.

B. Commence excavation. Stockpile soil so that erosion is minimized. Extra precautions shall be taken when soil is saturated.

C. Control surface water and erosion in accordance with the Temporary Controls section.

D. Dewater trench in accordance with the Dewatering section. Filter discharge using hay bales, silt fence, settling basin or natural vegetated buffer as site conditions require and as approved by the ENGINEER.

E. Backfill excavation to grade. Grade site so that soil erosion caused by runoff will be minimized.

F. Seed and mulch exposed ground.

3.02 SEEDING AND MULCHING

A. All areas which will remain open shall be seeded and mulched within five (5) days of being stripped or backfilled and graded.

B. Soil samples may be sent to the County Extension Service for analysis to determine the proper seed mixture and fertilizer requirements.

C. The following procedures shall be followed for temporary seeding:

1. Apply lime at a rate of 75 to 100 pounds per 1000 square feet. Incorporate into top two inches of soil.

2. Apply fertilizer at a rate of 30 pounds per 1000 square feet. Mix thoroughly into the top two inches of soil.

3. Apply seed mixture at a rate of two pounds per 1000 square feet evenly in two intersecting directions. Rake lightly.

4. Apply mulch material within 24 hours after seeding in accordance with the following:

   a. Hay or Straw: Application rate - 75 to 100 pounds per 1000 square feet. Spread by hand or with machine. Anchor on slopes and where subject to blowing or slipping.

   b. Wood Chips: Application rate - two to six inches deep. Use for tree and shrub planting.

5. Anchor mulch on all slopes exceeding 5% and other areas as required using one of the following methods:

   a. Mulch Netting: Spread over loose mulch and pin to the soil in accordance with the manufacturer's instructions.

3.03 HAY BALE DIKES

A. Embed hay bales into soil and anchor in place with stakes as shown on the Drawings. Butt hay bales together tightly.

B. Hay bales shall be replaced when they become clogged with soil particles or as directed by the ENGINEER.

3.04 DAMAGE AND REPAIR

A. Repair all damages caused by soil erosion or construction equipment at or before the end of each working day.

END OF SECTION

STORM DRAINS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnishing pipe for storm drains.

B. Installing and/or removing and replacing storm drains as shown on the drawings.

1.02 REFERENCE STANDARDS

A. ASTM D3034 - Type PSM Poly(Vinyl Chloride)(PVC) Sewer Pipe and Fittings.

B. ASTM D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

C. AWWA/ANSI C151/A21.51 AND C11/A21.11 – Ductile Iron Pipe

D. AASHTO M252, ASSHTO M294-97 - High-density polyethylene pipe and fitting gaskets shall be made of polyisoprene meeting ASTM F477.

E. ASTM D3350 minimum cell classification 335420C- High-density polyethylene pipe and fittings.

1.03 SUBMITTALS

A. Submit manufacturer's certifications, shop drawings and product data.

PART 2 PRODUCTS

2.01 GENERAL

A. All products included in this section shall conform to the requirements of the standard specifications referenced herein.

B. Pipe size and material shall be as shown on the Drawings.

2.02 MATERIALS

A. Polyvinyl Chloride Pipe (PVC): Pipe and fittings shall be SDR 35, conforming to ASTM D3034. Joints shall be push on joints complying with ASTM D3212.

B. Ductile Iron Pipe: Class 50 ductile iron pipe with FIELDLOK or approved equal within the sleeve and standard TYTON joint gaskets or approved equal in all other locations. Pipe shall meet AWWA/ANSI C151/A21.51 AND C11/A21.11. Ductile Iron pipe in the sleeve shall be restrained joint TR FLEX® or approved equal.

C. Smooth Interior HDPE Pipe (SPE): Pipe shall meet AASHTO M252, ASSHTO M294-97, gaskets shall be made of polyisoprene meeting ASTM F477. Pipe and fittings shall be high-density polyethylene meeting ASTM D3350 minimum cell classification 335420C.

D. Each length of pipe shall be marked or tagged with the nominal diameter, gauge or class, the name of the manufacturer or his trademark, and in the case of reinforced concrete pipe, the date of manufacture.

E. Backfill material shall be as specified in NHDOT Standard Specifications.

PART 3 EXECUTION

3.01 HANDLING PIPE

A. Exercise care in moving pipe to its final position. Use slings, straps and/or other devices to support pipe when it is lifted. Transporting pipe from storage areas shall be restricted to operations which will not cause damage to the pipe. Pipe shall not be dropped into the trench.

B. All pipe shall be examined before installation and no pipe shall be installed which is found to be defective. Defective pipe which cannot be repaired to the satisfaction of the ENGINEER shall be promptly removed from the project and replaced with new pipe.

3.02 CONTROL OF ALIGNMENT AND GRADE

A. Easement and property and other control lines necessary for locating the Work as well as elevations and bench marks used in the design of the Work are shown on the Drawings. The CONTRACTOR shall use this information to set line and use a laser, level, or transit to set grade.

B. The CONTRACTOR may use laser equipment to assist in setting the pipe provided he can demonstrate satisfactory skill in its use.

C. The use of string levels, hand levels, carpenter's levels or other similar devices for transferring grade or setting pipe will not be permitted.

D. During construction provide the ENGINEER, at his request, all reasonable and necessary materials, opportunities, and assistance for setting stakes and making measurements, including the furnishing of one or two rodmen as needed at intermittent times.

E. CONTRACTOR shall not proceed until he has made timely request of the ENGINEER for, and has received from him, such controls and instructions as may be necessary as Work progresses. The Work shall be done in strict conformity with such controls and instructions.

F. The CONTRACTOR shall carefully preserve bench marks, reference points and stakes, and in case of willful, careless, or accidental destruction by his own men, he will be responsible for the resulting cost to re-establish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the loss or disturbance of such control data.

G. Maintain the proper alignment in laying pipe.

3.03 EXCAVATING TRENCH AND INSTALLING PIPE

A. Pipe shall be laid in dry trench conditions. Provide for temporary diversion of water.

B. Excavate a trench to required depth sufficiently wide to allow for jointing of the pipe and compaction of the material under and around the pipe. Excavation shall conform the specifications. If ledge rock, rocky soil, hard pan or other unyielding foundation material is encountered at the normal grade of the pipe bed, excavate to 6 inches below invert grade and one

foot on each side of the interior face of the pipe wall and refill with compacted crushed gravel. Blocking is not permitted.

C. Compact disturbed trench bottom and shape to fit pipe for a depth of not less than 10 percent of the total diameter of the pipe. The pipe shall rest firmly on the shaped bottom for the entire length of pipe barrels. Excavate troughs to accommodate bells or couplings to provide ample space for jointing pipe.

D. Begin laying pipe at outlet and make sure that the lower segment of the pipe is in contact with the shaped trench bottom throughout its full length. Each pipe section shall be placed into position on the pipe bed in such a manner and by such means required to avoid injury to persons, any property or the pipe.

E. Fill handling hole in concrete pipes with a precast plug, seal and cover with mastic or mortar.

F. Allow time for inspection and approval before any backfill is placed. Relay any pipe out of alignment and remove any damaged pipe.

G. After placing pipe on shaped trench bottom, backfill material shall be placed and compacted to the spring line (horizontal center line) of the pipe in continuous layers not exceeding 6 inches loose depth. Additional backfill material shall then be placed from the spring line to 12 inches above the crown of the pipe. This material shall be placed and compacted in continuous layers not exceeding 6 inches loose depth.

H. After placement of the material around and over the pipe, alignment and grade of the pipe shall be checked. If the pipe has been properly installed, the CONTRACTOR may refill or backfill the remainder of the trench in conformance with NHDOT Standard Specifications and details shown on the Drawings.

I. At the end of each day's work or at other intervals, the ENGINEER, with the CONTRACTOR, may inspect the pipe installation. Unsatisfactory work shall be dug up and reinstalled to meet the requirements of the Contract Documents with no additional time for completion of the Work and at no additional cost to the OWNER.

3.04 JOINTING PIPE

A. Polyvinyl Chloride pipe (PVC): Joints shall be made according to the manufacturers recommendations. The bell end shall be protected from damage. The physical and chemical properties of pipe couplings shall be equal to that of the pipe.

B. Smooth Interior HDPE Pipe (SPE): Joints shall be made according to the manufacturer's recommendations. The bell end shall be protected from damage. The physical and chemical properties of pipe couplings shall be equal to that of the pipe.

C. Ductile Iron Pipe (DI): Joints shall be made according to the manufacturer's recommendations. The bell end shall be protected from damage. The physical and chemical properties of pipe couplings shall be equal to that of the pipe.

PART 4 MEASUREMENT AND PAYMENT

A. Installation of storm drains under this project will be measured per linear foot for the actual length pipe installed complete in place.

B. Payment will be made for installation of storm drain pipe and all associated appurtenances on a linear foot basis. The Price for the storm drain installation includes all labor, equipment, hardware and other materials necessary for or incidental to the completion of the work to the satisfaction of the Engineer including, but not limited to items shown on the plans and contained within the specification.

END OF SECTION

PRECAST CONCRETE STRUCTURES AND WATER QUALITY UNIT STRUCTURES

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnishing precast concrete structures and appurtenant materials.
B. Installation.
C. Leakage testing.

1.02 REFERENCE STANDARDS

A. AASHTO - Standard Specifications for Highway Bridges.
B. NHDOT – Standard Specifications for Road and Bridge Construction.
C. ACI 318 - Building Code Requirements for Reinforced Concrete.
D. ACI 350R - Concrete Sanitary Engineering Structures.
E. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
F. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
G. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars (Using 2-in or 50 mm Cube Specimens).
H. ASTM C827 - Early Volume Change of Cementitious Mixtures.
I. ASTM C890 - Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
J. ASTM C913 - Precast Concrete Water and Wastewater Structures.

1.03 SUBMITTALS

A. Submit Shop Drawings in accordance with the Submittal Procedures.

1. Shop Drawings shall include details of construction, reinforcing, lifting devices, joint details, access openings and doors, pipe penetrations and process equipment; design calculations; and, lifting and buoyancy analyses.

2. Shop Drawings and design calculations shall be stamped by a professional structural engineer, registered in the same state as the Project.

B. Submit manufacturer's product data for all components.

1.04 QUALITY ASSURANCE

A. Design Criteria:

1. Design of precast concrete structures and components shall conform to ACI 350R and ASTM C890.

2. Structures and components shall be capable of withstanding AASHTO H-20 loading with 30% impact factor, soil loading at 130 lb/ft3, and surcharge and groundwater elevations as shown on the Drawings, without failure or leakage.

3. Concrete: Minimum compressive strength of 5,000 psi at 28 days.

B. The structures shall be made by a manufacturer of precast concrete units regularly producing units of similar type and size.

C. The quality of all materials, the process of manufacture and the finished sections shall be subject to inspection by the ENGINEER. Such inspection may be made at the place of manufacture, and/or on the work site after delivery. Sections shall be subject to rejection due to failure to meet any of the Specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged after delivery will be rejected, or if already installed, shall be repaired or removed and replaced entirely at the CONTRACTOR'S expense as directed by the ENGINEER.

D. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close-textured and free of blisters, cracks, roughness and exposed reinforcement.

E. Imperfections may be repaired, subject to acceptance by the ENGINEER, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final acceptance. Concrete grout shall be used for repairs. Epoxy grout may be used for repairs, subject to acceptance by the ENGINEER.

1.05 SOURCE QUALITY CONTROL

A. Test concrete in accordance with ACI 318.
B. Retain plant records and quality control program used during production of precast tank and make such records and test results available to ENGINEER, if requested.
C. All precast concrete sections shall have the date of manufacture indelibly marked on the inside of the wall.

1.06 DELIVERY, STORAGE AND HANDLING

A. Precast structure sections shall not be shipped until the concrete has attained a compressive strength of 3,000 psi or until 5 days after fabrication and/or repair, whichever time is longer.
B. Conform to manufacturer's instructions for delivery and handling.
C. Protect edges of structures to prevent chipping or spalling.
D. Lift and support structure from lifting points using lifting or handling devices.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Specification includes references to designated manufacturers to illustrate minimum acceptable requirements for products. Precast concrete tank specification based on tanks manufactured by Rotundo & Sons, Inc.
B. Substitutions: Products of equal or better quality, detail, function and performance may be proposed for substitution by following the procedures in the applicable section.

2.02 MATERIALS

A. Concrete: ACI 318, Portland Cement Type II.
B. Reinforcing steel: ASTM A615, Grade 60.
C. Welded Wire Fabric: ASTM A185.

2.03 PRECAST STRUCTURE SECTIONS

A. All units shall have a monolithic floor and base wall section.
B. Cast in all required items such as sleeves, floor doors, etc. Provide penetrations for process equipment.

C. Floor doors shall be as specified in Section 07831 and as detailed on the Drawings.
D. Wall sleeves shall be as specified in Section 15410.
E. Fabrication shall be in compliance with ASTM C890 and ASTM C913.

2.04 CONCRETE GROUT

A. Concrete grout shall be premixed, prepackaged non-shrink cement based grout such as Five Star Grout manufactured by U.S. Grout Corporation.
B. Nonshrink when tested in accordance with ASTM C827.
C. Minimum compressive strength of 5000 psi at 28 days when tested in accordance with ASTM C109.

2.05 WATERPROOFING

A. All precast concrete structures shall be waterproofed with two seal coats applied to the exterior face of the walls in accordance with the seal coating manufacturer's recommendations. Waterproofing shall be masonry seal MSP-1 waterproofing material as made by the Masonry Seal Corporation, 7500 West Ridge Road, Elyria, Ohio or H.B. Tnemecol 46-465 as made by TNEMEC.
B. Exterior of all joints shall be coated with waterproofing after setting.
C. All interior surfaces of the precast concrete structures shall have Consolideck Saltguard WB or approved equal applied in accordance with the manufacturer's requirements. <u>These structures will be subjected to Tidal influx.</u>

PART 3 EXECUTION

3.01 INSTALLATION OF PRECAST CONCRETE STRUCTURES

A. Precast bases shall be placed on a layer of compacted bedding material. The excavation shall be properly dewatered to allow placing of bedding material and setting the precast tank on completely drained subgrade. Tank sections shall be placed using manufacturer's recommended procedure for sealing the horizontal joints.
B. Inlet and outlet pipes shall be connected and sealed in accordance with the manufacturer's recommended procedure and as shown on the Drawings.
C. A leakage test shall be made as described below in this section.
D. Upon successful completion of the leakage test all joints shall be pointed.
E. The exterior waterproofing coat shall be touched up after installation and shall be applied to the exterior of all joints in accordance with manufacturer's recommendations.
F. Interior concrete fill shall be placed on clean base slab and against clean walls after leakage test has been performed and accepted and water used for testing has been completely removed.
G. The access door and frame shall be placed on the top of the tank/access structure or some other means shall be provided to prevent accidental/unauthorized entry until the CONTRACTOR is ready to make final adjustment to grade.

3.02 LEAKAGE TESTS FOR CONCRETE STRUCTURES

A. Leakage tests shall be made by the CONTRACTOR and observed by the ENGINEER on each tank. The test shall be an exfiltration test made as described below.
B. After the tank and access structures have been assembled in place, all lifting holes shall be filled with an approved nonshrink concrete grout. The test shall be made before backfilling and before filling and pointing the horizontal joints. If the groundwater table has been allowed to rise above the bottom of the tank, it shall be lowered for the duration of the test. All pipes and other openings

into the tank and access structures shall be suitably plugged and the plugs braced to prevent blowout.

C. The tank shall then be filled with potable water to the underside of top slab. If observation indicates no visible leakage, that is, no water observed moving down the surface of the tank after 24 hours, the structure may be considered to be satisfactorily watertight. If the test, as described above is unsatisfactory as determined by the ENGINEER, it shall be the CONTRACTOR'S responsibility to disassemble, reconstruct, repair or replace the tank as required to construct a watertight structure. The tank shall then be retested and, if satisfactory, interior joints shall be filled and pointed.

D. If the CONTRACTOR elects to backfill prior to testing, for any reason, it shall be at the CONTRACTOR'S risk and it shall be incumbent upon the CONTRACTOR to determine the reason for any failure of any test. Allowable leakage rate shall be 0.1% of the volume of liquid per day in the tank filled to the underside of the top slab, over a testing period of 5 days. Review testing procedures with ENGINEER prior to starting test. No adjustments in the leakage allowance will be made for unknown causes such as leaking plugs, absorption, etc., i.e., it will be assumed that all loss of water during the test is a result of leaks through the concrete. The CONTRACTOR shall take any steps necessary to assure the ENGINEER that the water table is below the bottom of the tank throughout the test.

E. When groundwater is allowed to return to natural level outside the tank, there shall be no leakage into the tank or access structure. If leakage occurs, the CONTRACTOR shall repair, reconstruct or replace the tank or access structure, including retesting, at no additional cost to the OWNER.

F. If, for whatever reason, the tank or access structure are disturbed during construction activities, the tank or access structure shall be retested by the above methods, at no additional cost to the OWNER.

END OF SECTION

MISCELLANEOUS WORK AND CLEANING UP

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnishing all labor, materials, equipment and incidentals required to do all miscellaneous work and cleaning up not otherwise specified including, but not limited to, the following:

1. Cleaning up the construction site.
2. Disposing of material and debris.
3. The extra work of crossing existing sewers, drains, electrical and telephone conduits and water mains.
4. Miscellaneous work associated with connecting to existing utilities.
5. Disconnecting, plugging and abandoning the existing piping including all excavation, backfill, concrete plugs and surface restoration items.
6. Furnishing, installing and removing project signs.
7. Coordination with the City of Portsmouth
8. All other work incidental to completing the project.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 CLEANUP

A. Remove all construction material, excess excavation, equipment or other debris remaining on the construction site as a result of construction operations and shall render the site of the work in a neat and orderly condition at least equal to that which existed prior to the start of construction.

B. Dispose of all materials and debris off-site in accordance with local, state and federal regulations.

3.02 INCIDENTAL WORK

A. Do all incidental work not otherwise specified but obviously necessary to the proper completion of the Contract as specified and as shown on the Drawings.

END OF SECTION

SPECIAL PROVISIONS

SPECIAL PROVISION,

SECTION 603.72948 - RAILROAD CROSSING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnishing 7/8” thick steel casing pipe, carrier pipe, sand fill, casing end seals, and other Materials incidental thereto.

B. Installation by jacking.

C. Excavation, Trench Shoring, dewatering and backfill.

D. Complying with the Railroad requirements (see Appendix 2).

1.02 REFERENCE STANDARDS

A. AWWA C200 - Steel Water Pipe 6 Inches and Larger.

B. American Railway Engineering Association Specifications.

C. AWS Welding Code.

D. Pan Am - Standard Railroad Specifications Relating to Working Within Premises of the Pan Am and Premises Used and Controlled by Pan Am.

1.03 RAILROAD COORDINATION AND APPROVALS

Submit to the Railroad's Chief Engineering Officer, for approval and to the ENGINEER for record, the following Shop Drawings and data:

1. Detailed plans and calculations for jacking pits, backstops, guide rails, falsework, bracing, sheeting or other supports adjacent to the tracks. All plans and calculations shall be stamped by a professional engineer registered in the state where the project is located.

2. Complete construction scheduling and plans, with sufficient details for checking, for the installation and removal of temporary supporting members or structures above tracks. All plans and calculations shall be stamped by a professional engineer registered in the state where the project is located.

3. Complete description of procedure to be used to install casing pipe including length of pipe sections; method of connecting pipe, removing spoil, grouting around pipe, etc.

4. Data and information demonstrating that the CONTRACTOR or his subcontractor has had previous successful experience in jacking under similar conditions, including length of pipe installation, depth of pipe and subsurface conditions.

1.04 SERVICE CONTRACT AND INSURANCE

Before entering upon Railroad premises or property used and controlled by the Railroad, the CONTRACTOR shall:

1. Fully inform himself of all requirements of the Railroad as pertains to this project and shall conduct his work accordingly. Any questions relating to the requirements of the Railroad shall be directed to:

2. Execute the Railroad's Standard Service Contract.

3. Submit to the Chief Engineering Officer of the Railroad, at least seven (7) days before entering upon Railroad premises, an acceptable original insurance policy to be in force during the entire term of the work and for six (6) months subsequent to the completion of the work or for a minimum of one (1) year, whichever is greater, for the following kinds and amounts of insurance:

   a. Contractor's Public Liability - $10,000,000.

   b. Contractor's Property Damage Liability - $10,000,000. Submit copy of insurance policy to ENGINEER for record.

1.05 REQUIRED NOTICES AND FEES

A. CONTRACTOR shall make all necessary arrangements with the Railroad, including submitting required deposits, before entering Railroad premises or property used and controlled by the Railroad. The Railroad will provide at its sole discretion such personnel as it deems necessary or advisable because of the Project. The Railroad will furnish and assign an engineer(s) or inspector(s) and may require and furnish flagging personnel.

B. CONTRACTOR shall submit a deposit for Railroad Inspection Fee in the amount required by the Railroad (see Appendix 2). If Railroad expenses are greater than the amount of deposit, the Contract Price shall be increased by Change Order and the CONTRACTOR shall reimburse the Railroad for the difference, and, if the Railroad expenses are less than the amount of deposit, the Railroad will refund the balance to the CONTRACTOR and the Contract Price will be reduced accordingly by Change Order. The Railroad reserves the right to request additional deposits as project work progresses. Any additional deposits requested that result from poor performance of the CONTRACTOR shall be at no additional cost to the OWNER. All checks shall be made out to the Railroad.

C. CONTRACTOR shall give written notice to the Chief Engineering Officer of the Railroad at least seven (7) days in advance of starting work or locating equipment at the site.

D. CONTRACTOR shall give written notice to the Chief Engineering Officer of the Railroad at least three (3) days in advance of starting work that requires flagging personnel on duty at site.

PART 2 PRODUCTS

2.01 MATERIALS

A. Carrier Pipe: The carrier pipe is specified in the STORM DRAINS AND WATER QUALITY UNITS specification section.

B. Casing Pipe: The casing pipe shall be 48” inch diameter steel pipe conforming to AWWA C200 and the following criteria:

Yield Strength: 35,000 psi minimum.

Thickness: 7/8 inch minimum.

C. Casing Supports: As shown on the plans. Supports to be Cascade casing supports or approved equal.

D. Sand Fill: Sand fill installed between the casing pipe and carrier pipe shall be clean mineral aggregate with particle size limits as follows:

Sieve Designation	Percentage Passing by Weight
No. 4	100
No. 100	0 - 30
No. 200	0 - 12

E. Casing End Closures:

1. The Advance Standard Model AW Wraparound casing end seal is manufactured of 1/8” thick neoprene rubber, assuring excellent chemical resistance and resiliency. Also included are 1/2” wide T304 stainless steel bandings with 100% non-magnetic worm gear mechanism. The Model AW casing end seal has butyl mastic strips to seal edges, and is designed to facilitate installation when the carrier line has already been joined together and the installation is complete. Each model of end seal is made of 60 durometer synthetic.

PART 3 EXECUTION

3.01 GENERAL

A. After entering upon Railroad premises or property used and control-led by the Railroad the CONTRACTOR shall have in his possession on the job site the Drawings and Specifications which bear the stamp of approval of the Railroad's Engineer. All work shall be conducted according to these Drawings and Specifications.

B. Work shall be performed and completed in a manner fully satisfactory to the Railroad's Chief Engineering Officer or his authorized representatives. Inspection of the Work by the Railroad shall

be permitted at all times and the CONTRACTOR shall cooperate fully with the Railroad representatives.

C. CONTRACTOR'S work shall be performed in such a manner that the tracks, traffic and appurtenances of the Railroad will be safe- guarded.

D. All existing pipes, poles, wires, fences, property line markers and other structures which the Railroad's Chief Engineering Officer decides must be preserved in place without being temporarily or permanently relocated shall be carefully protected from damage by the CONTRACTOR. Should such items be damaged, they shall be restored by the Railroad at the CONTRACTOR'S expense to at least as good condition as that in which they were found immediately before the Work was begun. Temporary and permanent changes of tracks and telephone lines, telegraph lines, signal lines, and electric supply lines made necessary by or to clear the permanent work of the CONTRACTOR will be made or caused to be made by the Railroad at the expense of the CONTRACTOR.

E. The CONTRACTOR shall be fully responsible for all damages arising from his activities and from his failure to comply with the requirements of these specifications and the Railroad's specifications.

F. The Railroad will consider the following facilities to be fouled and subject to hazard when any object or operation is or can be brought nearer than the following designated distances:

1. Operating Track: 15 feet to the centerline of the track.

2. Signal Line or Communication Line: 4 feet to any wire or cable.

3. Electrical Supply Line: 10 feet to any wire of the line.

CONTRACTOR shall not operate any equipment within these limits.

G. The CONTRACTOR must perform pre and post surveys of the tracks affected by the pipe jacking operation to confirm that no settlement has occurred.

H. The CONTRACT shall not remove any groundwater or soil from Pan Am property from dewatering and excavation operations associated with this project. The CONTRACTOR shall employ construction techniques and procedures to dispose of excess soil and groundwater on Pan Am property that are acceptable to Pan Am.

I. The CONTRACTOR shall be required to work continuously during pipe jacking operations.

3.02 EXCAVATION

A. Excavation shall comply with NHDOT Standard Specifications.

B. As excavation approaches pipes, conduits, or other underground structures on or adjacent to Railroad property, digging by machinery shall be discontinued and the excavation shall continue by means of hand tools.

C. If any excavation is taken beyond the work limit indicated on the approved plans or prescribed in the Standard Railroad Specifications, the CONTRACTOR shall backfill and compact as prescribed in the Standard Railroad Specifications at no additional cost to the OWNER.

D. Open excavations and pipe shall be suitably plated over, bulkheaded or fenced as required for the protection of the work and safety of the public.

3.03 GROUND STABILIZATION

A. If required, ground stabilization shall be done to the soil prior to the start of jacking. Stabilization shall be by either dewatering or grouting or a combination of both to maintain the stability of the face of the heading.

B. Dewatering: The CONTRACTOR shall lower and maintain the groundwater level a minimum of two feet below the invert of the casing pipe at all times during construction in accordance with the DEWATERING specification requirements to prevent inflow of water or water and soil into the heading. Ground-water observation wells shall be installed in the area to be dewatered to demonstrate that the dewatering requirements are being complied with. Dewatering can cause settlement. The Railroad will survey the crossing prior to, during and after construction. If it is found the tracks need to be aligned and surfaced by the Railroad because of the dewatering, the cost of this shall be borne by the CONTRACTOR.

C. Grouting: The CONTRACTOR or the grouting subcontractor shall be a specialist in the field with a minimum of five (5) continuous years of successfully grouting soils. All granular soils (silty sands, sand or sand and gravel) shall be stabilized by injection of a cement or chemical grout from the ground surface or from the pipe heading. The stabilization shall extend as far as necessary outside the periphery of the casing pipe in order to maintain a stable face at the heading.

3.04 CASING PIPE INSTALLATION

A. Before any work is begun within the limits of jacking, the CONTRACTOR shall have assembled all tools, materials, and equipment which will be required. When the CONTRACTOR has started the jacking operation, he shall proceed in a continuous operation without stopping. This will minimize the tendency of the material to "freeze" around the pipe.

B. Jacking shall be performed in accordance with the American Railway Engineering Association Specifications, Chapter 1, Part 4 "Jacking Culvert Pipe Through Fills."

C. A jacking shield shall be used and jacked ahead of the casing pipe. The excavation within the jacking pipe should not advance beyond the head of the pipe shield. If the stability at the face needs to be maintained from raveling or running soil, suitable temporary bulkheads, struts, and bracing shall be required.

D. The casing pipe shall be jacked without being welded through the use of a collar plate. Upon completion of the jacking operation either the continuous butt weld will be performed or a continuous interior collar plate is to be provided as shown.

E. An alternate method of joining the casing pipe ends may be used if the casing pipe ends are beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest A.W.S. Welding Code. All joints of the casing pipe shall be butt welded, by a certified welder, prior to being subjected to the jacking operation.

F. The jacked installation shall have a hole essentially the same as the outside diameter of the pipe. If voids develop or if the hole diameter is more than 1 inch greater in diameter, the voids shall be filled by grouting or other methods approved by the Railroad.

G. Removal of rock and boulders of a size greater than the inside diameter of the casing pipe shall be performed as changed work in accordance with CHANGE ORDER PROCEDURES.

H. If an obstruction is encountered during installation that stops the forward movement of the casing pipe and it is impossible to advance the casing pipe in the opinion of the Railroad and/or ENGINEER, operations shall cease. Abandoning the pipe in place, filling the pipe with grout, and moving to a new location shall be performed as changed work in accordance with CHANGE ORDER PROCEDURES.

3.05 CARRIER PIPE INSTALLATION

A. After installation of the casing pipe is complete, clean the interior of the casing pipe of all excess material.

B. The carrier pipe shall have casing supports installed at 8’-0” on center as shown on the plans (see Special Provision section 900.08 for specification).

C. The ENGINEER shall be given ample opportunity to check all carrier pipe joints prior to filling the space between the carrier pipe and the casing pipe with sand. After the carrier pipe has been inspected, the space between the outside of the carrier pipe and the casing pipe shall be filled completely full of sand by pumping or blowing, in one continuous uninterrupted operation from one end of the casing pipe.

D. Neoprene casing end seal shall be installed at each end of the casing pipe after the carrier pipe has been installed, inspected and the open space is filled with sand to the satisfaction of the ENGINEER.

3.06 BACKFILLING

A. Backfilling and compaction performed on Railroad premises or property used and controlled by the Railroad shall be in accord with the Standard Railroad Specification. Backfilling and compaction performed outside the limits shall conform to the NHDOT Standard Specifications.

PART 4 MEASUREMENT & PAYMENT

4.01 MEASUREMENT

A. Installation of the jacking sleeve and carrier pipe under this project will be measured per linear foot for the actual length of 7/8” thick, 48” diameter steel casing and the 36” Class 50 Ductile Iron Drain pipe installed complete in place.

4.02 PAYMENT

A. Payment will be made for installation of the jacking sleeve and all associated appurtenances on a linear foot basis. The Price for the installation includes all labor, equipment, hardware and other materials necessary for or incidental to the completion of the work to the satisfaction of the Engineer including, but not limited to items shown on the plans and contained within the specification.

Payment carrier pipe and all associated appurtenances on a linear foot basis. The Price for the installation includes all labor, equipment, casing supports, end seals, testing, , hardware and other materials necessary for or incidental to the completion of the work to the satisfaction of the Engineer including, but not limited to items shown on the plans and contained within the specification.

END OF SECTION

SPECIAL PROVISION,

SECTION 900.04 - TIDAL WETLANDS MITIGATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Performing the Tidal Wetlands Mitigation work within limits shown on the Drawings and/or specified herein: Distribute soil across an approximately 12,060 sf intertidal area, and re-grade the surface to establish a level planting area within the zone of tidal influence to provide suitable tidal hydrology for a duration sufficient to support low marsh vegetation, grading to high marsh at the shoreline;

B. Establish micro-topographical variation by creating shallow pits and mounds scattered throughout the created salt marsh to provide habitat diversity within the mitigation area;

C. Establish drainage channels through the restored salt marsh to allow subsurface and surface drainage to flow through the marsh without eroding imported soils;

D. Install12-inch diameter coir logs around the front edges and sides of the restoration area to hold soil in place and reduce erosion from wave action in the pond. The coir logs will be anchored with oak stakes set in pairs and placed at opposite angles to secure the coir logs to the ground;

E. Set large rocks or boulders, approximately 12–24 inches in diameter, at regular intervals (approximately 75 to 100 feet apart) within the high marsh planting area and the upper portions of the low marsh planting area to break ice sheets during winter to reduce potential damage from ice scour;

F. Establish native plant species through planting of bare root seedlings of smooth cordgrass (Spartina alterniflora) within approximately 12,060 sf of low marsh area. **This work will need to be constructed by June 7. (It is important to let the soil stabilize for about two weeks to firm up sufficiently and to acquire the correct chemistry)**

G. Establish native plant species through planting of bare root seedlings of saltmeadow cordgrass (Spartina patens) within approximately 3,055 sf of high marsh area. **This work will need to be constructed by June 7. (It is important to let the soil stabilize for about two weeks to firm up sufficiently and to acquire the correct chemistry)**

1.02 QUALITY ASSURANCE

A. Employ trained personnel experienced in this type of work. The City can provide names of qualified individuals known to the City if requested.

1.03 PRODUCT DELIVERY AND STORAGE

A. All materials shall be submitted for review and approval along with samples.

PART 2 PRODUCTS

2.01 MATERIALS

A. The soil to be imported to the site will consist of a mix of sand and fine material. Stantec collected a soil sample from the existing restoration area adjacent to the proposed mitigation site. Based on the sample analysis performed by JTC, Inc., the soil imported for the proposed mitigation site should consist of approximately 65% sand (primarily fine sand between 0.1 and 0.5 millimeter grain size) and 35% fines (silt and clay less than 0.1 millimeter grain size). The imported soil should have less than 0.5% organic matter. Because this soil texture combination is similar to that which was collected at the adjacent restoration site, it is expected to allow for successful establishment of marsh vegetation in the proposed area. A material sample will be tested by the Contractor for approval by the City prior to work beginning.

B. In order to reduce the effects of ice scour on the restored salt marsh area, large rocks will be placed throughout the high marsh portion of the site as shown on the plan. These rocks will be approximately 12– 24 inches in diameter and will be placed approximately every 75–100 feet within the high marsh planting area and within the upper portions of the low marsh planting area. It is expected that these rocks will be able to be salvaged from the shoreline adjacent to the proposed restoration area, and new rocks will not need to be imported. The approximate placement of the rocks is shown on the plan.

C. In the spring of 2016, the proposed mitigation site will be planted with native species typical of salt marshes in the vicinity. Planting areas are shown on the plan. Nursery-grown bare-root seedlings will be utilized. Bare root seedlings will be planted at a density of approximately 1 seedling per square foot. The low marsh area will be planted with smooth cordgrass. The high marsh will be planted with saltmeadow cordgrass. Seedlings will be planted by hand and may be planted in rows or in clumps, but will be evenly distributed throughout the site. Planted stock will be obtained from local or regional nurseries, and a qualified professional will document that the appropriate species are utilized prior to planting.

Because the created bench will be inundated by the tides, no seeding is recommended for the site. Seeds would likely be washed away during the first tidal event. Seeding was not utilized at the adjacent mitigation site; vegetation expansion from rhizomes of the planted seedlings was sufficient to establish vegetative cover in the restoration area.

PART 3 EXECUTION

3.01 GENERAL

A. Earthwork will occur during low-tide conditions in the spring of 2015 to allow for successful implementation of this plan. Equipment such as excavators and bobcats will work within the intertidal areas from timber mats to minimize substrate disturbance and compaction. Construction activities will not occur during or immediately following heavy rain or flood events if such conditions preclude effective erosion and sedimentation control. The construction contractor will import soil to construct a bench within the salt marsh restoration area at an elevation of approximately 2-3 feet (matching the grade of the adjacent, existing restoration area) so that the bench will be covered with water during high tide and exposed during low tide. Based on this plan, approximately 635 cubic yards of soil will be imported to the site to accomplish the desired grading. The design does not require any soil or other material to be removed from the site. Plan view, cross sections and profiles detailing the elevations, slopes, and grades for the proposed restoration area are provided in on the plan.

B. The drainage outfall for the Brewster Street drainage pipe will be located within the restoration area as shown on Figure 3. The pipe outfall will be surrounded with rip-rap extending approximately 30 feet seaward from the shoreline. Imported soil will be spread around the outfall up to the edge of the rip-rap. In order to prevent intrusion of the soil into the spaces between the

rip-rap, a fabric layer will be installed between the rip-rap and the imported soil. Any soil removed from the area for construction of the drainage outfall will be stored on site and protected from tidal erosion for use in construction of the salt marsh restoration area.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Completion of the Wetlands Mitigation under this project will be measured on a lump-sum basis for the actual work complete in place. The plantings will be assumed to be 50% of the cost of this item.

4.02 PAYMENT

A. Payment will be made for wetlands mitigation as shown on the drawings and contained within the specification in two payments, 50% for all soil and earthwork and 50% for the plantings. The Price for the mitigation includes all labor, equipment, hardware and other materials necessary for or incidental to the completion of the work to the satisfaction of the Engineer including, but not limited to items shown on the plans and contained within the specification.

4.03 WARRANTY

A. The Warranty period for the plantings shall be 16 months from the time of planting. Planting should occur by June 7, 2015.

END OF SECTION

SPECIAL PROVISION,

SECTION 612.43036 – 36" DUCTILE IRON PIPE, CLASS 50;
SECTION 612.43215 – 15" DUCTILE IRON PIPE, CLASS 50;
SECTION 612.43218 – 18" DUCTILE IRON PIPE, CLASS 50;
SECTION 612.43224 – 24" DUCTILE IRON PIPE, CLASS 50;

Description

1.1 The work consists of installing ductile iron water pipe for drainage as indicated in the contract drawings and as directed by the Engineer.

1.2 The applicable sections of the NHDOT standard specifications shall apply to the work including but not limited to Section 603 – CULVERTS AND STORM DRAINS.

Materials

2.1 Materials shall conform to the requirements of the NHDOT standard specifications and shall be as indicated on the contract drawings.

2.2 15, 18" and 24" dia. ductile iron pipe shall be Tyton Joint®, Class 50, double cement lined (1/8"), bituminous coated, 18-20 foot lengths. Pipe shall be manufactured in full conformance with AWWA/ANSI C151/A21.51, AWWA/ANSI C111/A21.11 (for push on joints) and AWWA/ANSI C104/A21.4 (for cement lining and seal coating).
36" " dia. ductile iron pipe shall be TR Flex®, Class 50, double cement lined (1/8"), bituminous coated, 18-20 foot lengths. Pipe shall be manufactured in full conformance with AWWA/ANSI C151/A21.51, and AWWA/ANSI C104/A21.4 (for cement lining and seal coating).

Construction Requirements

3.1 Construction requirements shall conform to the applicable construction requirements of the NHDOT Standard Specifications for the type of work required. The ductile iron pipe shall be installed in the locations designated on the plans. The ductile iron pipe shall be installed as indicated on the plans or as directed by the Engineer in the Field.

Method of Measurement

4.1 15, 18", 24", and 36" Ductile iron pipe under this project shall be measured per linear foot for the length of ductile iron pipe installed.

Basis of Payment

5.1 Payment will be made for 15, 18", 24", and 36" ductile iron pipe required under this contract on a linear foot basis. The price for the 15, 18", 24", and 36" ductile iron pipe includes all excavation, backfill, compaction, labor, materials and equipment necessary for or incidental to the completion of the work to the satisfaction of the Engineer. Any materials damaged by the Contractor shall be replaced at no expense to the Owner.

END OF SECTION

SPECIAL PROVISION,

SECTION 900.03 – 12" PVC SANITARY SEWERS;
SECTION 900.04 – 15" PVC SANITARY SEWERS;
SECTION 900.05 – 10" PVC SANITARY SEWERS;
SECTION 900.06 – 6" PVC SANITARY SEWER SERVICES;
SECTION 900.07 – 4' DIA. SANITARY SEWER MANHOLES;
SECTION 900.08 – 18" DIA. DI SEWER SLEEVE;
SECTION 900.09– CONNECTION TO EXISTING SANITARY SEWERS AND SMHs;
SECTION 900.10 – MAINTENANCE OF SEWER FLOW AND BY-PASS PUMPING

Description

1.1 General Description of Work. This work shall consist of furnishing and installing the gravity sanitary sewer system including all services to the right of way lines, as well as gravity sanitary sewer main, sewer services, sewer manholes, allowing the continuance of sanitary sewer service, excavation, bedding, backfill, as shown on the plans and specified herein. The Contractor shall be responsible for supplying and installing the new sewer main piping and appurtenances in accordance with the plans and specifications or as ordered by the Engineer.

1.1.1 This project includes replacement of the existing gravity sewers, the work shall consist of all labor, equipment, and materials, and performing all operations in connection with the furnishing and installing pipe, pipe fittings, and appurtenances and accessories, of various sizes, classes, joints and types, furnishing and installing sewer manholes, frame and cover, brick invert, brick corbels, connection to existing sewers and coring existing manholes, furnishing and installing the DI sleeve, end seals, casing supports, carrier pipe and appurtenant work, at the locations and to the lines and grades indicated, complete in place in accordance with the plans and as specified herein or as ordered. The Contractor shall furnish all materials, labor, tools and equipment, and perform all operations, bypass pumping, testing, flushing, and incidentals necessary for a complete functioning sewer main and services installation, as outlined herein and on the plans. The Contractor shall be fully responsible for achieving the specified test results and shall submit results of pressure and leakage tests to certify compliance with the Specifications.

1.1.2 The City of Portsmouth or its Designated Representative, hereinafter called Owner, together with the Engineer, shall observe, accept, and reject work related to the sanitary sewer installation herein specified.

1.1.3 The Contractor shall furnish all materials, labor, tools, and equipment and perform all operations, testing, and incidentals necessary for a complete sewer installation as shown on the plans and specified herein.

1.1.3.1 Furnish and install pipe materials of the types(s) and size(s) and in the location(s) shown on the contract Drawings and as specified.

1.1.3.2 Furnish and install temporary plugs, manhole structures, service connections, and all incidental work, complete, in accordance with the specifications and Contract Drawings.

1.1.3.3 The extent of the work is generally shown on the Contact Drawings and shall be modified or extended to accommodate changes which become necessary as a result of encountering unforeseen or changed conditions in the field as directed by the Engineer.

1.1.4 Perform work in accordance with NHDES Env-Wq. 700 Standards of Design and Construction for Sewage and Wastewater Treatment Facilities, most recent edition, as applicable and the NHDES construction approval permit for this project.

1.1.5 Provide complete, tested and fully operational sewer system approved by Owner.

1.2 Sequence/Maintenance of Service: The Contractor shall be responsible for providing means necessary to allow for continuation of sewage flow from upstream sewer mains and effected residences adjacent to the construction of the replacement sewer. The flow shall be maintained in whatever manner the Contractor chooses; however, the method chosen must provide for round-the-clock fail-safe sewer service which shall not result in any sewer discharges. The Contractor shall submit the proposed plan to maintain sewage flow to the Engineer for review and approval a minimum of 10 days prior to start work on the sewer system. It should be noted that the project is in a residential area; therefore noise control during off hours must be limited to a maximum level of 55 dBA.

1.2.1 Flow from existing service connections and main lines shall be maintained at all times by pumping or other methods approved by the Engineer. Under no circumstances will the dumping of raw sewage on private property, in municipal streets or into waterways, be allowed.

1.3 Reference Drawings and Information. The plans indicate, in general, the alignment and finish grade elevations and underground utility and piping invert grades. The Engineer may make such adjustments in grade and alignment, as are necessary, in order to avoid interference and to adapt the piping to other conditions encountered. All locations of existing pipes, utilities, etc., shall be verified by the Contractor with the proper authority. Neither the Engineer nor the Owner guarantees the accuracy or completeness of the existing conditions shown on the construction plans. Cover over pipes shall conform to requirements of the City of Portsmouth and the New Hampshire Department of Environmental Services (NHDES).

1.3.1 Sufficient investigations shall be made by the Contractor so that the Contractor is knowledgeable about existing conditions prior to tendering a bid.

1.4 Submittals. Furnish the name of the manufacturer and catalog cuts to the Engineer prior to commencing work, for all given pipe material, use pipe of the same manufacturer throughout the project.

1.4.1 For Closeout Submittals: Operation and Maintenance Data - Submit installation instructions, servicing requirements, assembly views, lubrication instructions, and replacement parts list.

1.4.2 For Closeout Submittals: Project Record Documents - Accurately record actual locations and inverts of low pressure sewer system including tees, bends, valves and valve boxes, valve manholes, buried pipes including changes in direction, components and connections. Prepare and provide plans to Engineer of the actual location at project close-out: submit record drawings showing locations of installed sewer main slopes and manhole and all sewer line fitting locations in addition to any other information as may be required by the Portsmouth Sewer Department. As-Built and record drawings shall be subsidiary to the low pressure sewer system items. Swing ties shall be from permanent points such as building corners, property markers, manholes and hydrants. Unacceptable swing tie points are those subject to movement such as signs, pavement corners, fences, and utility poles.

1.5 Qualifications. Contractor shall specialize in performing work of this section with minimum five years documented experience with systems of similar size and a valid, current documentation. A copy of the related experience and documentation shall be provided to the Engineer and Owner prior to construction.

1.6 Delivery, Handling and Storage. When delivered to the site and prior to unloading, the Contractor shall inspect all structures and accessories for loss, damage or lack of specified identification and marking. Any defective or improper material shall be immediately marked and shall not be unloaded.
In shipping, storing and installing, pipe, manholes, valves, sewer structures and accessories shall be kept in a sound, undamaged condition. They shall, at all times, be handled with care and shall not be dropped, dumped, or bumped against any other object and in accordance with manufacturer’s requirements. Any material(s) damaged shall be marked and immediately removed from the job site and replaced at no expense to the Owner.
Storing: Joints shall be kept protected from damage and shall be kept clean and free of mud, dirt, concrete or other materials. Pipes and accessories shall be stored on high and dry areas to prevent surface water and soil from entering the pipes or contaminating valves prior to installation. Do not place concrete units in position to cause overstress, warp or twist. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

Materials

2.1 Materials. The Contractor shall provide the following material for the installation of the gravity sewer system, services, and appurtenances. Any material which does not conform to the requirements of these Specifications shall be immediately removed from the site and replaced by the Contractor without compensation.

2.1.1 Common Backfill. Common backfill shall be granular material consisting of hard sand and gravel so graded that, of the material passing the No. 4 sieve, not more than 35% shall pass the No. 200 sieve. Common backfill shall be free of organic matter, trash, roots or other deleterious material and shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness, or 8 in, whichever is smaller. Common backfill material shall be capable of forming a firm, stable base when spread and compacted in accordance with this specification. In addition, common backfill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Common backfill materials may be obtained from either on-site excavations or from off-site sources. Any materials excavated from the trench and not conforming to this specification shall be disposed of as specified and replaced with approved material, as required, at no additional cost to the Owner.

2.1.2 Sand Blanket Material. Sand blanket material shall meet the following gradation requirements, 100% passing the 1/2 in sieve and, of the material passing the #4 sieve, no more than 12% passing the #200.

2.1.3 Gravel Fill. Gravel fill shall consist of hard, durable gravel free from trash, organic matter, clay, surface coatings, and other deleterious materials. Gravel fill shall have a maximum stone size of two-thirds of the loose lift thickness, or 6 in, whichever is smaller. That portion passing the 4 in sieve shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

U.S. Sieve Size	Percent Passing
6 in	100
No. 4	25-70
No. 200 *	0-12

* Based on fraction passing the No. 4 sieve.

2.1.4 Crushed Gravel. Crushed gravel shall consist of hard durable sand and gravel, free from trash, organic matter, clay, surface coatings, and other deleterious materials. Crushed gravel material shall meet the following gradation requirements, as determined by ASTM C 136 and ASTM C 117:

U.S. Sieve Size	Percent Passing
3 inch	100
2 inch	95-100
1 inch	55-85
No. 4	27-52
No. 200 *	0-12

* Based on fraction passing the No. 4 sieve.

2.1.5 Sewer Pipe Blanket – Sand: Sand blanket material required for installation of the sewer mains, services, and appurtenances shall meet the following gradation requirements, 100% passing the 1/2 in sieve and, of the material passing the #4 sieve, no more than 12% passing the #200.

2.1.6 Gravity Sewer Pipe Bedding – Crushed Stone: Bedding shall be crushed stone conforming to ASTM C 33 stone size No. 67 gradation requirements.

2.1.7 Manhole Structures Bedding – Crushed Stone: Bedding shall be crushed stone conforming to ASTM C 33 stone size No. 67 gradation requirements.

2.2.1.1 Each length of pipe shall have an integral bell and shall be supplied in 12.5 ft. lengths.

2.2 Sanitary Sewer. All products and materials shall conform to the latest ASTM, ANSI or other appropriate standard and as otherwise specified herein. All products and materials shall conform to the City of Portsmouth Sewer Department requirements and to the latest appropriate New Hampshire Department of Environmental Services (NHDES) Standards, and as otherwise specified hereinafter. The Contractor shall submit manufacturer's certificates of compliance in accordance with these Specifications for items of the work under this section.

2.2.1 Gravity Polyvinyl Chloride Pipe shall be SDR-35, push-on joint conforming to ASTM D 3034. Fittings shall comply with ASTM D3034. All pipe shall be push on bell and spigot joints with factory installed gaskets meeting ASTM D3212. Lubricant shall be as recommended by the pipe manufacturer. Pipe and fittings shall be installed in accordance with ASTM D2321. Minimum pipe stiffness rating shall be at least 46 pounds per square inch at 5 percent pipe diameter deflection in accordance with ASTM D2412 and per NHDES Env-Wq 704.05(b).

2.2.1.2 Joint shall be push-on type using elastomeric gasket designed to prevent slipping during jointing. The gaskets shall be factory installed and secured in place prior to delivery to the job site.

2.2.1.3 Wye branch connections shall be supplied for service connections.

2.2.1.4 All pipe, fittings, gasket material and lubricant shall be supplied by the same manufacturer. Petroleum base lubricants shall not be used.

2.2.1.5 Physical and chemical properties of pipe couplings shall be equal to those properties of the pipe.

2.2.2 Flexible Couplings and Transition Couplings for non-pressure sewer pipe shall be resilient elastomeric plastic with recessed stainless steel bands at each end for fastening.

2.2.3 Ductile Iron Pipe Steel Sleeve used for sewer shall conform to ANSI A21.51/AWWA C 151 Class 52. Pipe shall be double cement lined and seal coated inside and outside in accordance with ANSI A21.4/AWWA C 104.

2.2.4 Casing End Seals shall be 1/8" thick neoprene with stainless steel bands connecting the casing to the carrier pipe. End seals rubber shall have one adhesive side for initial attachment to the pipe. Bonding agent shall seal the two ends of the rubber. Three-quarter-inch stainless steel bands shall secure the rubber seal to the casing and carrier pipes. Rubber seal shall be Model CCES as manufactured by Cascade Waterworks MFG or approved equal.
The casing end seal shall be installed at each end of the casing pipe after the carrier pipe has been installed and inspected to the satisfaction of the ENGINEER.

2.2.5 Casing Supports shall be shall be constructed of circular stainless steel bands, which bolt together forming a shell around the carrier pipe. The casing spacer shall be lined with a ribbed EPDM extrusion with a retaining section that overlaps the edges of the shell and prevents slippage. The spacer shall be designed with risers and runners to support the carrier pipe within the casing and maintain a minimum clearance of 1.0 in. between the casing ID and the carrier pipe OD. The runners shall be Glass Filled Polymer with ends of the runners beveled to facilitate installation over rough weld beads or the weld ends of misaligned or deformed casing pipe. The runners shall be attached to support structures (risers) at appropriate positions to properly support the carrier pipe within the casing and to ease installation. They shall have a minimum length of 11.0 in. and a minimum width of 2.0 in. The shell shall be manufactured of 12.0 in. wide, 14-gauge T-304 stainless steel. The riser shall be constructed of 10-gauge T-304 stainless steel, 10.75 in. minimum lengths with a height to be determined based on the annular space between the carrier pipe OD and the casing ID. Recommended positioning of the spacers is one placed 1-2 feet on either side of the bell joint and at 6 feet on center along the length of the pipe.

2.2.4.1 Pipe shall be furnished with necessary materials and equipment recommended by the manufacturer for use in joining pipe lengths and fittings.

2.2.5 Identification: Each pipe length and fitting shall be clearly marked with:

2.2.5.1 Manufacturer's name and trademark.

2.2.5.2 Nominal pipe size with sidewall dimension ratio.

2.2.5.3 Material designation.

2.3 Precast Concrete Manholes.

2.3.1 Materials:

2.3.1.1 Cement: ASTM C 150, Portland Type II.

2.3.1.2 Fine and coarse aggregates: ASTM C 33.

2.3.1.3 Water: Fresh, clean and potable.

2.3.1.4 Reinforcing steel: ASTM A 615, Grade 60.

2.3.1.5 Welded wire Fabric: ASTM A 185.

2.3.2 Precast Manhole Sections:

2.3.2.1 Precast manhole structures shall be capable of supporting H-20 loads.

2.3.2.2 Cone sections shall be eccentric.

2.3.2.3 In lieu of a cone section, when manhole depth is less than 6 feet, a reinforced concrete slab cover shall be used, having an eccentric entrance opening.

2.3.2.4 The base section shall be monolithic to a point at least 6 in above the openings cast to receive the sewer lines. For drop manholes, any opening shall be a minimum of 6 in from any joint.

2.3.3 Manhole Joints and Pipe Seals.

2.3.3.1 Horizontal joints between precast manhole sections shall be tongue and groove as shown on the Drawings and shall have a mastic-like sealant such as Ram-Nek, Kent Seal No. 2 or a butyl rubber joint gasket (O-ring) conforming to ASTM C 443. All horizontal joints shall be watertight in accordance with the testing requirements of this Section.

2.3.3.2 Pipe to manhole joints shall be an embedded flexible rubber boot or as shown on the Drawings. Non-shrinking mortar or grout is not acceptable. Pipe to manhole connections and joints shall be watertight in accordance with the testing requirements of Section 3.4.5 - Testing.

2.3.4 Waterproofing.

2.3.4.1 All manholes shall be waterproofed, at the factory, with two seal coats applied to the exterior of the manhole in accordance with the seal coating manufacturer’s recommendations. Waterproofing shall be masonry seal MSP-1 waterproofing material as made by the Masonry Seal Corporation, 7500 West Ridge Road, Elyria, Ohio, or Foundation Coating 47-461 as made by TNEMEC.

2.3.4.2 Exterior of all joints shall be filled with hydraulic cement and then coated with waterproofing after setting.

2.3.5 Brick Masonry for Inverts and Grade Adjustment: ASTM C 32, Grade SS

2.3.6 Mortar shall consist of one part cement, one-quarter part lime, and two parts sand.

2.3.6.1 Masonry Cement: ASTM C 150 (Type II).

2.3.6.2 Aggregate for Masonry Mortar: ASTM C 144.

2.3.6.3 Hydrated Lime for Masonry Purposes: ASTM C 207, Type S.

2.3.6.4 Mortar for Unit Masonry: ASTM C 270, Type S.

2.3.6.5 Premixed Materials: ASTM C 387.

2.4 Sewer Manhole Frames and Covers.

2.4.1 General.

2.4.1.1 The castings shall be of good quality, strong, tough, even-grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of every nature which would render them unfit for the service for which they are intended. Contact surfaces of covers and frame seats shall be machined at the foundry, before shipment to prevent rocking of covers in any orientation.

2.4.1.2 All castings shall be thoroughly cleaned and subject to a careful hammer inspection.

2.4.1.3 Castings shall be at least Class 30 conforming to the ASTM A 48. 2.4.1.4 All castings shall be heavy duty suitable for H-20 loadings.

2.4.2 Manhole frames and covers shall provide 30 in diameter clear opening. The cover shall have the word "SEWER" in 3 inch letters cast into the top surface.

2.4.2.1 Standard frame and covers shall be catalog number R-1743 as manufactured by Neenah Foundry Co. and as approved by the Engineer.

2.4.2.2 Sewer Manhole Castings for low pressure sewer system shall be catalog number 1755-F2 or equal as manufactured by Neenah Foundry Co. and as approved by the Engineer.

2.5 Casing pipe for low pressure sewer shall be PVC pressure pipe, UL and FM approved, Ductile Iron O.D., DR-14, Class 305 and shall be in accordance with AWWA C-900-07.

2.6 Trench insulation shall be rigid extruded polystyrene 8 feet long, 2 feet wide and 2 inches thick (2.45 m long, 0.6 m wide, 50 mm thick,) having an in-place density of 2.5 pcf, and a "K" factor of 0.14 BTU/in./hr./°F/sq. ft and conforming to ASTM C 578, Type VII, and shall be STYROFOAM HI-60 as manufactured by Dow Corning Chemical Co. or approved equal.

2.6.1 Straight joints between insulated pipe lengths, and the end sections of non-insulated pipe shall be sealed with heat shrinkable wrap-around polyethylene as supplied by the manufacturer and field installed by the Contractor.

Construction Requirements

3.1 General. The Contractor shall furnish all sanitary gravity sewer pipe, fittings, services, manholes, and related material and appurtenances, labor, tools and equipment, granular material, and concrete; and perform all operations and incidentals necessary for complete excavation, installation, backfill and testing, as outlined herein and on the plans; and maintaining service at all times. Additionally, the Contractor shall provide all adapters and fittings, as determined in the field, necessary to complete all connections whether or not specifically stated on the Drawings and in the Specifications

3.1.1 The Contractor shall be responsible for the layout of the work. The sanitary sewer and appurtenances shall be built at the locations indicated on the plan to facilitate reconstruction of other facilities within this area of the project.

3.1.2 The Contractor shall be responsible to field locate all existing sewer service laterals. This may involve exploratory test pits of which payment will be made under Item 206.19.for repair of damage to all existing facilities at no cost to the Owner regardless if test pits are done.

3.1.4 Location of new sewer services for lots indicated to be provided new services on the drawings, including services associated with the new low pressure sewer system, will be as determined by the Owner and Engineer. The Contractor shall coordinate and confirm locations of services prior to construction.

3.1.5 Any deviations from the locations shown on the plans require the Owner’s and Engineer’s approval. Any discrepancies with locations shown on the plans will be brought to the Engineer's attention and subsequently resolved between the Owner, the Engineer and the Contractor.

3.1.6 The Contractor, at the completion of each part of the work, shall furnish the as-built locations of the sewer main and services, including the low pressure sewer main, sewer services and appurtenances, referenced to the project construction baseline and benchmarks. The as-built locations shall be to an accuracy of plus or minus 0.10 feet in plan and elevation. As-built drawings shall include swing ties to services boxes and locations of corporations and any other information required by the Portsmouth Sewer Department.

3.2 Trench Excavation

3.2.1 General - Excavation, dewatering, sheeting, and bracing shall be carried out in such a manner as to eliminate any possibility of undermining or disturbing the foundations of any existing structure, utilities or any work previously completed under this contract.

3.2.1.1 All lawns, paved surfaces, roadways, and structures which have been damaged or disturbed by the Contractor's operations outside of the project work areas shall be restored to a condition at least equal to that in which they were found immediately prior to the beginning of operations or as specified on the drawings at no cost to the Owner.

3.2.1.2 On paved surfaces that will not be resurfaced under this contract, the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are so shaped as to cut or otherwise damage such surfaces during excavation or other phases of the work. Surfaces damaged by the Contractor’s operations shall be repaired and restored to a condition at least equal to that in which they were found immediately prior to beginning operations at no cost to the Owner.

3.2.1.3 Trenching support practices shall be in accordance with all OSHA requirements.

3.2.2 Execution - The Contractor shall provide trench shoring and dewatering, if necessary, to provide a stable and dry trench at all times. The pipe trench must be dewatered to 1 foot 6 in below the invert of the new sewer pipe. Trench width shall be 2 feet plus the diameter of the pipe or a minimum of 3 feet, whichever is greater. Cover on the gravity sewer pipe shall be a minimum of 6 feet or as shown on the contract drawings. The cover on low pressure sewer shall be 5’ or as shown on the Contract Drawings. Trench depth shall extend to 6 in below the invert of the main.

3.2.2.1 As the excavation approaches pipes, conduits, or other underground structures, digging by conventional trenching machine methods shall be discontinued. Only manual methods of excavating shall be employed around buried utilities.

3.2.2.2 Prior to doing any work outside the right-of-way line on private property or disturbing private property, the Contractor shall advise the property owner of the work and/or disturbance of the person's property that will be done, and the restoration thereof.

3.2.2.3 The Contractor shall maintain utilities, utility services and sewers encountered in the excavation, and repair or replace them to their owner's satisfaction and be responsible for consequential damages thereof.

3.2.2.4 The Contractor shall not be compensated for any additional work required in working in close proximity to a utility line, sewer, water or underground structure in the trench line above or below the sewer pipe.

3.2.2.5 Excavations shall be kept dry until the pipes and appurtenances to be built therein have been completed to such extent that they will not be damaged.

3.2.2.5.1 Provide, operate and maintain any dewatering system required to lower and control groundwater levels and groundwater hydrostatic pressure during the construction of the Work as required by this Section and the Contract Documents. The Contractor shall assume full responsibility and expense for the adequacy of the dewatering system with no additional time for performance.

3.2.2.5.2 The dewatering system shall be capable of developing an excavated subgrade relieved of any hydrostatic pressure that could cause a decrease in the stability of the excavated subgrade and which will provide the necessary groundwater control for the proper performance required for completion of the Work.

3.2.2.5.3 Dewater activities and discharge shall be in accordance to local, state, and federal erosion control and treatment practices. Contractor shall assume full responsibility of his operation and any damage caused by it. Dispose of subsurface water collected in a manner which conforms to all applicable local and state ordinances, statutes and laws. Obtain all permits required for operation of the dewatering system.

3.2.2.5.4 Maintain continual and complete effectiveness of the dewatering system operation to provide a firm, stable, excavated subgrade at all times as required for proper performance of the Work.

3.2.2.5.5 Provide dewatering necessary to maintain the groundwater table 18 inches below the base of the proposed structure and/or pipe at all times.

3.2.2.5.6 Erosion Control: Provide adequate protection from erosion from any of the dewatering operations utilized during the course of the construction. Any damage, disruption or interference to newly constructed work or existing properties, buildings, structures, utilities and/or other work resulting directly or indirectly from dewatering operations conducted under this Contract shall be remedied by the Contractor, at no cost to the Owner.

3.2.2.5.7 Treatment of Dewatering Operations Discharges: Provide such additional treatment devices as may be required to meet the provisions of the Contract. This may include the construction of sumps and/or settling basins, stone rip-rap, silt fences or other requirements. The treatment devices shall be later removed and/or filled in with acceptable backfill material, and restored to original conditions once they are no longer needed, at no additional cost to the Owner.

3.2.3 Over-Excavation - If, in the opinion of the Engineer together with the Owner, the material at or below the depth of the trench is unsuitable for foundation, it shall be removed to such depths as directed by the Owner and Engineer, and shall be replaced with Granular Backfill (sand), conforming to NHDOT paragraph 209.2.1.1 and placed as provided in NHDOT Item 209.3.

3.2.3.1 Where the bottom of the excavation shall, by error of the Contractor, have been taken to a depth greater than the depth shown on the drawings, or as directed by the Engineer, said condition shall be corrected by refilling to the proper grade with compacted Granular Backfill (sand), conforming to NHDOT paragraph 209.2.1.1. All costs shall be borne by the Contractor.

3.2.4 Rock and Boulder Excavation - Rock and boulder excavation shall be in accordance with "Section 206, Structure Excavation for Pipes and Other Minor Structures."

3.2.5 Excess and Unsuitable Excavation - Excess excavation that will not be used for backfill, and unsuitable excavation shall be removed from the site and disposed of by the Contractor in accordance with local, state or federal regulations; and shall be considered incidental to the appropriate pipe item.

3.3 Trench Backfill.

3.3.1 General - After the pipe has been placed and has been inspected by the Owner together with the Engineer, backfilling shall be performed without delay.

3.3.2 Bedding - Bedding shall meet the requirements of section 2.1.5 for low pressure sewer and section 2.1.6 for gravity sewer, and shall extend the full width of the trench from 6 inches below the pipe to 12 inches above the pipe crown. Compact the bedding material to 95% modified proctor (in accordance with ASTM D 157 and ASTM D 2922) in 6-inch lifts or less with approved hand-operated devices. Bedding shall be carried up evenly on both sides of the pipe, so as not to disturb the pipe.

3.3.3 Blanket – When a blanket is used (in lieu of bedding to 12” above top of pipe and only with approval of the Engineer) from the springline of the pipe to a minimum of 12 in above the pipe crown, the trench shall be backfilled by placing and compacting the sand in lifts of 6 in or less to 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922. The filling shall be carried up evenly on both sides of the pipe, care being taken not to raise or otherwise, dislodge the pipe. Backfill to this depth shall be thoroughly compacted with approved hand-operated devices.

3.3.4 Backfill - Backfill material from 12 in above the pipe crown to the underside of the pavement select material profile, or to the underside of gravel and loam areas, shall be backfilled with common backfill described herein and as approved by the Engineer.

3.3.4.1 Backfill shall be placed and compacted in layers of 6 in or less. Compaction shall be by hand-operated compactors.

3.3.4.2 Tamping and compacting of trenches with excavating machines, including plate compactor attachments, is prohibited.

3.3.4.3 Trench areas improperly backfilled or having excessive settlement, as determined by the Engineer, shall be reopened to the required grade and repaved as necessary. The Contractor shall receive no additional compensation for repair of trenches, inclusive of necessary surface treatment, constructed under this Contract.

3.3.4.4 Soil compaction for pipe backfill shall be 95% Modified Proctor in accordance with ASTM D 157 and ASTM D 2922.

3.3.5 Temporary Trench Pavement Patch – All temporary pavement patching for sewer pipe related trenches shall be in accordance with Section 403.

3.4 Sewer Installation.

3.4.1 General.

3.4.1.1 Pipe and fittings shall be handled with care to ensure that the pipe and fittings are in sound, undamaged condition. Particular care shall be taken to prevent damage to pipe coating and lining (if any). Any component not kept clean and clear of foreign material may be rejected by the Owner or Engineer.

3.4.1.2 The Contractor shall furnish slings, straps and/or other approved devices to support the pipe when it is lifted. Pipe and fittings shall not be dropped from trucks onto the ground or into the trench. Transporting pipe and fittings from storage areas shall be restricted to operations which will not cause damage to the pipe or lining (if any).

3.4.1.3 All pipe and fittings shall be examined before laying, and no pipe or fittings shall be installed which are found to be defective. Damaged pipe coatings and/or lining (if any) shall be repaired as approved or directed by the Engineer at no additional cost to the Owner.

3.4.1.4 If any defective pipe is discovered after it has been laid, the Contractor shall remove the defective pipe and replace it with sound pipe at no additional cost to the Owner.

3.4.1.6 In general, gravity pipe laying shall proceed upgrade with spigot ends pointing in the direction of the flow.

3.4.2 Control of Alignment and Grade.

3.4.2.1 The Contractor shall use laser equipment to assist in setting the gravity sewer pipe and must demonstrate satisfactory skill in its use. Equipment shall be accurately calibrated to NH weights and measures standards, and have a current calibration sticker affixed.

3.4.2.2 The use of string levels, hand levels, carpenter’s levels or other similar devices for transferring grade or setting pipe are not to be permitted.

3.4.2.3 During construction provide the Owner, upon request, all reasonable and necessary materials, opportunities, and assistance for setting stakes and making measurements, including the furnishing of one or two rodmen as needed at intermittent times.

3.4.2.4 The Contractor shall carefully preserve bench marks, reference points and stakes, and in case of willful, careless, or accidental destruction by his own workers, he will be responsible for the resulting expense to re-establish such destroyed control data and shall be responsible for any mistakes or delay that may be caused by the loss or disturbance of such control data.

3.4.2.5 Maintain good alignment in laying pipe. The deflection at joints shall not exceed the manufacturer’s recommended limit. Provide fittings, if required, in addition to those shown on the Drawings when pipe crosses utilities encountered when excavating the trench. Use solid sleeves for pressure sewer applications only where shown on the plans unless otherwise approved by Engineer.

3.4.3 Installing Pipe and Fittings.

3.4.3.1 The Contractor shall have on the job site with each pipe laying crew, all the proper tools to handle and cut the pipe.

3.4.3.2 All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until installed.

3.4.3.3 All pipes and appurtenances laid in open trench excavation shall be bedded and uniformly supported over their full-length on bedding of the types specified herein and shown on the drawings. Pipe and fittings shall be laid accurately to the line and grades. The Contractor shall furnish and install all supports necessary to hold the piping and appurtenances in a firm, substantial manner. All work shall be performed in a dry trench.

3.4.3.4 Pipe shall be laid in the dry trench conditions. At no time shall water in the trench be permitted to flow into the pipe. At all times when pipe laying is not actually in progress, or the trench is unattended, the open ends of pipe in the trench shall be closed by temporary water-tight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water and foreign material entering the pipe has passed. The plug shall remain in place until all excavation and bedding has been completed and may only be

removed when the next section of pipe (or component) is ready for installation. The Contractor can be fined by the City of Portsmouth DPW if groundwater is discharged to the Town's sewer system.

3.4.3.5 After placing the pipe on the bedding, the bedding material shall be placed and compacted to the spring line (horizontal centerline) of the pipe, or to top of pipe, or to 12" above the top of pipe, as indicated in the typical trench details. Following placement of the bedding material, the blanket material (if used as indicated in the typical trench details) shall be placed and compacted from the spring line to 12 in above the crown of the pipe.

3.4.3.6 After placement of materials as indicated in 3.4.3.5, the pipe shall be checked for alignment and grade. If the pipe has been properly installed, the Contractor may refill or backfill the remainder of the trench in conformance with the Trenching Section, and details shown on the Drawings.

3.4.3.7 Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed the manufacturer recommendation required for making a satisfactory joint and shall be subject to the approval of the Owner and Engineer. The pipe shall be subject to mandrel testing as indicated in Section 3.4.5.4.

3.4.3.8 When cutting of pipe is required, the cutting shall be done by machine (power cutter) without damage to the pipe or cement lining (if any). Cut ends shall be smooth and at right angles to the long axis of the pipe. Pipe ends to be used with a rubber gasket joint shall be beveled and filed or ground smoothly to conform to a manufactured spigot.

3.4.3.9 For push-on joints, all foreign matter in the gasket seat in the socket shall be removed and the gasket wiped clean and flexed before placing in its seat. A thin film of lubricant shall be applied to the inside surface of the gasket. The plain end of the next pipe, after wiping clean, shall be aligned and carefully entered into the socket until it just makes contact with the gasket. Joint assembly shall be completed by forcing the end of the pipe past the gasket until it makes contact with the bottom of the socket. At fittings install precast thrust blocks as specified here-in.

3.4.3.10 Lay PVC pipe and fittings in accordance with the requirements of AWWA C 900, except as provided herein. PVC pipe shall not be installed when temperatures are below 32 º F (0 º C) unless approved by the Engineer.

3.4.3.11 Lay ductile iron pipe and fittings in accordance with the requirements of AWWA C 600, except as provided herein.

3.4.3.13 As soon as excavation has been completed to the proper depth the pipe bed shall be prepared as follows:

3.4.3.13.1 Pipe Laid on Bedding Material: Place and compact bedding materials, as specified in the Trenching Section, to the elevation necessary to bring the pipe to grade. The compacted material shall be shaped so that the bottom quadrant of the pipe rests firmly on the bedding for the entire length of pipe barrels. Suitable holes shall be dug for bells or couplings to provide ample space for jointing pipe.

3.4.3.14 Each pipe section shall be placed into position on the pipe bed in such a manner and by such means required to avoid injury to persons, any property or the pipe.

3.4.3.15 Permanent blocking under the pipe is not permitted except where a concrete cradle is required, in which case precast concrete blocks shall be used.

3.4.3.16 Jointing shall conform to the manufacturer's instructions and appropriate ASTM Standards.

3.4.3.17 Any debris, tools etc. shall be removed from the pipe.

3.4.3.18 Unsatisfactory work shall be dug up and reinstalled to meet the requirements of the Contract Documents with no additional time allowed for completion of the Work and at no additional cost to the Owner.

3.4.3.19 Thrust Blocking: Bends, tees, and other fittings in pipe lines of the low pressure sewer system buried in the ground shall be backed up with precast concrete thrust blocks as specified here-in.

3.4.3.20 Insulation: As shown on the drawings and as directed by the Engineer, generally insulation shall be installed over sewer lines having less than 5 feet of cover as directed by the Engineer.

3.4.4 Service Connections.

3.4.4.1 House service lines shall be laid from the connection on the main line sewer to the property line, as directed by the Engineer.

3.4.4.2 All new service connections shall be 6 in PVC for gravity sewers.

3.4.4.3 New services shall terminate as shown on the Drawings, be capped with a watertight cap, and the end shall be marked with a ferrous metal rod or pipe terminating at finish grade.

3.4.5 Testing.

3.4.5.1 General. The Contractor shall sub-contract an independent third party to conduct pressure and leak testing. The testing sub-Contractor shall furnish all necessary equipment and labor for, and perform, pressure testing and leakage tests on the new sewer system. All testing of pipelines shall be witnessed by the Engineer and Owner and shall be subject to their review and acceptance of the results. The Contractor shall be responsible for coordinating all testing activities with the Engineer and Owner.

3.4.5.2 Testing forms which indicate all testing information and results shall be submitted to the Engineer.

3.4.5.3 Gravity Sanitary Sewer Pipe Testing With All Service Connections Capped. All gravity sewers shall be tested for water tightness by use of low pressure air tests in accordance with NHDES Env-Wq 704.07.

3.4.5.3.1 Air Test: Leakage testing shall be by means of low-pressure air in accordance with the procedures described in UNI-B-6. The maximum allowable pressure drop from the test pressure shall be 1.0 psig during the minimum holding time.

Test pressure psi shall be calculated using the following equation:
$P = 3.5 + (H/2.31)$
P = Test pressure (max. =9 psi)
H = Height (ft) of groundwater above invert.

Minimum holding time required for a 1.0 psig maximum pressure drop shall be calculated using the following chart.

Pipe Dia. (in.)	Min. Time (min:sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Time (min:sec) for length (L) Shown					
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43
36	34:00	66	30.768 L	51.17	76.55	102.34	128.12	153.50	179.29

3.4.5.4 Deflection Test for Flexible Pipe: Deflection testing will be done with a properly sized "GO-NO-GO" mandrel only unless specifically approved by the City of Portsmouth Sewer Department. Maximum allowable pipe deflection shall be five percent (5%). The deflection test shall be performed no sooner than thirty (30) days after installation.

3.4.5.5.1 Pressure and leakage tests under the direction of the Engineer shall be conducted on all pipes installed under this section of the Work. Deflection tests shall be conducted on PVC pipe as ordered by the Engineer. The Engineer shall witness all tests. The Contractor shall supply all plugs, pumps, weirs, gauges, water, water trucks, mandrels, etc., necessary to conduct the tests. Should the Work fail the leakage or deflection tests, corrective action shall be taken by the Contractor in a manner approved by the Engineer and, if directed by the Engineer, the Contractor shall dig up and relay the failed section with no additional time allowed for completion of the Work and at no additional cost to the Owner.

3.4.5.8 Flushing: All the mains shall be properly flushed by the Contractor under the direction of the Portsmouth Sewer Department. In general, flushing shall be performed at a flow rate required to achieve a minimum velocity of 3.5 feet per second. The Contractor can be fined by the City of Portsmouth DPW if discharge water is flushed into the Town’s sewer system.

3.4.6 Protection of Water Supplies.

3.4.6.1 There shall be no physical connection between a public or private potable water supply system and a sewer, or sewer appurtenance, which would permit the passage of any sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole.

3.4.6.2 Sewer lines damaged or broken during construction shall be repaired immediately by the Contractor. All necessary repairs shall be made prior to the continuation of any water main work. The Engineer, Owner and utility authority shall be immediately notified of any breaks in the sewer lines.

3.4.6.3 Gravity sewers shall be located outside a 400 feet radius centered at a municipal well; 200 feet radius centered at a small public well, and 75 feet radius centered at a private well.

3.4.6.4 Gravity sewers shall be located during design, at least 10 feet horizontally from any existing or proposed water main, except that a deviation from this separation to avoid subsurface structures, including telecommunication chambers, interference of building foundations, etc., shall be allowed only if approved by the Engineer, provided that the sewer is constructed as follows:

3.4.6.4.1 Gravity sewer pipe shall be class 52 ductile iron for a maximum distance of 75 feet each side of the obstruction.

3.4.6.4.2 Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 psi for gravity sewers and 1-1/2 times working pressure for force mains and low pressure sewer systems.

3.4.6.5 Whenever gravity sewers must cross water mains, the sewer shall be constructed as follows:

3.4.6.5.3 Vertical separation of all sewer mains and water mains shall not be less than 18 inches (sewer under water).

3.4.7 Casing Installation.

3.4.7.1 Casing pipe shall be installed by open cut, with bedding and cover material as shown on the drawings.

3.4.7.2 Casing pipe ends shall be beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest AWS Welding Code. All joints of the casing pipe shall be butt welded by a welder certified by the State of New Hampshire for the specific application.

3.4.8 Carrier Pipe Installation - After casing pipe has been installed and cleaned of dirt and debris, pipe spacers shall be attached to carrier pipe as shown on the Drawings. As carrier pipe is jointed, it shall be pushed into position inside the casing pipe.

3.4.8.1 After the carrier pipe has been tested for leakage, bulkheads shall be constructed at each end of the casing pipe. On brick bulkheads, a "one brick" opening shall be left in the bulkhead at the top of the casing pipe at each end and covered with polyethylene to prevent entry of backfilling materials. The portion of the carrier pipe passing through the brick bulkhead shall be wrapped with three layers of fifteen pound asphalt-impregnated felt before the bulkhead is constructed.

3.5 Manhole Installation.

3.5.1 Installation of Manhole Bases and Sections.

3.5.1.1 Precast bases shall be placed on properly compacted bedding material. The excavation shall be properly dewatered to allow placing of bedding material and setting the manhole base on completely drained subgrade.

3.5.1.2 Inlet and outlet stubs shall be connected and sealed in accordance with the manufacturer's recommended procedure, and as shown on the Drawings.

3.5.1.3 Barrel sections and cones of the appropriate combination of heights shall then be placed, using manufacturer's recommended procedure for sealing the horizontal joints.

3.5.1.4 A leakage test shall then be made as described below in this section.

3.5.1.5 Upon successful completion of the leakage test all joints shall be pointed.

3.5.1.6 The exterior waterproofing coat shall be touched up after installation and shall be applied to the exterior of all joints in accordance with manufacturer's recommendations.

3.5.1.7 The inverts and the shelf shall be constructed of brick.

3.5.1.8 The frame and cover shall be placed on the top of the manhole or some other approved means shall be provided to prevent accidental entry by unauthorized persons, children, animals, etc., until the Contractor is ready to make final adjustment to grade.

3.5.2 Mixing Mortar.

3.5.2.1 Mortar shall be mixed in accordance with ASTM C 270 or the recommendations of the manufacturer.

3.5.3 Brick Masonry.

3.5.3.1 Only clean bricks shall be used in brickwork for grade adjustment and manhole inverts. The bricks shall be moistened by suitable means, until they are in a surface dry, saturated condition.

3.5.3.2 Each brick shall be laid in full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and shall be thoroughly bonded.

3.5.3.3 Brick masonry shall be protected from too rapid drying. Use an approved cover and protect from the weather and frost.

3.5.3.4 All masonry joints which are exposed to view shall be examined to locate cracks, pointed up and filled with mortar. Where necessary, in the opinion of the Engineer, the joints shall be cut out and repointed with mortar.

3.5.3.5 All brick masonry inverts shall allow unimpeded flow. Steps or puddles will be basis for rejection.

3.5.4 Setting Frames and Covers.

3.5.4.1 Frames shall be set with the tops conforming accurately to the grade of the pavement or finished ground surface or as indicated on the Drawings. Frames shall be set concentric with the top of the masonry and in a full bed of mortar so that the space between the top of the manhole masonry and the bottom flange of the frame shall be completely filled and made watertight. A thick ring of mortar extending to the outer edge of the masonry shall be placed all around and on the top of the bottom flange. The mortar shall be smoothly finished and have a slight slope to shed water away from the frame.

3.5.5 Leakage Tests for Sewer Manholes

3.5.5.1 Leakage tests shall be made and observed by the Engineer on each manhole. The test shall be a vacuum test made as described below.

3.5.5.2 Vacuum test:

3.5.5.2.1 The vacuum test may be performed on manholes, completely constructed, with inlet and outlet pipes in place. Test shall be conducted before any backfilling begins. Any material around the base section shall be removed to expose the entire side of the manhole. Plug pinholes and horizontal seams with a non-shrinking mortar.

3.5.5.2.2 Brace the inlet and outlet pipes/plugs to prevent movement during the test. Use air inflated plugs in good condition.

3.5.5.2.3 The vacuum test shall be performed using equipment approved by the Engineer. The equipment shall be in good operating condition. No gauges are to have any broken glass or other visible abnormalities. The test shall be performed by trained personnel familiar with the equipment and the test.

3.5.5.2.4 The test shall have a minimum duration of two minutes. The vacuum shall be pumped down to 10 inches of mercury on an approved gauge, and held. At the time the removal of air is stopped, the test time shall begin.

3.5.5.2.5 Any manhole that has a vacuum drop to nine inches of mercury or less, within the following time intervals, shall have failed the test:

0 – 10 ft. deep: less than 2 minutes. 10 ft.– 15 ft. deep: less than 2-1/2 minutes. 15 ft. – 20 ft. deep: less than 3 minutes. over 20 ft. deep: less than T.

Calculations for manholes deeper than 20 feet:

T = 0.085 DK/Q
T = Time of pressure drop in seconds
K =0.000419 DL; but not less than 1.0 Q = 0.0015 ft3/min/ft2 of area
D = Nominal manhole diameter in.
L = Depth of manhole in feet.

Method of Measurement

4.2 Sewer casing including carrier pipe of the kind, type and size specified will be measured by the linear foot to the nearest 0.1 foot.

4.3 Sewer wyes , tee wyes, fitting and couplings will not be measured but shall be considered incidental to the sewer pipe item.

4.5 Sewer manholes will be measured by the vertical foot to the nearest 0.01 foot.

4.9 Sewer pipe and service line insulation shall be measured per square yard installed including all necessary backfill, excavation, labor, materials and equipment.

4.10 No separate measurement will be made for maintaining sewer flow, pumping or bypass system and this work shall be considered subsidiary to installation of the new sewer system.

4.11 The Engineer must be involved in and approve the measurement of every pay item.

Basis of Payment

5.1 The accepted quantity of sanitary gravity sewer pipe, sewer sleeve/casing, sewer manholes and sewer services will be paid for at the contract price per in place as shown on the plans and specified herein, and shall include furnishing and installing pipe, excavation, bedding, blanket, backfill, couplings, bends, testing, sheeting, shoring, dewatering, maintaining sewage flow, restoration, connection to existing sewers, and all other work required for or incidental to the completion of this item except as noted below.

5.1.1 Common structure excavation required for the removal of unsuitable material below the typical trench section will be paid for as provided under 206.

5.1.2 Rock structure excavation and common structure excavation exploratory will be paid for as provided under 206.

5.1.3 Granular backfill (sand) to replace material excavated under 5.1.1 will be paid for as provided under 209.

5.2 The accepted quantity of sewer casing pipe, including carrier pipe, will be paid at the contract price complete in place as shown on the plan and specified herein, and shall include furnishing and installing carrier pipe, assembly of carrier pipe, excavation, bedding, blanket, backfill, furnishing and installing carrier pipe, pipe spacers, bulkheads and appurtenances, furnishing and installing grout and all other work required for or incidental to the completion of this item, except as noted below.

5.3 Sewer service wyes will be not be paid but shall be considered incidental to the sewer pipe item.

5.5 The accepted quantity of sewer manholes will be paid for at the contract unit price per vertical foot for the manhole constructed and shall include furnishing and installing manhole base, riser and cone sections, frames and covers, installing inside drop connections where required, furnishing and brick channel and table, all brick work to adjust frames, testing, and all other work required or incidental to the completion of this item.

5.7 Any work not specifically having a pay item and necessary for a complete and operational sanitary sewer, as herein specified and called for on the plans, shall be considered incidental and subsidiary to the pay item work specified herein. The work considered as subsidiary and not separately paid for shall include but not be limited to the following:

5.7.1 Pipe material handling and storage on site. 5.7.2 Excavation, bedding, blanket and backfill.

5.7.2 Excavation, bedding, blanket, and backfill.

5.7.3 Sheeting, shoring, and dewatering of trenches (if applicable).

5.7.4 Maintaining existing sewer service and system flow.

5.7.5 Restoration of property, utilities, and water lines (if applicable).

5.7.6 Pressure testing and lamping.

5.7.7 Plugging abandoned sewers and removal and disposal of existing manholes.

5.7.8 As built survey, as built and record drawings.

5.7.9 Connections to existing sewers and couplings

603.20018 18” DI PIPE SLEEVE (CASING FOR 12” PVC GRAVITY SEWER)	LF
604.315 SEWER MANHOLE 4' DIAMETER	VF
612.35006 6" PVC SEWER SERVICE PIPE, SDR 35	LF
612.35010 10" PVC SEWER PIPE, SDR 35	LF
612.35012 12" PVC SEWER PIPE, SDR 35	LF
612.35015 15" PVC SEWER PIPE, SDR 35	LF
612.30025 CONNECTION TO EXISTING FACILITIES	UNIT
612.30020 GRAVITY SEWER MAINTENANCE OF SEWER SYSTEM FLOW	UNIT

END OF SECTION

SPECIAL PROVISION,

SECTION 202.901 – HEALTH AND SAFETY PLAN

Description

This is a contingency item.

It is the Contractor's ultimate responsibility to ensure the health and safety of all the Contractor's employees and subcontracting personnel, the Engineer and his representatives, and the public from any on-site chemical contamination.

The Health & Safety Plan (HASP) shall be prepared by a Certified Industrial Hygienist or other experienced individual with the appropriate OSHA required training to prepare such a plan. It shall include the components required by OSHA 29 CFR 1910.120(b). The preparer's name and work experience shall be included as part of the Health and Safety Plan submittal. The plan shall be designed to identify, evaluate, and control health and safety hazards and provide for emergency response if needed. The Health and Safety Plan shall be a dynamic document with provision for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public. Health and safety procedures provided by the Contractor shall comply with all the appropriate regulations that address employee working conditions (e.g. OSHA, RCRA, CERCLA). In addition, guidelines of NIOSH, OSHA, USCG, EPA, etc., shall be followed, where applicable. Equipment used for the purpose of health and safety shall be approved and meet pertinent standards and specifications of the appropriate regulatory agencies.

The Health and Safety Plan shall be submitted to the City of Portsmouth for approval at least one (1) week prior to commencement of work. The review and acceptance of the plan by the City of Portsmouth does not relieve the Contractor of the responsibility for attaining the required degree of protection and training, or to comply with all laws, rules, regulations, standards or guidelines in effect during the execution of the contract.

A copy of the Health and Safety Plan shall be maintained on-site at all times by the Contractor. The on-site copy shall contain the signature of the Engineer and each on-site employee of the City of Portsmouth, Contractor and Subcontractors. The employee's signature on the Health and Safety Plan shall be deemed prima facie evidence that the employee has read and understands the plan. A copy of the plan with signatures shall be submitted to the Engineer at the conclusion of the Contract, or at the Engineer's request. Signature sheets shall be submitted monthly, or at the request of the Engineer.

Basis of Payment

The work to be done under this item shall be paid at the Contract Lump Sum Price under Item 202.901 for the development and preparation of the HASP by a qualified individual.

SPECIAL PROVISION,

SECTION 202.902 – IMPLEMENTATION OF HEALTH AND SAFETY PLAN

Description

This is a contingency item.

For all construction activities which require handling or exposure to potentially hazardous materials, the Health and Safety Plan shall specify an on-site Safety Officer. The Site Health and Safety Officer duties shall include, but are not limited to: implementation of the site Health and Safety Plan, training, evaluating risks, safety oversight, determining levels of personnel protection required, and performing any required monitoring at the site. A Daily Log shall be kept by the on-site Safety Officer and provided weekly to the Engineer. This log shall be used to record a description of the weather conditions, levels of personnel protection being employed, monitoring data, and any other information relevant to on-site safety conditions. The Site Health and Safety Officer shall sign and date the Daily Log.

In the event that subsurface contamination is discovered during construction, the Site Safety Officer shall be present to oversee all handling, storage, sampling, and transport of such contaminated materials.

The level of protection, relative to respiratory and dermal hazards, required to ensure the health and safety of on-site personnel will be stipulated in the Health and Safety Plan and will be subject to modification by the on-site Safety Officer based on changing site and weather conditions and the following factors: type of operation or activity, chemical compounds identified on-site, concentration of the chemicals, physical state of the hazardous materials, potential duration of exposure to hazardous materials, dexterity required to perform work, decontamination procedures, necessary personnel and equipment, and type of equipment to be utilized.

The Contractor shall be required to provide appropriate personnel protective equipment for anyone who is working in an area either containing or suspected of containing a hazardous environment. This work will include both individuals physically working in these areas and those directing the work of same. Contingencies for upgrading the level of protection for on-site workers will be identified in the Health and Safety Plan and the Contractor shall have the necessary materials/equipment on hand to implement the level of protection upgrade to Level “C” in a timely manner. Payment for this level of upgraded protection shall be paid for under Item 180-300.

Method of Measurement

Implementation of the Health and Safety Plan will be measured per hour of implementing the plan**.**

Basis of Payment

Implementation of the Health and Safety Plan will be paid at the contract bid price per hour of implementing the plan and shall include the cost of enforcement by an on-site Safety Officer. Personnel protective clothing and equipment below Level "C" shall be considered incidental to the project and shall be a cost borne by the Contractor.

SPECIAL PROVISION,

SECTION 202.903 – PERSONNEL PROTECTION LEVEL "C" UPGRADE

Description

This is a contingency item.

The Contractor shall provide to all workers disposable, protective clothing appropriate to the hazard level of the work. The protective equipment and its use shall be in strict compliance with the Health and Safety Plan (Item 202.901), and all appropriate regulations that address employee working conditions.

Basis of Payment

Payment for Item 202.903 will be at the contract unit price, per hour, per man, required in level "C" personnel protection.

SPECIAL PROVISION,

SECTION 202.904 – MONITORING/HANDLING AND STOCKPILING OF CONTAMINATED SOILS

Description

This is a contingency item.

Within limited areas of the project site, it is possible that excavated soils may be contaminated. The Engineer shall be responsible for evaluating soil with non-natural discoloration, petroleum or chemical odor, the presence of petroleum liquid or sheening on the groundwater surface, or any abnormal gas or materials in the ground which are known or suspected to be contaminated with oil or hazardous materials. The Contractor will be responsible for stockpiling contaminated soil, maintaining the stockpile, identifying a disposal facility, and removing the soil from the site to the facility.

The Engineer shall be contacted immediately by the Contractor when any observations indicate contamination requiring soil removal or when contamination not detectable by on-site instrumentation is suspected. Soil suspected of gasoline contamination shall be field tested by the Engineer using standard jar headspace procedures approved by the New Hampshire Department of Environmental Services. The Contractor shall be required to supply all personnel and materials necessary to comply with this section and to support the anticipated levels of protection and monitoring described above.

All contaminated soils exhibiting a jar headspace screening level of 100 parts per million (ppm) using a photo-ionization detector will be stockpiled for disposal on and under two layers of minimum 6 mil polyethylene sheeting in accordance with all New Hampshire Department of Environmental Services statutes, policies, and regulations. The Contractor will be responsible for maintaining the security of the stockpile up to the time the soil is transported off-site for disposal.

The Contractor shall be responsible for identifying a disposal/recycling facility and obtaining all permits, approvals, Bill of Lading, etc. prior to the removal of the contaminated soil from the site. Any soils contaminated with hazardous materials that are not of petroleum origin shall be handled on a case-by-case basis. The Contractor shall obtain at least three bids for the handling and disposal of any contaminated material. All manifest, bills of lading, etc. will be the responsibility of the Contractor with copies provided to the Engineer.

Method of Measurement

Measurement shall be made by the volume, in cubic yards of contaminated material monitored, handled and/or stockpiled as described under Item 202.904.

Basis of Payment

Work under this item shall be paid at the Contractor bid price, per cubic yard, which payment shall be considered compensation for all labor, tools, equipment and materials needed to do the work as described above.

SPECIAL PROVISION,

SECTION 202.908 – DISPOSAL OF PETROLEUM CONTAMINATED SOIL;

Description

These are contingency items.

The Contractor shall be responsible for the proper disposal or recycling of contaminated soils. The classification of the above soil types and the proper methods of disposal and recycling of these soils shall comply with the methods described under Item 180-400 and in accordance with all New Hampshire Department of Environmental Services and Environmental Protection Agency statutes, policies, and regulations.

Method of Measurement

Measurement shall be made by the weight, in tons, of contaminated material removed from the site and delivered to an approved landfill, disposal facility, or recycling facility, and includes any costs for approvals, permits, testing, transportation and disposal.

Basis of Payment

The work under these items shall be paid at the Contractor bid price, per ton, which payment shall be considered as full compensation for all labor, tools, equipment and materials required to do the work as described above.

SPECIAL PROVISION,

SECTION 202.910 – TREATMENT OF CONTAMINATED GROUNDWATER

Description

This is a contingency item.

The Contractor is advised that contaminated groundwater may be encountered during trench excavations. It is possible that treatment of the contaminated groundwater using liquid-phase granular-activated carbon will be required to complete the work under this Contract. The methods described under Item 183-100 provides for the identification, testing, management and treatment or disposal of contaminated groundwater and shall be implemented, at a minimum and as necessary by the Contractor via Methods under Item 183-100.

It is not the intent herein for the Engineer to design for or specify to the Contractor which particular treatment is to be used, if necessary. Rather, it is the Engineer's intent to provide guidance to the Contractor for informational and bidding purposes only. It is, therefore, the Contractor's responsibility to use a treatment method which allows him/her to meet any and all laws, regulations, policies, guidelines and permit requirements.

The overall handling and management of contaminated groundwater is regulated by NHDES and the US EPA. The unpermitted discharge of contaminated dewatering effluent into the environment (storm drain, surface water body, onto the ground) is a violation of several federal and state laws and regulations.

Should dewatering of contaminated groundwater be necessary, approvals must be sought from the appropriate regulatory jurisdiction.

There are basically four options available:

1) Pump to a tight tank or "vacuum truck", with subsequent treatment/disposal at an off-site approved facility;

2) Discharge to a sanitary sewer with appropriate permit from local and regional sewerage authorities and DES;

3) Discharge to a storm drain or surface water body with permit or approval from DES and/or the US EPA; or

4) Discharge to the ground with the approval from DES.

Generally, the utilization of options (2) through (4) involves treating the contaminated groundwater prior to discharge. Treatment of contaminated groundwater for dewatering operations is generally performed using a mobile treatment trailer equipped with one or more granular-activated carbon (GAC) canisters, although other techniques are also used.

Due to the lead time necessary to obtain a surface water discharge permit or a temporary groundwater discharge permit for on-site infiltration, option (1) may be the most cost-effective and expedient alternative.

Containerization of the water with subsequent treatment and discharge per the terms of a surface water discharge permit or a temporary groundwater discharge permit is also a viable option The NHDES normally requires that the treated discharge water meet Ambient Groundwater Quality Standards. The discharge standards are normally met by treating the dewatered groundwater through granular-activated carbon canisters, or similar techniques.

The Contractor shall be responsible for determining compliance with the requirements of the obtained Permit and for any sampling, testing, and disposal required in connection with said Permit. The Contractor is also advised that additional requirements may be administered by the local sewer authority. The NHDES and Town reserve the right to collect additional samples of dewatered groundwater to determine the Contractor's compliance with the Permit's requirements.

Longer term discharges to surface waters or storm drains, and any discharge to the ground, requires approval and/or issuance of a permit from NHDES and US EPA.

For the purpose of these specifications and to establish a basis for the bid, it is anticipated that liquid-phase granular-activated carbon will be the treatment medium for dewatered contaminated groundwater. The bidder shall factor into the payment item all costs associated with the testing and analyses that may be required by the permitting agency. In addition, any laboratory testing of groundwater is to be performed by a DES certified laboratory for the parameters being tested. Copies of all field and laboratory testing results will be supplied to the Engineer. Bid price shall also include full compensation for labor, materials, maintenance, mobilization, rental and other related costs. Item 202.910 will be used for disposal of used granular-activated carbon canisters.

Method of Measurement

Work under Item 202.910 is based upon the number of gallons disposed or contaminated groundwater pumped through the liquid-phase granular-activated carbon (Item 202.911) as the medium for the treatment of contaminated groundwater that is found in pipe trenches, manhole excavations, catch basin excavations, that need to be dewatered.

Basis of Payment

Payment shall be made at the unit price bid per gallon of groundwater pumped, which price shall be full compensation for all necessary labor and materials, mobilization, maintenance, demobilization of the appropriate unit(s), freight, rental costs, field and laboratory testing costs and permits. Costs associated with the disposal of liquid-phase granular-activated carbon shall be considered subsidiary to Item 202.910.

SPECIAL PROVISION,

SECTION 203.1 – COMMON EXCAVATION

Description

1.1 The work consists of all excavation not included as rock excavation or not otherwise classified under the project, including excavation of jacking and receiving pits and other features and materials encountered in the work, as indicated in the contract drawings and as directed by the Engineer.

1.2 The applicable sections of the NHDOT standard specifications shall apply to the work.

Classification of Material

2.1 Unclassified excavation shall not be accounted for separately under this project but shall be included under the pay item for common excavation.

Construction Requirements

3.1 Construction requirements shall conform to the applicable construction requirements of the NHDOT Standard Specifications for the type of work required.

Method of Measurement

4.1 Common Excavation under this project shall be measured by the cubic yard.

Basis of Payment

5.1 Payment will be made for Common Excavation required under this contract on a cubic yard basis. The Price for the Common Excavation includes all excavation, backfill, compaction, labor, proper disposal and equipment necessary for or incidental to the completion of the work to the satisfaction of the Engineer

SPECIAL PROVISION,

AMENDMENT TO SECTION 503 -- COFFERDAMS AND WATER DIVERSION STRUCTURES

This special provision provides for a water diversion structure consisting of sand bags and neither amends nor modifies other provisions of this section except as provided below.

Add to 1.1:

1.1.1 On this project, the Contractor shall construct a water diversion structure consisting of sand bags.

Add to 2.1:

2.1.1 Sand bags shall meet the nominal dimensions of approximately 3 feet wide, 3 feet long and 2.5 feet thick. Bags shall be filled with clean sand aggregate and shall have prior approval of the Engineer.

Add to 3.2.1:

3.2.1.1 **Dewatering and Cofferdam at proposed Headwall**. The Contractor shall construct a water diversion structure and coffer dam of sand bags around the outlet of the proposed 36" Ductile Iron outlet. Water shall be removed from the work area while placing the proposed outlet. The structure shall be constructed in a workmanlike manner and in a way to minimize erosion and to isolate the area of excavation and placement of stone fill. Appropriate measures of safety and protection shall be incorporated into the work and construction method.

3.2.1.2 The temporary water diversion structures shall have a vertical face along the water edge with a back slope of 1:1. The height of the structure shall be dependent upon the anticipated water level during the time of construction.

Add to 5.2:

The following sentence: Sandbags and all associated work with sand bagging and maintaining the water diversion structure shall be considered to be included in the unit cost of this item.

Add 5.4:

If for any reason the contractor elects to not implement temporary water diversion(s), no payment will be made.

SPECIAL PROVISION,

SECTION 585.31 – STONE FILL, CLASS C2;

Description

1.1 The work consists of providing stone fill for the various types at the locations identified in the project drawings.

1.2 The applicable sections of the NHDOT standard specifications shall apply to the work including but not limited to Section 105 – CONTROL OF THE WORK, Section 503 – COFFERDAMS AND WATER DIVERSION STRUCTURES, Section 585 – STONE FILL, and Section 603 – CULVERTS AND STORM DRAINS.

Materials

2.1 Materials shall conform to the requirements of the NHDOT standard specifications with the additional requirements that gradation for stone sizes C2 shall be as indicated in the table provided in the project.

Construction Requirements

3.1 Construction requirements shall conform to the applicable construction requirements of Sections 585 of the NHDOT Standard Specifications for the type of work required.

Method of Measurement

4.1 Stone Fill, Class C1 under this project shall be measured by the cubic yard of Stone Fill, Class C2 installed.

Basis of Payment

5.1 Payment will be made for Stone Fill, Class C2 provided under this contract on a cubic yard basis and includes all materials and equipment necessary for or incidental to the completion of the work to the satisfaction of the Engineer.

SPECIAL PROVISION,

SECTION 604.394 – WATER QUALITY/SETTLING TANK (11' x 5');
SECTION 604.395 – WATER QUALITY/SETTLING TANK (13' x 7')

Description

1.1 The work consists of installing water quality/settling tanks for drainage as indicated in the contract drawings and as directed by the Engineer.

1.2 The applicable sections of the NHDOT standard specifications shall apply to the work.

Materials

2.1 Materials shall conform to the requirements of the NHDOT standard specifications and shall be as indicated on the contract drawings. **All structures under this section may be subject to tidal influx and shall be coated on the inside of the structures with Consolideck Saltguard WB in accordance with the manufacturer's requirements.**

Construction Requirements

3.1 Construction requirements shall conform to the applicable construction requirements of the NHDOT Standard Specifications for the type of work required. The water quality/settling tanks shall be installed in the locations designated on the plans. The water quality/settling tanks shall be installed as indicated on the plans or as directed by the Engineer in the Field.

Method of Measurement

4.1 Water quality/settling tanks under this project shall be measured per each for the number of water quality/settling tanks installed.

Basis of Payment

5.1 Payment will be made for water quality/settling tanks required under this contract on a per each basis. The Price for the water quality/settling tanks includes all excavation, backfill, compaction, pipe connections, frames and covers, brick work, labor, materials and equipment necessary for or incidental to the complete in place installation of the water quality/settling tanks to the satisfaction of the Engineer. Any materials damaged by the Contractor shall be replaced at no expense to the Owner.

APPENDIX

APPENDIX 1

BORING LOGS

Stantec — BOREHOLE LOG — B-1

CLIENT: City of Portsmouth, NH
PROJECT No.: 195112923
LOCATION: Brewster St, Portsmouth, NH
EXPLORATION No.: B-1
EXPLORATION DATE: 4/17/2014 to 4/17/2014
WATER LEVEL: 5.5 feet bgs
DATUM:

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SPT blows / 6"	SPT N-Value	PID Reading (PPM)
		Ash					in.			
0		Medium dense black ASH			SS	1	24	6 8 6 6	14	
		Loose black ASH			SS	2		4 4 5 3	9	
5		Loose black ASH		▽	SS	3		1 3 5 12	8	
		Medium dense GRAVEL								
		Medium dense gray SILT/CLAY			SS	4		7 7 6 6	13	
		Very loose dense gray SILT/CLAY, trace organics			SS	5		4 1 1 1	2	
10		Very loose, stiff gray SILT/CLAY			SS	6		1 1 1 6	2	
		Exploration terminated at 12 feet bgs.								
15										
20										
25										

Undrained Shear Strength - tsf: 1 2 3 4

Water Content & Atterberg Limits: W_P W W_L

Dynamic Penetration Test, blows/foot: ★

Standard Penetration Test, blows/foot: ●

10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✕ Pocket Penetrometer / Torvane

STN13-GEO-VOC 195112923_PORTSMOUTHNH.GPJ JW NHP.GDT 7/23/14

Stantec

BOREHOLE LOG

B-2

CLIENT City of Portsmouth, NH

PROJECT No. 195112923

LOCATION Brewster St, Portsmouth, NH

EXPLORATION No. B-2

EXPLORATION DATE 4/17/2014 to 4/17/2014

WATER LEVEL 7.5 feet bgs

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading (PPM)
		Concrete					in.			
0		Medium dense ASH			SS	1		3 4 6 9	10	
		Medium dense coarse GRAVEL								
		Medium dense coarse GRAVEL			SS	2		6 6 5 5	11	
5		Medium dense coarse GRAVEL, trace silt			SS	3		6 5 6 8	11	
		Medium dense coarse GRAVEL		▽	SS	4		9 9 7 4	16	
		Medium dense coarse GRAVEL			SS	5		4 5 6 4	11	
10		Loose coarse GRAVEL			SS	6		5 5 2 2	17	
		Exploration terminated at 12 feet bgs.								
15										
20										
25										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 195112923_PORTSMOUTHNH.GPJ JW NHP GDT 7/23/14

Stantec BOREHOLE LOG B-3

CLIENT City of Portsmouth, NH
LOCATION Brewster St, Portsmouth, NH
EXPLORATION DATE 4/17/2014 to 4/17/2014
WATER LEVEL 7.5 feet bgs
PROJECT No. 195112923
EXPLORATION No. B-3
DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading (PPM)
		Concrete					in.			
0		Medium dense Black ASH			SS	1		4 6 9 5	15	
		Medium dense GRAVEL			SS	2	3	11 11 9 6	20	
5		No Recovery			SS	3		7 6 5 4	11	
		Loose coarse GRAVEL		▽	SS	4		3 4 4 4	8	
		Loose SILT/CLAY								
		Loose gray CLAY			SS	5		3 2 2 3	4	
10		No Recovery			SS	6		7 4 3 2	7	
		Exploration terminated at 12 feet bgs.								
15										
20										
25										

Undrained Shear Strength - tsf
1 2 3 4
Water Content & Atterberg Limits W_P W W_L
Dynamic Penetration Test, blows/foot ★
Standard Penetration Test, blows/foot ●
10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test
□ Field Vane Test ■ Remolded
✕ Pocket Penetrometer / Torvane

STN13-GEO-WOC 195112923_PORTSMOUTHNH.GPJ JW NHP.GDT 7/23/14

Stantec

BOREHOLE LOG

B-4

CLIENT City of Portsmouth, NH

LOCATION Brewster St, Portsmouth, NH

EXPLORATION DATE 4/17/2014 to 4/17/2014

WATER LEVEL 5.0 feet bgs

PROJECT No. 195112923

EXPLORATION No. B-4

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading (PPM)
							in.			
0		Topsoil								
		Topsoil								
		GRAVEL								
		Fine-medium SAND								
5				▽						
		Gray CLAY								
10										
		Exploration terminated at 12 feet bgs.								
15										
20										
25										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO-I-VOC 195112923_PORTSMOUTHNH.GPJ JW NHP.GDT 7/23/14

Stantec

BOREHOLE LOG

B-5

CLIENT City of Portsmouth, NH

PROJECT No. 195112923

LOCATION Brewster St, Portsmouth, NH

EXPLORATION No. B-5

EXPLORATION DATE 4/17/2014 to 4/17/2014

WATER LEVEL 6.5 feet bgs

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SPT N-Value	PID Reading (PPM)
0		Topsoil					in.			
		Topsoil								
		ASH								
		Light brown CLAY								
5		COBBLES		▽						
		Gray CLAY								
10										
15		Exploration terminated at 15 feet bgs.								
20										
25										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✕ Pocket Penetrometer / Torvane

STN13-GEO4-VOC 195112923_PORTSMOUTHNH.GPJ JW NHP.GDT 7/23/14

Stantec

BOREHOLE LOG

B-6

CLIENT **City of Portsmouth, NH**

LOCATION **Brewster St, Portsmouth, NH**

EXPLORATION DATE **4/17/2014 to 4/17/2014**

WATER LEVEL **6.5 feet bgs**

PROJECT No. **195112923**

EXPLORATION No. **B-6**

DATUM

DEPTH (ft)	ELEVATION (ft)	MATERIAL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY	SAMPLES SPT blows / 6"	SAMPLES SPT N-Value	PID Reading (PPM)
0		Pavement					in.			
		Pavement (1.5")								
		FILL, with brick								
5		Gray CLAY		▽						
10										
15		Exploration terminated at 15 feet bgs.								
20										
25										

Undrained Shear Strength - tsf

1 2 3 4

Water Content & Atterberg Limits W_P W W_L

Dynamic Penetration Test, blows/foot ★

Standard Penetration Test, blows/foot ●

10 20 30 40 50 60 70 80 90

Driller: Great Works; Supervisor: Pete Michaud

△ Unconfined Compression Test

□ Field Vane Test ■ Remolded

✖ Pocket Penetrometer / Torvane

STN13-GEO4-VOC 195112923_PORTSMOUTHNH.GPJ JW NHP.GDT 7/23/14

APPENDIX 2

PERMITS

SHORELAND PERMIT

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

STANTEC CONSULTING

JUL 24 2014

5 DARTMOUTH DR., STE 101
AUBURN, NH 03032

SHORELAND IMPACT PERMIT 2014-01678

Permittee: City of Portsmouth & Boston & Maine Railroad
680 Peverly Hill Rd.
Portsmouth, NH 03801

Project Location: Brewster Street, Portsmouth
Portsmouth Tax Map/Lot No. 139 / 164-4

Waterbody: North Mill Pond

NOTE--
CONDITIONS

APPROVAL DATE: 07/22/2014 **EXPIRATION DATE: 07/22/2019**

Based upon review of the above referenced application, in accordance with RSA 483-B, a Shoreland Impact Permit was issued. This permit shall not be considered valid unless signed as specified below.

PERMIT DESCRIPTION: Impact 18,500 sq. ft. in order to install stormwater drains within the town easement.

THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:

1. All work shall be in accordance with plans by Stantec and received by the NH Department of Environmental Services (DES) on June 26, 2014.
2. This permit is contingent upon receiving a Wetland Permit for the proposed work within the 100 ft tidal buffer area, per RSA 482-A.
3. No more than 1% of the area of the lot within the protected shoreland shall be covered by impervious surfaces unless additional approval is obtained from DES.
4. All activities conducted in association with the completion of this project shall be conducted in a manner that complies with applicable criteria of Administrative Rules Chapter Env-Wq 1400 and RSA 483-B during and after construction.
5. Erosion and siltation control measures shall be installed prior to the start of work, be maintained throughout the project, and remain in place until all disturbed surfaces are stabilized.
6. Erosion and siltation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters.
7. No person undertaking any activity in the protected shoreland shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards established in Env-Ws 1700 or successor rules in Env-Wq 1700.
8. Any fill used shall be clean sand, gravel, rock, or other suitable material.

9. This permit shall not preclude DES from taking any enforcement or revocation action if DES later determines that any of the structures depicted as "existing" on the plans submitted by the applicant were not previously permitted or grandfathered.

GENERAL CONDITIONS THAT APPLY TO ALL DES SHORELAND IMPACT 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, and/or consult with other agencies as may be required (including US EPA, US Army Corps of Engineers, NH Department of Transportation, NH Division of Historical Resources (NH Department of Cultural Resources), NHDES-Alteration of Terrain, etc.);
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.

APPROVED: _____
Craig W. Day
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)

WETLANDS PERMIT

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

STANTEC CONSULTING
DEC 11 2014
5 DARTMOUTH DR., STE 101
AUBURN, NH 03032

WETLANDS AND NON-SITE SPECIFIC PERMIT 2014-01636

Permittee: City of Portsmouth DPW
680 Peverly Hill Rd.
Portsmouth, NH 03801

Project Location: Brewster Street, Portsmouth
Portsmouth Tax Map/Lot No. 139 / 164-4

Waterbody: North Mill Pond

NOTE--
CONDITIONS

APPROVAL DATE: 10/15/2014 **EXPIRATION DATE: 10/15/2019**

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: Impact a total of 4,670 sq. ft. of tidal wetland and previously developed upland tidal buffer zone to install a 36 inch stormwater culvert with a headwall and stone outlet protection including the following: 495 sq. ft. of tidal wetland impact for the construction of the headwall and placement of rip-rap; 1,115 sq. ft. of temporary impact in tidal wetland for construction access; and 3,060 sq. ft. of impact to previously developed upland tidal buffer zone to install a 36 inch culvert.

Approve as compensatory mitigation the restoration of 15,115 sq. ft. of saltmarsh in North Mill Pond.

THIS APPROVAL IS SUBJECT TO THE FOLLOWING PROJECT SPECIFIC CONDITIONS:

1. All work shall be in accordance with plans by Stantec dated September 26, 2014, as received by the Department on October 9, 2014.
2. The contractor performing the work shall use a rubber tracked excavator and utilize mats to buffer the substrate from the equipment within the temporary impact area.
3. Siltation/turbidity barrier shall be installed throughout the duration of construction to protect from the occurrence of sedimentation during tidal cycles.
4. All temporary work areas shall be restored to original condition following completion of construction.
5. A coastal wetlands ecologist shall be on-site during construction of the outlet to minimize impacts to aquatic resources.
6. Coastal staff shall be notified in writing prior to commencement of work and upon its completion. Notification may be via e-mail to David Price at David.Price@des.nh.gov.
7. Any future work in jurisdiction as specified in RSA 482-A on this property will require a new application and approval by the Department of Environmental Services ("DES") Wetlands Bureau.
8. This permit shall not be effective until recorded at the Rockingham County Registry of Deeds office by the permittee. A copy of the recorded permit shall be submitted to the DES Wetlands Bureau prior to construction.
9. Appropriate siltation/erosion/turbidity controls shall be in place prior to construction, shall be maintained during construction, and shall remain in place until the area is stabilized.
10. Within three days of final grading or temporary suspension of work in an area that is in or adjacent to wetlands or surface waters, all exposed soil areas shall be stabilized by seeding and mulching during the growing season, or if not within the growing season, by mulching with tack or netting and pinning on slopes steeper than 3:1.
11. Work shall be done during low tide.

12. Work shall be conducted in a manner so as to minimize turbidity and sedimentation to surface waters and wetlands.
13. Work shall be conducted in a manner that avoids excessive discharges of sediments to fish spawning areas.
14. Construction equipment shall be inspected daily for leaking fuel, oil and hydraulic fluid prior to entering surface waters or wetlands.
15. Faulty equipment shall be repaired prior to entering jurisdictional areas.
16. 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.
17. All refueling of equipment shall occur outside of surface waters or wetlands.

Wetland restoration/construction:
18. This permit is contingent upon the restoration of 15,115 sq. ft. of saltmarsh in accordance with plans received by DES on June 24, 2014.
19. This permit shall not be effective until it has been recorded with the county Registry of Deeds office by the Permittee. A copy of the recorded permit shall be submitted to the DES Wetlands Bureau by certified mail, return receipt requested, prior to construction.
20. The schedule for construction of the mitigation area shall coincide with site construction unless otherwise considered and authorized by the Wetlands Bureau.
21. The mitigation area shall be properly constructed, monitored, and managed in accordance with approved final mitigation plans.
22. Saltmarsh restoration areas shall be properly constructed, landscaped, monitored and remedial actions taken that may be necessary to create functioning wetland areas. Remedial measures may include replanting, relocating plantings, removal of invasive species, changing soil composition and depth, changing the elevation of the wetland surface, and changing the hydrologic regime.
23. The permittee shall designate a qualified professional who will be responsible for monitoring and ensuring that the mitigation areas are constructed in accordance with the mitigation plan. Monitoring shall be accomplished in a timely fashion and remedial measures taken if necessary. The Wetlands Bureau shall be notified in writing of the designated professional prior to the start of work and if there is a change of status during the project.
24. The permittee shall notify DES and the local conservation commission in writing of their intention to commence construction no less than 5 business days prior to construction.
25. The permittee or a designee shall conduct a follow-up inspection after the first growing season, to review the success of the mitigation area and schedule remedial actions if necessary. A report outlining these follow-up measures and a schedule for completing the remedial work shall be submitted by December 1 of that year. Similar inspections, reports and remedial actions shall be undertaken in at least the second and third years following the completion of each mitigation site.
26. Saltmarsh restoration areas shall have at least 75% successful establishment of wetlands vegetation after two (2) growing seasons, or shall be replanted and re-established until a functional wetland is replicated in a manner satisfactory to the DES Wetlands Bureau.
27. Wetland soils from areas vegetated with purple loosestrife shall not be used in the wetland creation site. The potential for the establishment of the invasive species should be considered in other areas where spoils may be spread to limit its further establishment.
28. The permittee shall attempt to control invasive, weedy species such as purple loosestrife (Lythrum salicaria) and common reed (Phragmites australis) by measures agreed upon by the Wetlands Bureau if the species is found in the mitigation areas during construction and during the early stages of vegetative establishment.
29. A post-construction report documenting the status of the completed project with photographs shall be submitted to the Wetlands Bureau within 60 days of the completion of construction.

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, and/or consult with other agencies as may be required (including US EPA, US Army Corps of Engineers, NH Department of Transportation, NH Division of Historical Resources (NH Department of Cultural Resources), NHDES-Alteration of Terrain, etc.);
5. Transfer of this permit to a new owner shall require notification to and approval by DES;
6. 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.
7. Review enclosed sheet for status of the US Army Corps of Engineers' federal wetlands permit.

APPROVED: _____
Per David Price
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)

ARMY CORPS PERMIT

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

November 25, 2014

Regulatory Division
CENAE-R-PEC
Permit Number: **NAE-2014-02171**

City of Portsmouth-DPW
680 Peverly Hill Road
Portsmouth, New Hampshire 03801

Dear Applicant:

This is to inform you that we have reviewed your application to perform work as described on the attached State of New Hampshire Letter File No. 2014-01636, dated October 16, 2014.

Based on our review of the information you provided to the NHDES Wetlands Bureau, we have determined that your project, will have only minimal individual or cumulative environmental impacts on waters of the United States, including wetlands. **We hereby conditionally authorize your project under the attached Federal permit known as the New Hampshire State Programmatic General Permit (NHSPGP) pending final concurrence with the Wetlands Bureau approval by the Governor & Executive Council (G&C).** This work must be performed in accordance with the terms and conditions of the PGP, including the following **Special Condition(s)**.

Special Condition No. 1. To avoid impacts to historic resources a "Recovery Plan" shall be developed and approved by the Corps prior to construction and implemented during the above referenced work.

You are responsible for complying with all of the PGP's requirements. Please review the attached PGP carefully to familiarize yourself with its contents. You should ensure that whoever does the work fully understands the requirements and that a copy of the permit document is at the project site throughout the time the work is underway. A copy of the PGP can also be found at http://www.nae.usace.army.mil/Regulatory/SGP/NH_PGP.pdf.

This authorization expires on August 03, 2017 unless the PGP is modified, suspended, or revoked before that. You must complete the work authorized herein by that date. If you do not, you must contact this office to determine the need for further authorization before continuing the activity. We recommend that you contact us *before* this authorization expires to discuss a time extension or reissuance of the authorization.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

This authorization requires you to complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

Please note that if your proposal is vetoed or modified by the G&C, making it different from that which the NHDES Wetlands Bureau approved on the date stated in the first paragraph

of this letter, you must re-submit a complete application to this office for review and processing in accordance with the terms and conditions of the then-current NHSPGP.

This authorization presumes that the work as described above and as shown on your plans is in Waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to this office.

This permit does not obviate the need to obtain other Federal, state or local authorizations required by law, including those listed in the PGP. Performing work not specifically authorized by this determination or failing to comply with all the terms and conditions of the PGP may subject you to the enforcement provisions of Corps regulations.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://www.nae.usace.army.mil/reg/Customer_Service_Survey.pdf.

If you have questions concerning this, please contact Michael Hicks of my staff at (978) 318-8157, (978) 318-8335/8338, (800) 343-4789, or, if calling from within Massachusetts, (800) 362-4367. His e-mail address is michael.c.hicks@usace.army.mil.

Sincerely,

Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosures

Copies Furnished:

New Hampshire Department of Environmental Services, Wetlands Bureau, Attn: Mr. Collis Adams, P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095

Michael Leach, Stantec, 5 Dartmouth Drive Suite 101, Auburn NH 03032-3984
Michael.Leach@stantec.com

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

October 16, 2014

City of Portsmouth-DPW
680 Peverly Hill Rd.
Portsmouth, NH 03801

RE: File #2014-01636 - City Of Portsmouth - Portsmouth
Tax Map/Lot # 139 / 164-4

Dear Property Owner:

The Department of Environmental Services (DES) Wetlands Bureau has reviewed and approved the above referenced application to impact a total of 4,670 sq. ft. of tidal wetland and previously developed upland tidal buffer zone to install a 36" stormwater culvert with a headwall and stone outlet protection including the following: 495 sq. ft. of tidal wetland impact for the construction of the headwall and placement of rip-rap; 1,115 sq. ft. of temporary impact in tidal wetland for construction access; and 3,060 sq. ft. of impact to previously developed upland tidal buffer zone to install a 36" culvert.

Approve as compensatory mitigation the restoration of 15,115 sq. ft. of saltmarsh in North Mill Pond.

Any person aggrieved by this decision may appeal to the N.H. Wetlands Council ("Council") by filing an appeal that meets the requirements specified in RSA 482-A:10, RSA 21-O:14, and the rules adopted by the Council, Env-WtC 100-200. The appeal must be filed **directly with the Council within 30 days** of the date of this decision and must set forth fully **every ground** upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council.

Information about the Council, including a link to the Council's rules, is available at <http://nhec.nh.gov/> (or more directly at <http://nhec.nh.gov/wetlands/index.htm>.) Copies of the rules also are available from the DES Public Information Center at (603) 271-2975.

Because of the type and classification of this project, the application must also be approved by the Governor and Executive Council. Upon completion of the appeal period, a copy of the file will be forwarded to the Governor and Executive Council for their consideration.

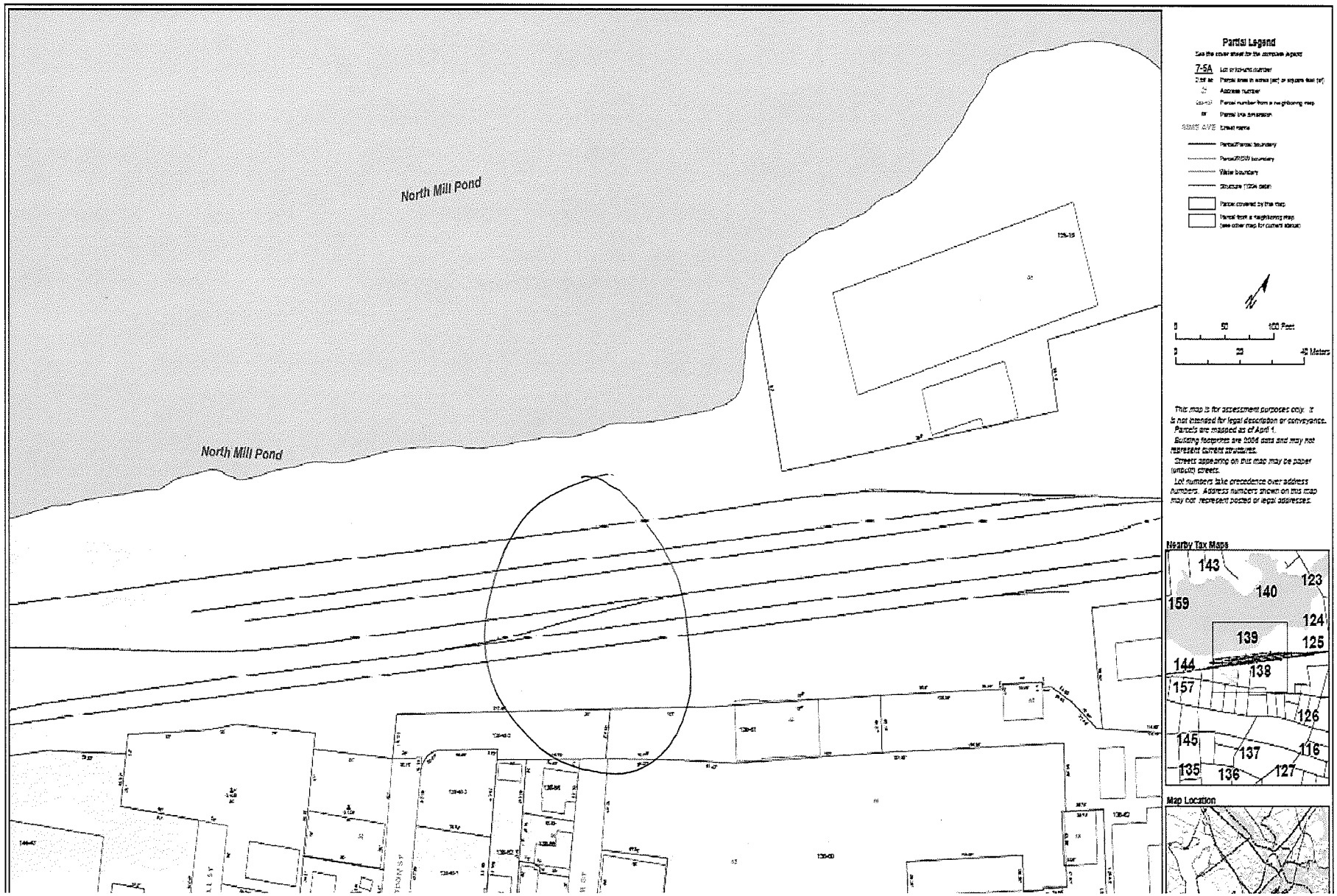
Sincerely,

Collis G. Adams, CWS, CPESC
Wetlands Bureau Administrator

CGA/wslsl

Enclosure: copy of decision

cc: Portsmouth Conservation Commission
Portsmouth Board of Selectmen
Michael Leach, Stantec Consulting Services, Inc.
Abutters


North Mill Pond
North Mill Pond
Parcel Legend
See the cover sheet for the complete legend
7-5A
Lot or parcel number
Parcel area in acres (ac) or square feet (sf)
Address number
Parcel number from a neighboring map
Parcel line dimension
Street name
Parcel/Parcel boundary
Parcel/ROW boundary
Water boundary
Structure 1990s data
Parcel covered by this map
Parcel from a neighboring map
0
50
100 Feet
0
20
40 Meters
This map is for assessment purposes only. It is not intended for legal description or conveyance.
Parcels are mapped as of April 1.
Building footprints are 2004 data and may not represent current structures.
Streets appearing on this map may be paper (unbuilt) streets.
Lot numbers take precedence over address numbers. Address numbers shown on this map may not represent posted or legal addresses.
Nearby Tax Maps
143
123
140
159
124
139
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137
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135
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127
Map Location

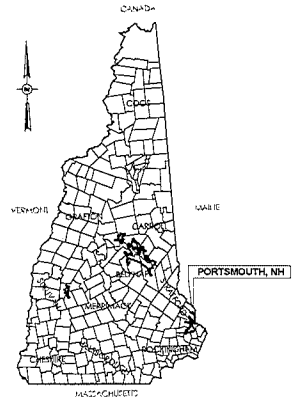
Stantec

CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
BREWSTER STREET DRAINAGE IMPROVEMENTS

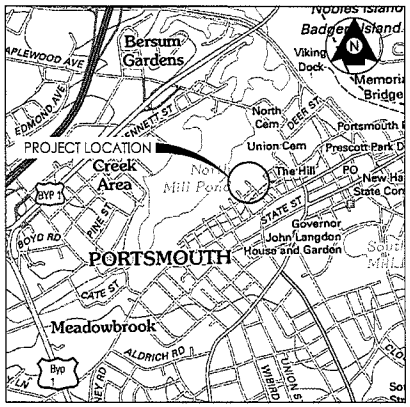
SEPTEMBER 2014

Project Number: 195112923

INDEX OF SHEETS

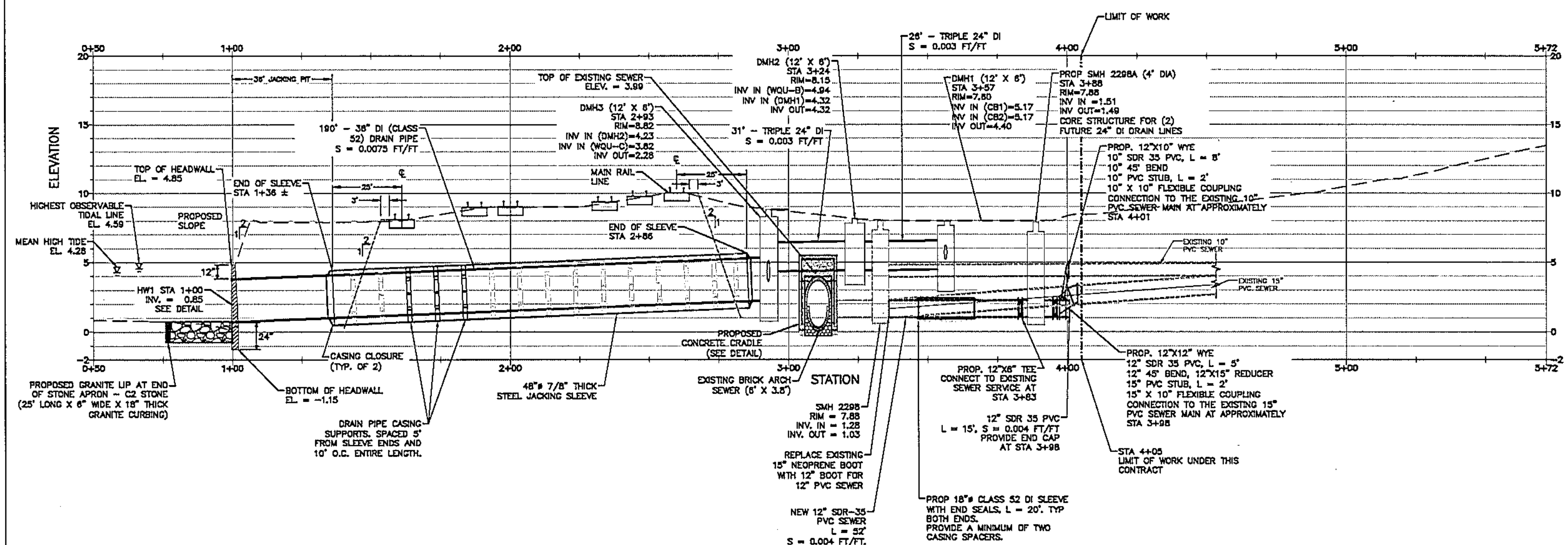


LOCATION MAP

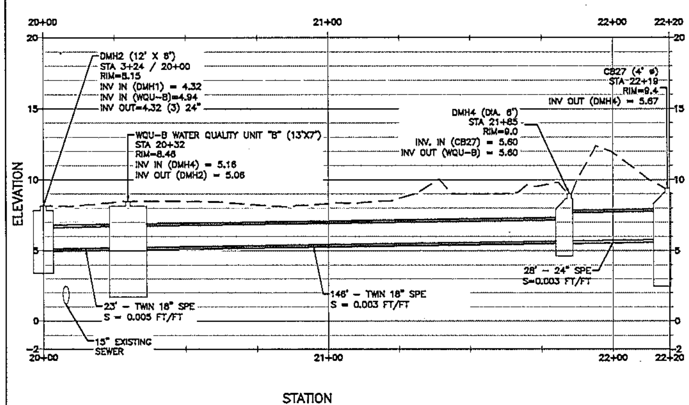


VICINITY MAP
NOT TO SCALE

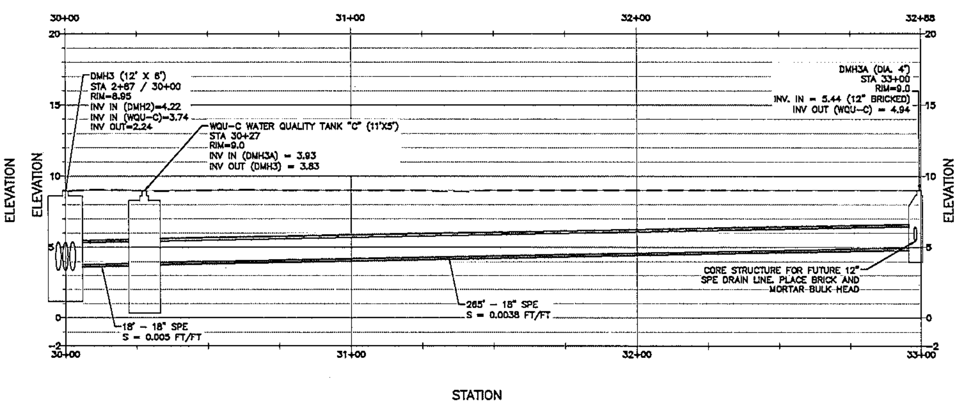
Set No.



DRAINAGE PROFILE – BREWSTER ST
SCALE: HORZ. 1" = 20' VERT. 1" = 4'



DRAINAGE PROFILE – WESTERLY REACH
SCALE: HORZ. 1" = 20' VERT. 1" = 4'



DRAINAGE PROFILE – EASTERLY REACH
SCALE: HORZ. 1" = 20' VERT. 1" = 4'

0 20' 40'

Stantec

Stantec Consulting Services Inc.
5 Dartmouth Drive, Suite 101
Auburn, NH 03032 U.S.A
Tel. 603.669.8672
Fax. 603.669.7636
www.stantec.com

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Consultants

Legend

Notes

Revision | By | Appd. | YY.MM.DD

Issued | By | Appd. | YY.MM.DD

Dwn. | Chkd. | Dsgn. | YY.MM.DD

Permit-Seal

Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
BREWSTER STREET DRAINAGE PROFILE

Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
P-101	3 of 9	0

GENERAL NOTES AND SPECIFICATIONS FOR EROSION CONTROL

1. The contractor is responsible for water control during all phases of construction. No work shall be permitted in flowing water. Streams shall be temporarily dammed by use of sand bags or other suitable means. The diversion shall be accomplished by temporary culverts or by pumping. All diverted water shall be discharged to stone fill or other suitable energy dissipater surrounded by silt fence.

2. This plan is to be used as a guideline only. Additional silt fence, stone check dams, or other measures may be dictated by field conditions.

3. The Contractor is responsible for complying with all local, state, and federal regulations.

4. Temporary Stabilization:
All disturbed areas shall have temporary or permanent stabilization within 14 days of initial disturbance. After this time any disturbance shall be stabilized by the end of the day, with the following exceptions:

(1) Stabilization is not required if work is to continue in the area in the next 24 hours and there is no precipitation forecast for the next 24 hours.

(2) Stabilization is not required if the work is in a self-contained excavation with a depth of 2 feet or more.

Temporary Stabilization Measures:

(1) Hay or straw mulch with a thickness of at least 2 inches.

(2) Soil tracking with tracked equipment. Should be limited to small areas with slopes less than 100 feet long (less than 30 feet with slopes steeper than 3:1)

(3) A combination of the above.

(4) Erosion Control matting.

5. Materials:
A. Mulch material: Select mulch material for erosion control that will best meet the site conditions from the following.

(1) Hay or straw – Shall be dry, free of mold and weed seeds. Hay or straw can be used on disturbed areas that will not be reworked for 7 to 30 days.

(2) Wood Chips – Shall be dry, free of soil and other foreign material.

(3) Rolled Erosion Control Products (RECP) – Shall be dry, and shall be made of straw or hay, coconut and related fibers, wood excelsior, jute, polypropylene, nylon, or an approved combination of different materials.

B. Mulch Anchoring: When mulch must be held in place, the following mulch anchoring material shall be used:
(1) Mulch Netting (Paper, twine, plastic, or plastic and wood fiber).

C. Fertilizer: Complete fertilizer 10-20-20 (Standard Product) – Class A
10-10-10 (Standard Product) – Class B

D. Lime: Ground limestone containing not less than 95% total carbonates (calcium or magnesium).

E. Temporary Seed Mixture: When it is impractical to establish permanent protective vegetation on disturbed earth by October 15, use "Conservation Mix" or the following seed mixture. Disturbed areas that will not be reworked for 30 days or more shall also receive temporary seed and mulch.

Kind of Seed	% By Weight
Annual Ryegrass	30
Perennial Ryegrass	30

Apply seed mixture at 30 pounds per acre.

F. Permanent Seed Mixture: (Not for Wetland Restoration):

(1) For Class A (Lawn) restoration of growth: Shall normally be used on loam areas. This seed shall conform to the following and shall be furnished on a pure live seed (PLS) basis.

Class A

Kind of Seed	PLS Per Acre, LBS
Red Fescue (Creeping)	21
Kentucky Bluegrass	21
	21
Perennial Ryegrass (Manhattann)	21
Total:	84

(2) For Class B (Field) restoration of growth: Shall normally be used for all slope work. This seed shall conform to the table below unless amended by the engineer to suit special local conditions encountered. This seed shall be furnished on a pure live seed (PLS) basis.

Class B

Kind of Seed	PLS Per Acre, LBS
Tall Fescue (ALTA or K-31)	20
Perennial Ryegrass (Manhattan)	15
Red Fescue (Creeping)	5
Red Clover	5
Birdsfoot Trefoil (Empire variety Preferred)	5
Total:	50

8. Seeding and Mulching
A. All areas shall be seeded and mulched within 48 hours of final grading.

B. Soil samples may be sent to the county extension service for analysis to determine the proper seed mixture and fertilizer requirements.

C. The following procedures shall be followed for temporary seeding:

(1) Apply lime at a rate of 75 to 100 pounds per 1000 square feet. Incorporate into top two inches of soil.

(2) Apply fertilizer at a rate of 30 pounds per 1000 square feet. Mix thoroughly into the top two inches of soil.

(3) Apply seed mixture at a rate of 50 pounds per acre and additional 3-4 lbs. per 1000 square feet for sloped areas of 45% and greater evenly in two intersecting directions. Rake lightly.

(4) Apply mulch material within 24 hours after seeding in accordance with the following:

(A) Hay or Straw: Application rate – 75 to 100 pounds per 1000 square feet. Spread by hand or with machine. Anchor on slopes and where subject to blowing or slipping.

(B) Wood Chips – Application rate – Two to six inches deep. Use for tree and shrub planting.

(5) Anchor mulch on all slopes exceeding 3% and other areas as required using the following method:

(A) Mulch Netting: Spread over loose mulch and pin to the soil in accordance with the manufacturer's instructions.

D. When temporary seeding cannot be accomplished to have established or visible growth by October 15, the disturbed areas shall be covered with 8 inches of mulch and anchored or erosion control blankets for the duration of the winter.

7. Maintenance of Erosion Control Structures:
A. Stone check dams shall be replaced when they become clogged with soil particles or as directed by the owner/representative.

B. When the sediment accumulation reaches a depth of 12 inches behind the silt fence, it shall be disposed of.

C. Repair all damages caused by soil erosion or construction equipment at or before the end of each working day.

D. Stone stabilized construction entrances shall be inspected to ensure tracking of sediments onto public right-of-ways or streets is not occurring. Maintenance may include periodic top dressing with additional aggregate to ensure a minimum thickness of eight inches.

E. All measures shall be removed within 30 days of stabilization.

8. Wetland Restoration
A. Replace wetland soil from stock pile to a minimum depth of 8 inches or equal to original depth.

B. Grade areas to match preconstruction grades

C. Apply "New England Wetmix" seed or equal in accordance with the manufacturers application rates.

9. Winter Erosion Control
A. All erosion control features such as silt fence must be in place prior to the ground freezing.

B. All disturbed areas of the site shall be seeded and mulched from October 15 to May 1 regardless of whether final grading has been finished. Work may continue through this period if the following winter erosion controls are implemented.

(1) Oat seeds shall be substituted for any other temporary annual grass seeds.

(2) All exposed earth shall be mulched with 6 inches of hay or straw. Slopes over 5% shall have an additional covering of staked jute mat or its equivalent.

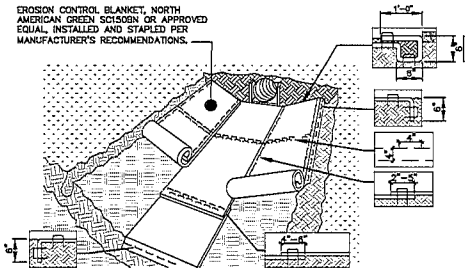
C. The following maintenance items should be performed specifically for the various erosion control devices:
(1) Diversion Dike:
(A) Minimum inspection frequency – Weekly.

(B) Remove any flow blockage caused by ice or sediment.
(2) Mulch:
(A) Minimum inspection frequency – Daily.

(B) Replace mulch on any area where original mulch cover has been lost.
(3) Silt Fence:
(A) Minimum inspection frequency – Weekly.

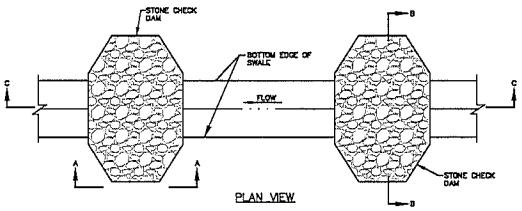
(B) Clean and remove any collected sediment before predicted thaws or rainy periods.
(4) Stone Check Dams:
(A) Minimum inspection frequency – Weekly.

(B) Remove and replace clogged stone.

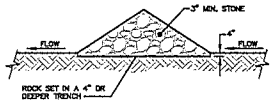


NOTES:
1. TO BE USED ON SLOPES 3 HORIZONTAL TO 1 VERTICAL OR STEEPER.
2. PREPARE SOIL INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED PRIOR TO INSTALLING BLANKET

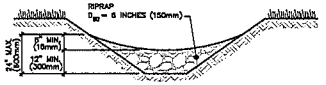
1 EROSION CONTROL BLANKET DETAIL
NOT TO SCALE



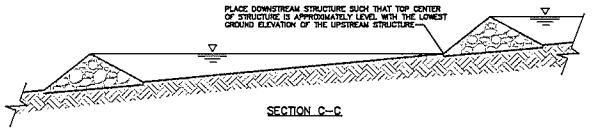
PLAN VIEW



SECTION A–A



SECTION B–B

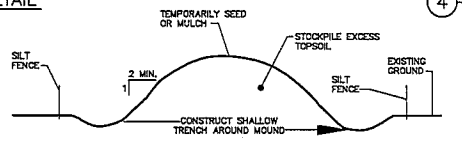


SECTION C–C

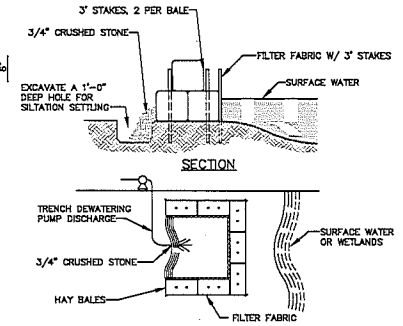
DITCH GRADE (G)	CHECK DAM SPACING(S)
0.02 FT/FT (M/M)	67 FT (20.5 M)
0.03 FT/FT (M/M)	44.5 FT (13.8 M)
0.04 FT/FT (M/M)	33.4 FT (10.2 M)
0.05 FT/FT (M/M)	26.7 FT (8.2 M)
0.06 FT/FT (M/M)	22.3 FT (6.8 M)

DO NOT USE CHECK DAMS BELOW 2% OR ABOVE 6% DITCH GRADES

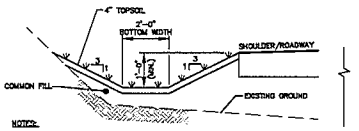
2 STONE CHECK DAM DETAIL
NOT TO SCALE



TYPICAL TOPSOIL STOCKPILE MOUND DETAIL
NOT TO SCALE

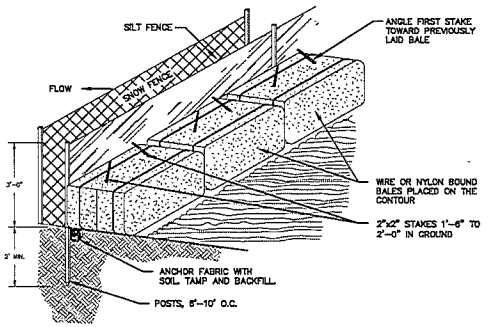


DEWATERING BASIN DETAIL
NOT TO SCALE



NOTES:
1. GRASS LINED SWALES ARE TO BE USED EVERYWHERE UNLESS INDICATED OTHERWISE.
2. IF LONGITUDINAL SLOPE IS GREATER THAN 2% , TEMPORARY STONE CHECK DAMS ARE NEEDED TO REDUCE STORMWATER VELOCITY AND PREVENT SOIL EROSION WITHIN THE SWALE.
3. SWALE TO BE SEEDED WITH A GRASS SPECIES NATIVE TO THE AREA THAT TOLERATES WET/DRY CONDITIONS.

3 GRASS SWALE DETAIL
NOT TO SCALE



4 SILT FENCE & BALE DETAIL
NOT TO SCALE

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Notes

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD
File name: 12923-C-104-DETAILS.dwg	Dsn.	Chkd.	Dgn.

Permit-Seal

Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

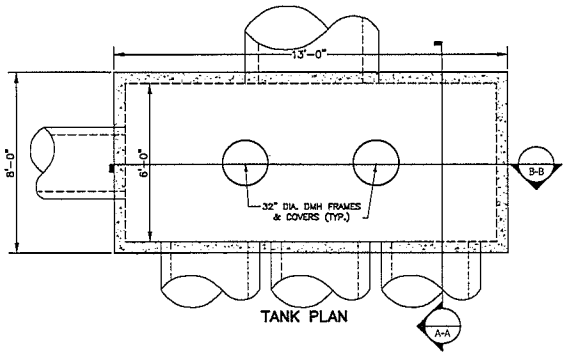
BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
DET1	5 of 9	0

SPECIAL DRAIN MANHOLE NOTES:

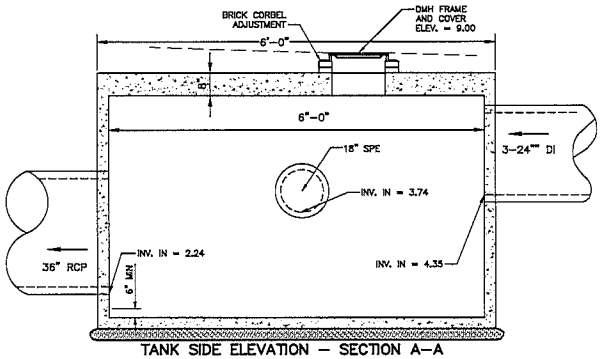
CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MANHOLES AND WATER QUALITY STRUCTURES.



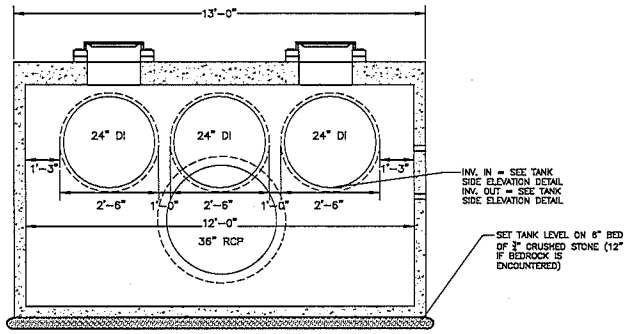
TANK PLAN

NOTES:

1. TANKS SHALL BE PRECAST REINFORCED CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 P.S.I. @ 28 DAYS.
2. STEEL REINFORCEMENT: ASTM A-615 GR. 60 WITH MINIMUM 1" COVER.
3. TANKS AND COVERS SHALL BE DESIGNED TO MEET ACI 318 WITH AASHTO HS20-44 LOADING.
4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF PROPOSED TANKS PRIOR TO CASTING. ALL SHOP DRAWINGS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN NEW HAMPSHIRE.
5. OPENINGS FOR DRAIN PIPES AND OTHER APPURTENANCES SHALL BE CAST INTO STRUCTURE DURING FABRICATION BY MANUFACTURER AND SHALL NOT BE FIELD CUT OR CORED.
6. TONGUE AND GROOVE JOINTS (GLENDON ST. TANK) ARE TO BE SEALED WITH A 8" STRIP OF ASPHALTIC BUTYL RUBBER . CONSTRUCTION JOINTS ARE TO BE SEALED WITH 1" DIA. BUTYL RUBBER, OR APPROVED EQUAL. ALL JOINTS SHALL BE SUBJECT TO WATER TIGHTNESS TESTING.
7. TANKS SHALL BE MANUFACTURED BY SUPERIOR CONCRETE CO. OF AUBURN, ME OR BY APPROVED EQUAL.



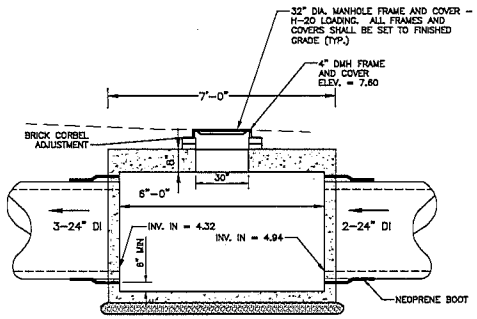
TANK SIDE ELEVATION – SECTION A–A



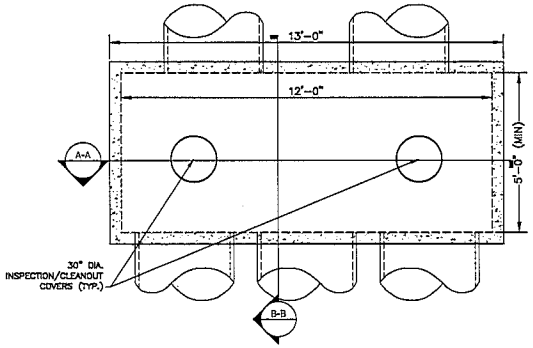
TANK END ELEVATION SECTION B–B

SPECIAL DRAIN MANHOLE 3 DETAIL (12'X6' STRUCTURE)

NOT TO SCALE



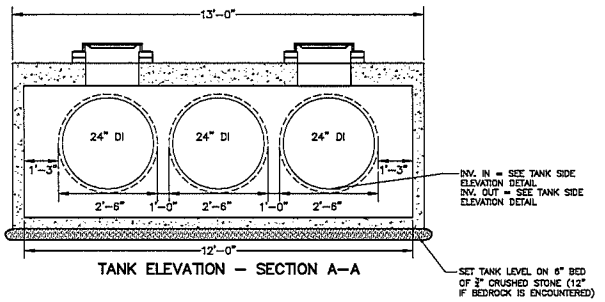
TANK ELEVATION – SECTION B–B



TANK PLAN

SPECIAL DRAIN MANHOLE 2 DETAIL (13X6' STRUCTURE)

NOT TO SCALE



TANK ELEVATION – SECTION A–A

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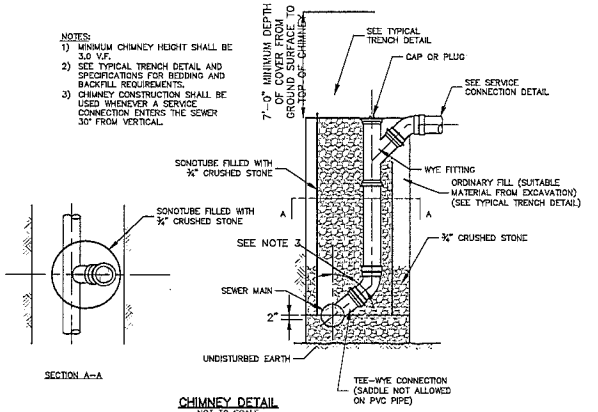
Permit-Seal

Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

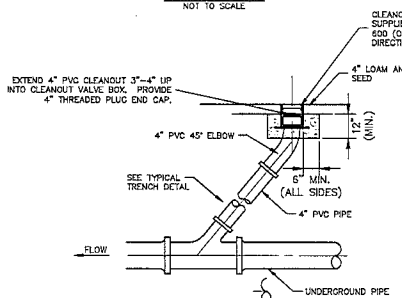
BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
DET3	7 of 9	0



CHIMNEY DETAIL
NOT TO SCALE



CLEANOUT DETAIL
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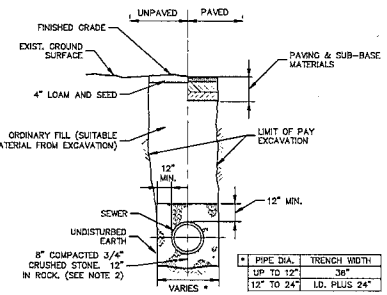
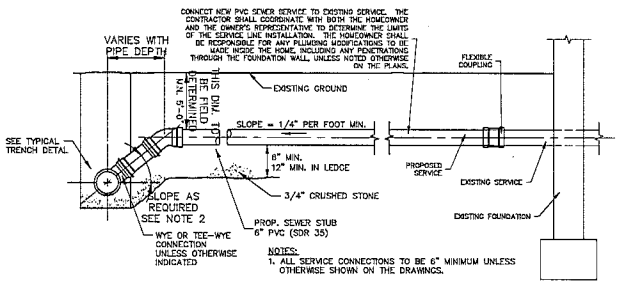


TYPICAL TRENCH DETAIL FOR SEWER PIPE
NOT TO SCALE

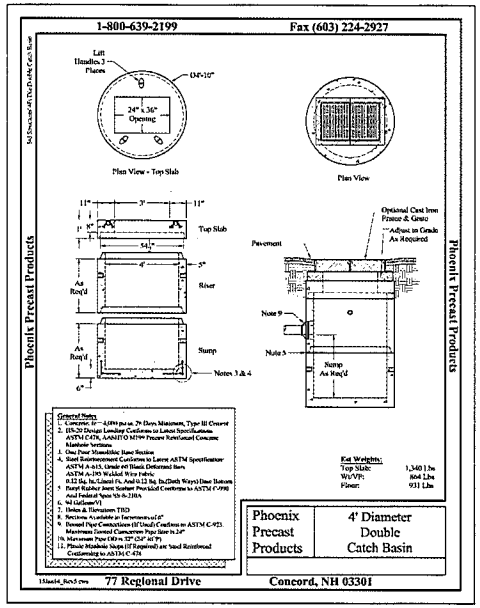
NOTES

1. SHORING AND STABILIZING OF TRENCH SIDEWALLS DURING EXCAVATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR ANY TRENCH EXCAVATION BEYOND THE LIMITS OF PAY EXCAVATION INDICATED INCLUDING ROCK EXCAVATION.
2. FOR TRENCH EXCAVATION IN ROCK AS DETERMINED BY THE ENGINEER, ALLOWABLE PAY LIMIT SHALL BE AS DEFINED IN TABLE ABOVE.
3. FOR CONSTRUCTION RELATIVE TO UNSUITABLE MATERIALS ENCOUNTERED DURING EXCAVATION, THE ENGINEER SHALL BE CONTACTED IMMEDIATELY UPON ENCOUNTERING UNSUITABLE MATERIAL PRIOR TO EXCAVATION TO VERIFY THE WORK. THE CONTRACTOR SHALL EXCAVATE THE UNSUITABLE MATERIAL AND REPLACE WITH SELECT FILL AS DIRECTED BY THE ENGINEER.

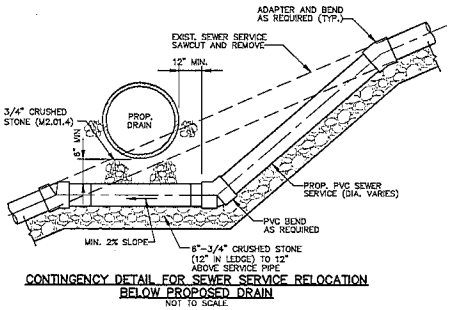


NOTES:
1. ALL SERVICE CONNECTIONS TO BE 6" MINIMUM UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. USE CHIMNEY DETAIL WHERE SERVICE CONNECTION ENTERS SEWER AT GREATER THAN 60° TO THE HORIZONTAL.

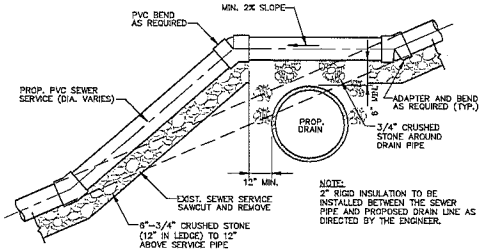
DETAIL FOR SEWER SERVICE CONNECTION
NOT TO SCALE



STANDARD DETAIL FOR DOUBLE-GRATE CB
NOT TO SCALE



CONTINGENCY DETAIL FOR SEWER SERVICE RELOCATION BELOW PROPOSED DRAIN
NOT TO SCALE



NOTE:
2" RIGID INSULATION TO BE INSTALLED BETWEEN THE SEWER PIPE AND PROPOSED DRAIN LINE AS DIRECTED BY THE ENGINEER.

CONTINGENCY DETAIL FOR SEWER SERVICE RELOCATION ABOVE PROPOSED DRAIN
NOT TO SCALE

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Notes

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Issued	By	Appd.	YY.MM.DD
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Permit-Seal

Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

Project No.	Scale	
195112923	AS NOTED	
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DET5	9 of 9	0

US Army Corps
of Engineers ®
New England District

Minimum Notice: Permittee must sign and return notification
within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2014-02171

Project Manager Richard Kristoff

Name of Permittee: City of Portsmouth-DPW

Permit Issuance Date: December 25, 2014

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch C *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

_____ _____
Signature of Permittee Date

_____ _____
Printed Name Date of Work Completion

(____) _____ (____) _____
Telephone Telephone

APPENDIX 3

PAN AM RAILROAD SPECIFICATIONS AND REQUIREMENTS

PAN AM RAILWAYS
1700 IRON HORSE PARK
NO. BILLERICA, MA 01862

December 3, 2014

Rene LaBranche
Senior Associate
Stantec
5 Dartmouth Drive, Suite 101
Auburn NH 03032-3984

RE: Drainage Culvert Installation
Brewster Street
PORTSMOUTH, NH
VS 3 – MAP 55

Pan Am Railways (PAR) has reviewed the information package received September 4, 2014 for the above referenced culvert installation. The City of Portsmouth proposes to install a 36 inch drainage pipe, inside a 48 inch steel sleeve, across our Portsmouth Yard starting at Brewster Street and extending into the North Mill Pond in the City of Portsmouth, NH. Stantec is the design engineer for this project and represents the City of Portsmouth. The work area will impact our Portsmouth Yard along the Portsmouth-Newington Running Track. Based on a review of the information submitted to date, PAR respectfully submits the following comments regarding this project:

- As you are aware, any work activities that require access to Railroad Right-of-Way (ROW) and/or affect Railroad Operations require prior approval and must be performed under the supervision of a Railroad Flagman/Inspector. All work shall be coordinated accordingly with train movements.

- The Contractor will be required to execute a Standard Railroad Service Contract and provide an acceptable Railroad-protective insurance policy to our Real Estate Department prior to scheduling work. Please contact Mike Twidle at (978) 663-6937 for coordination of Real Estate requirements.

- Please contact Mr. Keith Kady at (978) 808-7413 to coordinate Railroad Flagging/Inspection requirements upon finalization of the appropriate documentation with our Real Estate Department. Please give at least 14 days notice prior to scheduling of this service.

- The Contractor must take adequate precautions to insure that no operating equipment at the site will adversely impact any Railroad subsurface utilities. Please be advised that Pan Am Railways is not a Dig Safe member utility,

therefore the Contractor will be required to coordinate the location of our underground Communication and Signal (C&S) facilities with the Engineering Department prior to scheduling work. The Contractor shall be responsible for any repair or replacement charges should Railroad track, signals or other structures be damaged during the performance of the project. Please contact Ted Krug at (978) 663-1108 to coordinate this effort.

- As PAR understands it, a 48 inch steel casing sleeve will be installed by jacking under the first two main line tracks. The remaining tracks that need to be crossed will be removed by Pam Am forces and replaced at the City's expense after the culvert has been installed by direct bury method. All labor and equipment necessary to facilitate the replacement of the removed tracks shall be invoiced to the City of Portsmouth. All materials shall be invoiced to the City prior to the start of construction.

- The general specification for the installation of pipe under the Railroad shall follow the standards used by the American Railway Engineering and Maintenance-of-Way Association (AREMA) and is summarized in the following section:

    - The proposed steel casing pipe shall meet the requirements of the wall thickness and minimum yield strength for the specific size pipe. It should be noted that the casing steel pipe ends should be located a minimum of 25 ft. perpendicular to the centerline of the tracks.
    - Grout hole spacing for the steel casing pipe shall be in accordance with AREMA specifications. Grout holes must be installed prior to jacking of the casing pipe and the annular space outside the casing pipe shall be grouted upon completion of the casing installation.
    - ¼ inch thick end caps shall be installed at each end of the steel casing pipe, leaving holes at each end to allow for leakage. Stainless steel pipe spacers will be used at maximum intervals of 8 ft.
    - In the event that dewatering is required, the Contractor will monitor for differential settlement at multiple locations tangent to the proposed pipeline route and along the tracks as well.
    - The Contractor will be required to submit work plans to this office detailing the materials and construction procedures for the pipe installation and excavation support documents for the jacking and receiving pits utilized during this portion of the project. All work plans and associated calculations shall be stamped by a Professional Engineer registered in the State of New Hampshire.
    - The Contractor may be required to work continuously during pipe jacking operations within the Railroad loading influence line.

- A survey shall be performed both before and after the construction of this line to determine if differential settlement has occurred. PAR shall determine whether

any significant settlement has occurred and if so, shall make repairs using a railroad workforce at the contractor's expense.

PAR review of this submittal was performed to insure conformance to Railroad requirements and therefore relies on the information provided. Based on the above-referenced comments, the design appears to be in accordance with our requirements subject to the above stipulations.

This letter of approval is valid for one (1) year from date of writing. If actual construction does not commence within that timeframe, the Railroad may require, at its discretion, additional terms and conditions under which the work shall be performed and/or resubmittal of plans and specifications for further consideration, without guarantee of approval.

If you have questions or require additional information regarding this letter, please do not hesitate to contact the undersigned at (978) 663-1127 or Mr. Ted Krug, P.E., Chief Engineer of Design and Construction at (978) 663-1108.

Very truly yours,

BOSTON AND MAINE CORPORATION/
SPRINGFIELD TERMINAL RAILWAY CO.

Shawn Higgins, P.E.
Project Engineer

CC: TK/MT/KK/DGR/File
Mr. Dave Desfosses – City of Portsmouth, NH

SECTION I

General Information

GTI - Rail Division
Engineering Department

January 1995

I. GENERAL INFORMATION

A. Initial Contact:

Guilford Transportation Industries-Rail Division (Boston and Maine Corp., Maine Central Railroad Company, and the Springfield Terminal Railway Company) owns rail lines in New England and the Northeast. In 1976 a portion of the Boston and Maine was sold to the Massachusetts Bay Transportation Authority, but is still operated over by the B&M. The B&M System and the MBTA sale is shown on the system map entitled "Boston and Maine Corp. - Lines Operated", at the end of this section. The sale consists of lines primarily North and Northwest of Metropolitan Boston, within the Commonwealth of Massachusetts.

Projects contemplated upon lines owned by GTI-Rail Division, the submission of plans and specifications should be made to the attention of the Chief Engineer-Design and Construction, GTI-Rail Division at the operating Railroad's headquarters. Also all legal documents and agreements should be made with the operating Railroad.

If the project contemplated is upon a line owned by the MBTA and operated by the B&M, the submission of plans and specifications should be made to the Chief Engineering Officer - Railroad Operations, MBTA, Ten Park Plaza, Boston, MA 02116 with a copy to the B&M Attention: Chief Engineer-Design and Construction.

B. Plans and Specifications:

1. SCOPE: It is the intent of the Railroad to eliminate or minimize any risk involved with construction on or affecting Railroad property. Therefore, we require Railroad approval of the plans and specifications for all phases of the proposed construction. The initial submission should contain three (3) sets for review with a later submission of five (5) sets for final approval.

2. PLANS: The plans are to show all the work which involves the Railroad (in some cases a partial set of the construction plans may be acceptable). They should contain a location map, a plan view of the project, with appropriate profiles and cross sections, and sufficient details. The proposed construction is to be located with respect to top of rail and centerline of track. Also to be included on the plan is Railroad stationing, property lines and subsurface soil conditions. The subsurface soils information is to be in the form of boring logs with the borings located on the plan view. (Please familiarize yourself with Railroad policy with regards to obtaining borings on Railroad property in Section II A.)

All pipe laid on Railroad property, adjacent to operating tracks must be capable of withstanding Railroad live loading. If reinforced concrete pipe is used, it must be Class 5 R.C. Pipe.

Pipe sleeves under Railroad tracks and along the right-of-way shall not be less than 5'6" below the base of rail. Under secondary or industry tracks, this distance may be reduced to 4'6", pending Railroad approval. The length of the pipe sleeve shall be the greatest length produced from the Railroad requirements shown on sheet 5, entitled "GTI Rail Division Requirements for Minimum Jacking Sleeve Lengths".

3. SPECIFICATIONS: The Specifications contained in Section III are the Standard Specifications of the Railroad. They apply to all types of construction work on the Railroad, including steel sleeves 30" in diameter and greater. These specifications are to be included in their entirety as a special section on the job specifications.

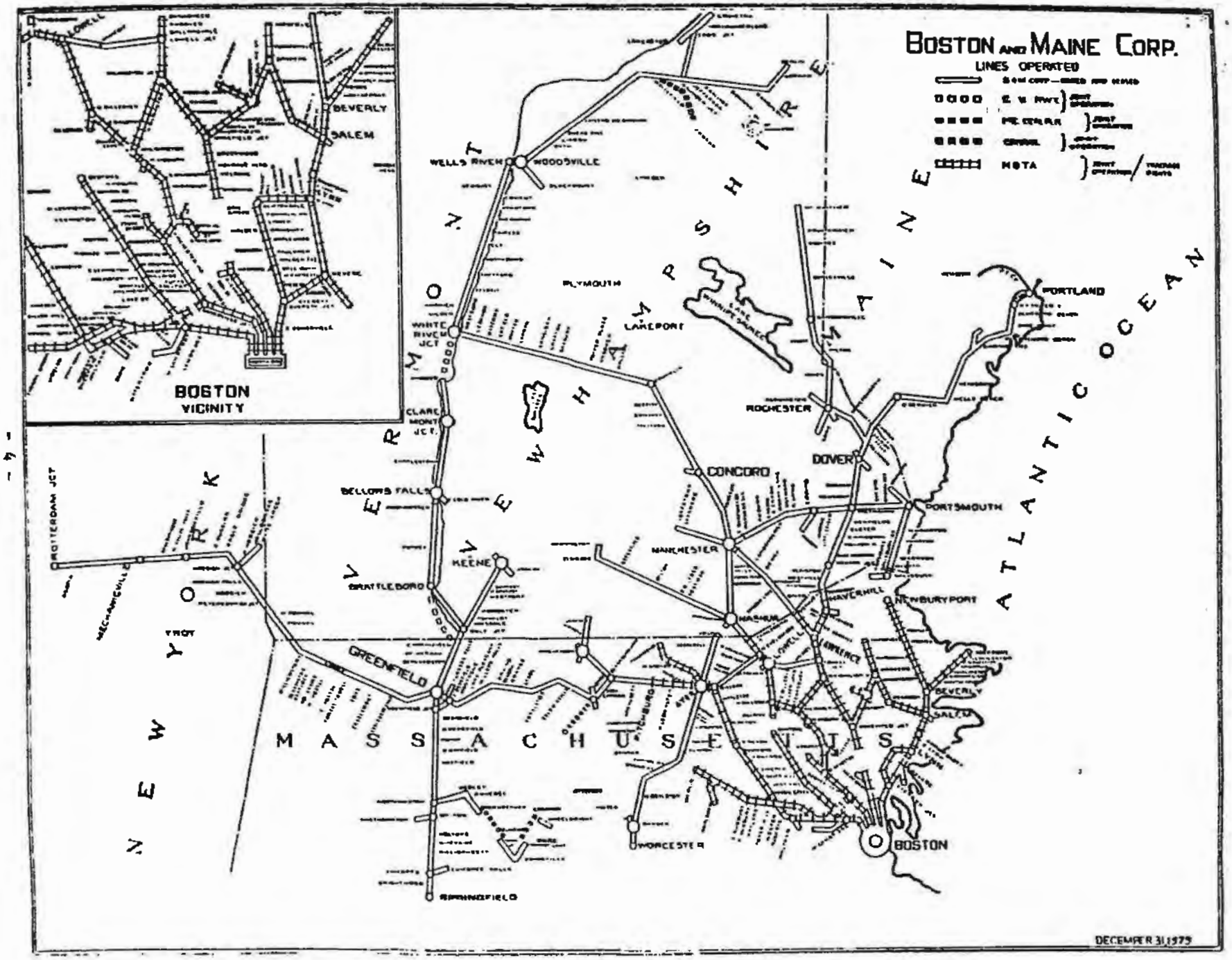
NOTE: Railroad specifications are the minimum requirements. In the event the contract specifications or drawings demand more stringent requirements, then, pending Railroad approval, the more stringent requirements will prevail.

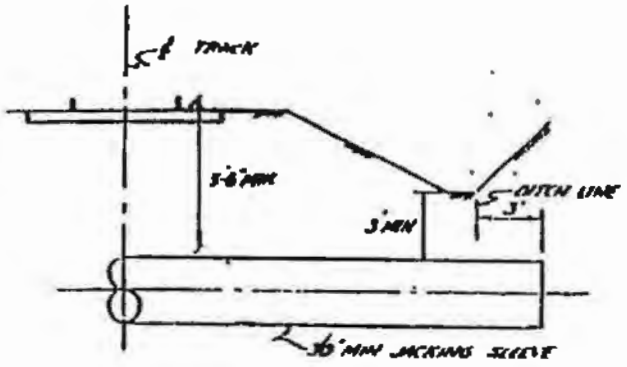
On those projects which occur on MBTA property, the Standard MBTA Specifications are to be used.

C. Review of Plans and Specifications:

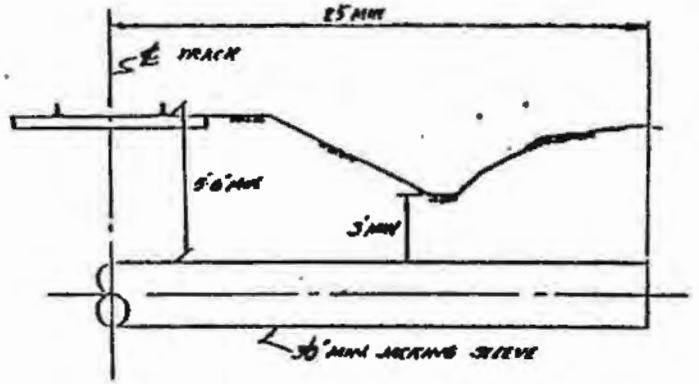
1. Project on lines owned by GTI-Rail Division:

The GTI-Rail Division requires payment for services it renders in the review of plans, specifications and related consultations, to cover crossings, bridges, pipes, conduits, wires, etc. which encroach upon Railroad property. An initial advance lump sum nonrefundable deposit to cover the cost of review is required. The amount of deposit will be determined at the time the initial submission is made. No work will proceed until the advance deposit has been received. Checks are to be made payable to the Operating Railroad.

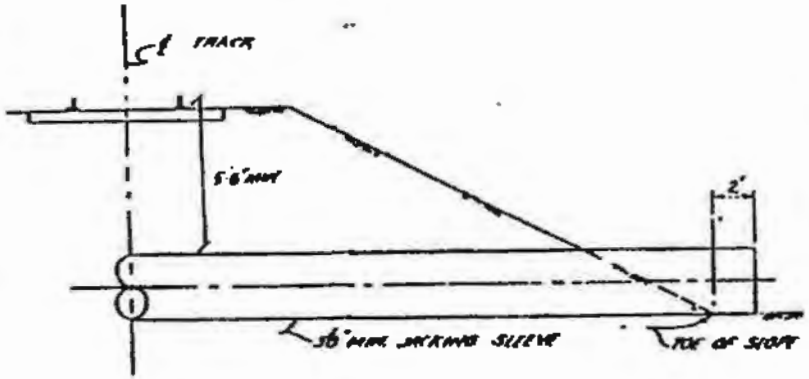

BOSTON AND MAINE CORP.
LINES OPERATED
BOSTON VICINITY
BEVERLY
SALEM
LYNN
WELLS RIVER
WOODSVILLE
PLYMOUTH
WHITE RIVER JCT
LAKEPORT
CLAREMONT JCT.
BELLOWS FALLS
ROTTERDAM JCT
MECHANICVILLE
BRATTLEBORO
KEENE
GREENFIELD
SPRINGFIELD
WORCESTER
ROCHESTER
PORTLAND
CONCORD
DOVER
PORTSMOUTH
MANCHESTER
HAVERHILL
NEWBURYPORT
LAWRENCE
LOWELL
BOSTON
NEW HAMPSHIRE
VERMONT
MAINE
NEW YORK
MASSACHUSETTS
ATLANTIC OCEAN
DECEMBER 31,1979



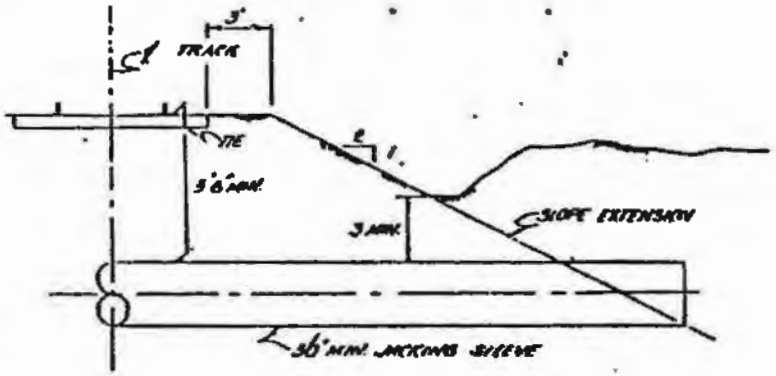
NO 1 GTI RAIL DIVISION REQUIREMENT FOR MINIMUM JACKING SLEEVE LENGTH



NO 3 GTI RAIL DIVISION REQUIREMENT FOR MINIMUM JACKING SLEEVE LENGTH



NO 2 GTI RAIL DIVISION REQUIREMENT FOR MINIMUM JACKING SLEEVE LENGTH



NO 4 GTI RAIL DIVISION REQUIREMENT FOR MINIMUM JACKING SLEEVE LENGTH

FOUR.. OF G.T.I RAIL DIVISION REQUIREMENTS FOR MINIMUM JACKING SLEEVE LENGTHS WITH 25 FEET AS THE ABSOLUTE MIN. FROM NEAREST ℄ TRACKS USE WHICH EVER OF THE FOUR (4) REQUIREMENTS GIVES THE GREATEST LENGTH.

SECTION II

Railroad Policies

GTI - Rail Division
Engineering Department

January 1995

II. GTI-RAIL DIVISION POLICIES

A. Regarding obtaining Surface and Subsurface Information.

In the event that the property either operated or owned by GTI-Rail Division has to be entered upon to obtain surface or subsurface information, the contractor is to obtain Railroad approval for the boring locations, Railroad insurance, and execute the Standard Railroad Service Contract, prior to any work being done. The Assistant Chief Engineer-Design should be contacted for information and initiation of this process.

B. Regarding Underground Utility Crossings.

1. Method of Installation:

(a) In a Public Way: (No work shall be done without engineer approval by the Railroad and a Railroad Inspector present.)

1. In or immediately adjacent to an at-grade crossing which has been rebuilt within the past ten (10) years, no open cuts will be allowed. All sleeves will be installed by the jacking method.

2. In or immediately adjacent to an at-grade crossing not scheduled for rebuilding, the preferred method of installation is by jacking. As an alternate, the sleeve may be installed by open cut within an acceptable depth, with strict adherence to the backfill specifications, and with the Owners paying for the complete rebuilding of the crossing, train schedule permitting.

3. In or immediately adjacent to an at-grade crossing scheduled for rebuilding the preferred method of installation is by jacking. As an alternate, within seven (7) calendar days of the scheduled date of the crossing reconstruction, the sleeve may be installed by open cut within an acceptable depth, train schedule permitting. Strict adherence shall be made to the backfill specifications, which provides the Railroad with written certification from a testing lab or P.E. registered in the State in which the work is performed, that the backfill density requirements of the Railroad specifications have been met or exceeded.

(b) Not within a Public Way:

The accepted method of crossing the Railroad is by jacking of a pipe sleeve under the Railroad. Only upon written request, will an alternate of open cut be given consideration. The engineering decision shall be based upon, but not limited to track usage, depth of excavation, soil conditions, and physical constraints. In the event an open cut is allowed, the contractor or owner must adhere to the following items:

1. The installation is to be a continuous operation and performed to a Railroad approved schedule.

2. No work shall be done without a Railroad inspector present.

3. Strict adherence to the Railroad backfill specifications by the Owner or its Contractor.

4. The Owner or its Contractor is to provide the Railroad with a non-refundable, lump sum payment for after the fact maintenance. The determination of this amount is based on the individual situation. No work will be allowed until this payment is received. This payment is not to be confused with the advance deposit for Railroad protective services (flagging, inspection, etc.) also required from the Owner or its Contractor before he enters upon Railroad property. Checks are to be made payable to the Operating Railroad.

C. Regarding Insurance and Indemnification.

1. Before entering upon the property of the Railroad, the Owner or its Contractor shall:

(a) Provide insurance, as specified in the Railroad specifications. The original policy shall be provided to the Railroad. No work will be done until an acceptable policy has been received and approved. The Railroad shall have the right to increase the limits of liability for both public liability and property damage during the life of the agreement.

(b) The Contractor shall execute the Standard Railroad Service Contract which indemnifies and saves harmless the Railroad.

(c) Provide payment as shall be required by the Railroad's Real Estate Department for preparation of agreement(s) and review of insurance.

D. Regarding Legal Documents for Temporary and Permanent Installations on:

1. Railroad lines:

(a) Outside Public Ways:

The Owner is required to either obtain a License Agreement, which includes an annual rental charge, that may be terminated by either party by giving 30 to 90 days notice, or the Owner may apply for a permanent easement, which may or may not be approved by the Railroad.

(b) Within Public Ways:

The Owner is not required to obtain an easement from the Railroad or obtain a License Agreement from the Railroad to install a facility. However, the Owner is required to conform with the requirements of C-1a and C-1b, and the Standard Railroad Specifications.

2. MBTA lines operated and controlled by the Railroad:

(a) Outside Public Ways:

The legal requirements will be as determined by the MBTA, however, the Railroad will require written notification and copy of the Agreement from the MBTA, indicating that their requirements have been met prior to any work being initiated, and the Contractor to sign a Standard Railroad Service Contract.

(b) Within Public Ways:

The Owner is not required to obtain an easement from the Railroad or to obtain a License Agreement from the Railroad to install a facility. However, the Owner is required to conform with the requirements of C-1a and C-1b, and the Standard Railroad Specifications.

E. Regarding Permanent Clearances.

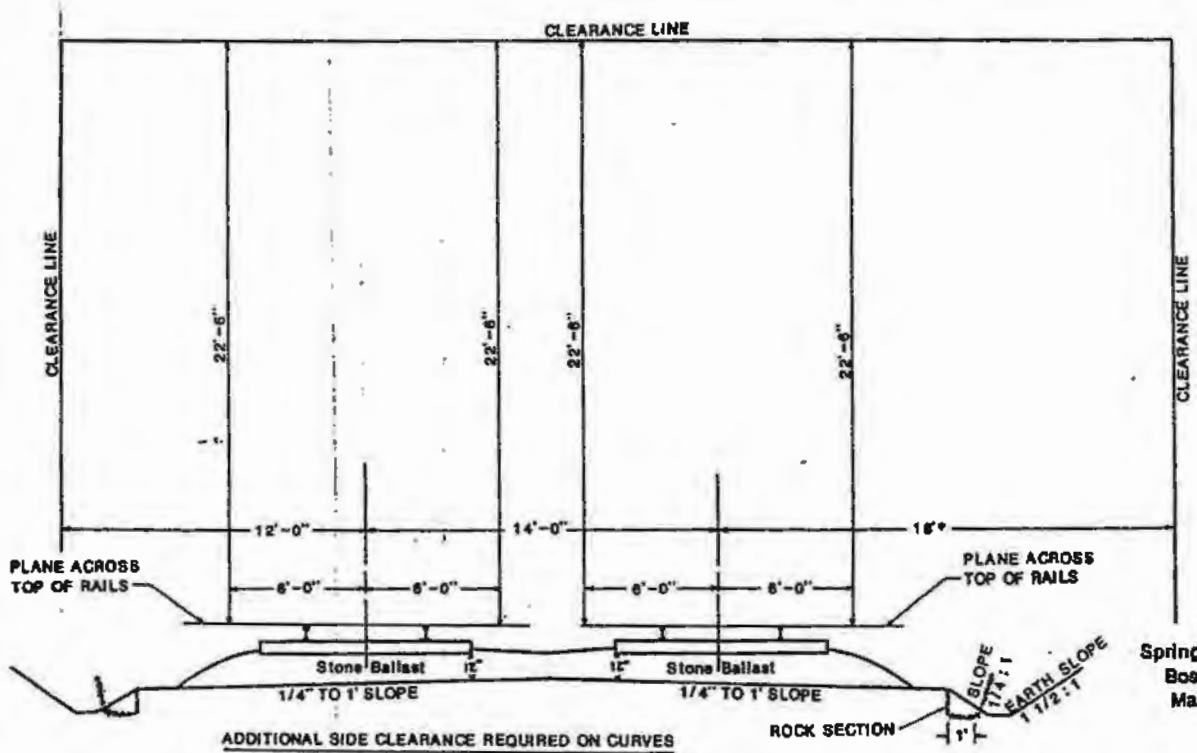
1. Railroad lines: All clearances for new construction shall adhere to those dimensions set forth on Standard Plan N8 entitled "GTI Rail Division Clearance Diagram New Bridge Construction". A copy of this standard plan is located at the end of this section. In the event of existing, severe limitations, the standard dimensions may be revised, at the discretion of the Railroad, but only upon written request.

2. MBTA lines operated and controlled by the Railroad.

(a) Railroad freight operations - The Chief Engineering Officer, GTI Rail Division, shall determine the clearance dimensions required for freight service.

Drawn	MT
Checked	
Issue	Date
B	4/99

N8



ADDITIONAL SIDE CLEARANCE REQUIRED ON CURVES

INCREASE SIDE CLEARANCES 1 1/2" ON EACH SIDE AND 3" BETWEEN TRACKS FOR EACH DEGREE OF CURVE

ON SUPERELEVATED TRACK, THE TRACK CENTERLINE IS PERPENDICULAR TO A PLANE ACROSS TOP OF RAILS

* ACCESS ROAD LOCATION DETERMINED BY SITE SPECIFICS

NOTE: OVERHEAD BRIDGE DRAINAGE MUST BE DIRECTED AWAY FROM THE RAILROAD

Guilford Rail System
Springfield Terminal Railway Co.
Boston & Maine Corporation
Maine Central Railroad Co.

Clearance Diagram
for
New Overhead Bridge Construction

George S Thayer
CHIEF ENGINEER–DESIGN & CONSTRUCTION

VICE PRESIDENT–ENGINEERING

Standard Railroad Specifications

Pan Am Railways/
Springfield Terminal Railway Company
Engineering Department

Office of Vice President Engineering
N. Billerica, Massachusetts
Date: 01/2011

SPECIFICATIONS RELATING TO WORKING WITHIN PREMISES OF
PAN AM RAILWAYS / SPRINGFIELD TERMINAL RAILWAY CO.

No other section of the Project Specifications shall supersede or modify this Section entitled: SPECIFICATIONS RELATING TO WORK WITHIN PREMISES USED AND CONTROLLED BY PAN AM RAILWAYS / SPRINGFIELD TERMINAL RAILWAY COMPANY.

1. DEFINITIONS:

1.1 Railroad: The work "Railroad" means Pan Am Railways and the Springfield Terminal Railway Company, their successors or assigns and their officers, agents and servants.

1.2 Owner: The word "Owner" means the individual, utility, government, or corporation who has title to the structure to be constructed upon property owned, controlled, or adjacent to the Railroad.

1.3 Utility: The work "Utility" includes public or private communication, water, sewer, electric, gas and petroleum companies.

1.4 Government: The work "Government" includes State, Town, City, County and other forms of Municipal Government.

1.5 Corporation: The word "Corporation" shall mean any firm duly incorporated under laws of a State Government.

1.6 Individual: The work "Individual" shall mean any party, which is not defined by 1.3, 1.4, or 1.5.

1.7 Contractor: The work "Contractor" means the individual, partnership, firm, corporation or any combination thereof, or joint venture, contracting with either a Utility, Government, Corporation or Individual, for work to be done on Railroad Property.

1.8 Owner or it's Contractor: The term "Owner or its Contractor" as used in these specifications shall not affect the responsibilities of each party as set forth in the Project Specifications.

1.9 Chief Engineering Officer of the Railroad: The Vice President of Engineering or Chief Engineer-Design and Construction or their authorized representatives at the Railroad.

2. SCOPE:

These specifications intend to provide for safeguards to the property owned or controlled by the Railroad and to its operations upon that property during construction operations by the Owner or its Contractor.

3. GENERAL:

3.1 Before entering upon Railroad premises or property used and controlled by the Railroad:

3.1.1 The Owner or its Contractor shall fully inform himself of all requirements of the Railroad as pertains to the specific project and shall conduct all his work accordingly. Any questions relating to the requirements of the Railroad should be directed to the representative of the Chief Engineer-Design and Construction at the Operating Railroad.

3.1.2 The Owner or its Contractor shall execute the Railroad's Standard Service Contract, and shall provide the Real Estate Department of the Railroad the insurance specified under Section 8.

3.1.3 The Owner or its Contractor shall take note that if an excavation is to be made within a 2 to 1 slope line commencing 3 feet from the end of tie, he shall submit for approval by the Chief Engineering Officer of the Railroad, his proposed method of preventing the soil from running.

3.1.4 The Owner or its Contractor shall furnish detailed plan, for falsework, bracing, sheeting, or other supports adjacent to the tracks for approval by the Chief Engineering Officer of the Railroad, and the work shall be performed in accordance with the approved plans. All plans and calculations shall be stamped by a Professional Engineer registered in the State in which the work is to be performed.

3.1.5 The Owner or its Contractor shall furnish to the Chief Engineering Office of the Railroad for approval complete sequence and plans with sufficient detail for checking, for the installation of, temporary supporting or removal of all members or structures above track. All such work shall be performed in

accordance with the approved plans and specifications. All plans and calculations shall be stamped by a Professional Engineer registered in the State in which the work is to be performed.

3.1.6 The Owner or its Contractor shall give written notice to the representative of the Chief Engineer-Design and Construction of the Railroad at the headquarters of the Operating Railroad at least seven (7) days in advance of starting work or locating equipment at the site. In addition, the Contractor shall give notice on the Wednesday prior to the week he proposed to do work which might cause any hazard, as described under Sections 4.

3.1.7 The Owner or its Contractor shall make all necessary arrangements with the Railroad before entering upon Railroad premises, or Property used and controlled by the Railroad.

3.1.8 The Owner or its Contractor shall at all times be aware that the Railroad may at any time withhold entry due to lack of flagging and/or inspection personnel.

3.2 After entering upon Railroad premises or property used and controlled by the Railroad.

3.2.1 The Owner or its Contractor shall have in his possession on the job site the contract plans and specifications, which bear the stamp of approval of the Railroad's Engineer of Design. The Owner or its Contractor shall conduct all his work according to these plans and specifications.

3.2.2 All work shall be performed and completed in a manner fully satisfactory to the Railroad's Chief Engineering Officer or his authorized representatives. Railroad inspection of the work shall be permitted at all times and the Owner of its Contractor shall cooperate fully with the Railroad representatives.

3.2.3 All equipment used by the Owner or its Contractor on Railroad premises or property used and controlled by the Railroad may be inspected by the Railroad and shall not be used if considered unsatisfactory by the Railroad's representative. Equipment of the Owner or its Contractor to be used adjacent to tracks shall be in first class condition so as to positively prevent

any failure that world cause delay in the operation of trains or damage to Railroad facilities. Equipment shall not be placed or put into operation adjacent to a track without first obtaining the permission of the Railroad.

3.2.4 Operators of such equipment may be examined by the Railroad representative to determine their fitness. If it is determined that they are unfit to work then the owner or its Contractor shall remove them from service.

3.2.5 Cranes used for lifting loads over Railroad property shall be rated at 150% of the load based on the crane manufacturer's load chart.

3.2.6 If the Chief Engineering Officer of the Railroad deems it necessary, the Owner or its Contractor shall furnish and erect in close proximity to the site of the work a suitable, furnished shelter with lights, heat, telephone, etc., exclusively for Railroad personnel mentioned previously.

3.2.7 The Owner or its Contractor's work shall be performed in such manner that the tracks, traffic and appurtenances of the Railroad will be safeguarded. He shall ascertain and comply with the requirements of the Railroad relative to his work on or adjacent to Railroad premises and except as permitted, he shall keep the tracks clear of obstruction.

3.2.8 Open excavations shall be suitable planked over when construction operations are not in progress.

3.2.9 Blasting will be permitted under or adjacent to tracks only after proof that blasting is required and all methods have been submitted to and approved by the Railroad's Chief Engineering Officer.

3.2.10 The Owner or its Contractor shall be fully responsible for all damages arising from his failure to comply with the requirements of these specifications.

3.2.11 If the specifications of the Railroad and the Consulting firm differ, then that which is more stringent shall prevail.

4. HAZARDS:

4.1 The Contractor's attention is called to the fact that the work under the Contract shall be performed adjacent to Main Line track, telephone lines, telegraph lines, signal lines and electric supply lines of the Railroad. A maximum speed of about __ miles per hour will be considered as prevailing for the operation of trains of the Railroad at this project.

4.2 An operating track shall be considered fouled and subject to hazard when any object or operation is or can be brought nearer than 15 feet to the centerline of the track. Specific site conditions may increase this dimension at the discretion of the Chief Engineer or his authorized representative.

4.3 A signal line or communication line shall be considered fouled and subject to hazard when any object is brought nearer than 4 feet to any wire or cable.

4.4 An electrical supply line shall be considered fouled and subject to hazard when any object is brought nearer than 10 feet to any wire of the line.

4.5 Cranes, trucks, power shovels, or any other equipment shall be considered as fouling a track, signal line, communication line, or electric supply line when working a position that failure of equipment with or without load could foul the track, signal line, communication line or electric supply line.

4.6 Railroad operations will be considered subject to hazard when explosives are used in the vicinity of Railroad premises, during the driving or pulling of sheeting for footings adjacent to a track, when erecting structural steel across or adjacent to a track, when operations involve swinging booms or chutes that could in any way come nearer than 15 feet to the center line of a track or wire line. None of these or similar operations, therefore, shall be carried on during the approach or passing to a train.

4.7 When, in the opinion of the Chief Engineering Officer of the Railroad or his representative the construction work would cause hazard to the safe operation of trains or to other Railroad facilities including any communication lines on Railroad premises, the Railroad will employ the necessary qualified employees to protect its trains and other facilities.

5. CLEARANCES:

Staging, falsework, or forms shall at all times be maintained with a minimum vertical clearance of 22'-6" above top of the rail and a minimum side clearance of 10'-0" from the center line of track, unless otherwise approved by the Railroad.

6. PROTECTION/INSPECTION SERVICES:

6.1 If deemed necessary by the Chief Engineering Officer of the Railroad the Railroad will furnish and assign an engineer(s) or inspector(s) for general inspection purposes or for general protection of Railroad property and operations during construction. Prior to start of any work on the Railroad, the Owner or its Contractor shall submit a deposit in the amount required by the Railroad. The Railroad may request additional deposits if projected expenses exceed the initial deposit amount. If the Railroad expenses are less than the amount of deposit, the Railroad will refund the balance to the Owner or its Contractor, after receipt of a written request. The Railroad will provide at its sole discretion such personnel, as it deems necessary or advisable because of the project. The Railroad reserves the right to request additional deposits as project work progresses. All checks are to be made out to the Operating Railroad.

6.2 If the Railroad determines that flagmen are necessary, the number required shall be on duty at the site during the hours of hazard described under Section 4. No work shall be performed if flagmen are required but not on duty.

6.3 It shall be the responsibility of the Owner or its Contractor to keep the Railroad informed at all times, and prior to such times, when the Owner or its Contractor shall be working on, above, or adjacent to

the Railroad creating the hazards described under Section 4. Failure of the Owner or its Contractor to give the Railroad suitable advance notice of hazardous operation shall result in the stoppage of the Owner's or its Contractor's work by the Railroad, until such time as sufficient number of flagmen are on duty at the site.

7. EXTRA-CONTRACT SERVICES:

7.1 Temporary and permanent changes of tracks and telephone lines, telegraph lines, signal lines, and electric supply lines made necessary by or to clear the permanent work of the Contractor will be made or caused to be made by the Railroad at the expense of the Owner or its Contractor.

7.2 All other changes made or services furnished by the Railroad, at the request of the Owner or its Contractor will be at the Owner's or its Contractor's expense.

8. INSURANCE:

8.1 At his sole expense the Owner or its Prime Contractor shall obtain, prior to working adjacent to Railroad premises and entry upon Railroad premises and keep in force during entire term of the work and for six (6) months subsequent to completion of work the following amounts and kinds of insurance. All policies shall be written for a minimum of one (1) year.

(A) Work on Pan Am Railways Property:

1. Contractors Public Liability - $5,000,000/$10,000,000

2. Contractors Property Damage Liability - $5,000,000/$10,000,000

3. The named insured shall be written exactly as follows: "Maine Central Railroad Co. and The Springfield Terminal Railway Company, their affiliates, successors and assigns,c/o Pan Am Railways, Iron Horse Park, North Billerica, Massachusetts 01862."

(B) Work on MBTA Property or other property where MBTA passenger service is operated:

1. Contractors Public Liability - $5,000,000/$10,000,000

2. Contractors Property Damage Liability - $5,000,000/$10,000,000

3. The named insured shall be written exactly as follows: "Pan Am Railways and The Springfield Terminal Railway Company, their affiliates, successors and assigns, and the Massachusetts Bay Transportation Authority."

The insurance shall be a Railroad Protective Liability Policy in a form acceptable to the Railroad.

The ORIGINAL insurance policy shall be furnished to the Real Estate Department of the Railroad at least ten (10) days prior to commencement of work. The Railroad shall have the right to increase the limits of liability for both public liability and property damage during the life of the agreement.

9. EXCAVATION:

9.1 The Owner or its Contractor shall furnish detail plans for falsework, bracing, shoring, sheeting, or other supports for excavation adjacent to the tracks to the Chief Engineering Officer of the Railroad for approval. The work shall be performed in accordance with the approved plans. No approval shall be given until the advance deposit (Item 6.1) has been received.

9.2 Open excavations shall be suitably planked over when construction operations are not in progress.

9.3 As excavation approaches pipes, conduits, or other underground structures on or adjacent to Railroad property, digging by machinery shall be discontinued and the excavation shall continue by means of hand tools.

9.4 All existing pipes, poles, wires, fences, property line markers, and other structures, which the Railroad's Chief Engineering Officer decides must be preserved in place without being temporarily or permanently relocated shall be carefully protected for damage by the Owner or its Contractor. Should such items be damaged, they shall be restored by the Railroad, at the Owner's or its Contractor's sole

expense, to at least as good condition as that in which they were found immediately before the work was begun.

9.5 If any excavation is taken beyond the work limit indicated on the approved plans or prescribed herein, the Owner or its Contractor shall backfill and compact as prescribed herein at his own expense.

9.6 The Railroad IS NOT a Dig Safe member utility. The Owner or its Contractor must contact the Railroad to have sub surface Railroad utility lines marked out prior to any excavation on Railroad property. The Owner or its Contractor will conduct all work so as to carefully protect Railroad utilities and will be responsible for all costs incurred to repair or replace Railroad utilities that are damaged.

10. BACKFILL:

10.1 Material

The material shall consist of stones, rock fragments and fine, hard durable particles resulting from the natural disintegration of rock. The material shall be free from injurious amounts of organic matter. The wear shall be not more than 60 percent. The material shall consist of a mixture of stones or rock fragments and particles with 95 to 100 percent passing the 3 inch sieve and 25 to 70 percent passing the No. 4 sieve. Not more than 15 percent of the material passing the No. 4 sieve shall pass the No. 200 sieve.

10.2 Backfilling

10.2.1 All backfill material adjacent to a pipe shall be approved soil. Backfill material shall be free from hard lumps and clods larger than 3-inch diameter, and free from large rocks or stumps. Uniformly fine material shall be placed next to any pipe liable to dent or break.

10.2.2 All backfill material shall be compacted at near optimum moisture content, in layers not exceeding 6 inches in compacted thickness by pneumatic tampers, vibrator compactors, or other approved means to the base of the Railroad subgrade. Care shall be

exercised to thoroughly compact the backfill under the haunches of the pipe to insure that the backfill soil is in intimate contact with the side of the pipe. Fill at the sides of the pipe may be compacted by rolling or operating heavy equipment parallel with the culvert, provided care is taken to avoid displacement or injury of the pipe. Material in the vicinity of pipes shall be compacted to not less than 95 percent of AASHO T 99, Method C. The Contractor will be required to supply, to the job site, ballast stone as prescribed herein to be installed by the Railroad.

10.3 The Owner or its Contractor shall provide testing, if requested by the Railroad, through the use of a testing lab or Professional Engineer registered in the State in which the work is performed, to insure that the in place density of the backfill meets or exceeds the requirements of Section 10.2.2. Written certification of the tests shall be given to the Railroad immediately upon completion of the test.

All Items Not addressed by the Pan Am Railways/ Springfield Terminal Railway Company's Standard Railroad Specifications shall conform to the latest specifications set forth in the American Railway Engineering and Maintainence of Way Association's Manual for Railway Engineering.

10.3 Certification

The Owner or its Contractor shall provide testing, through the use of a testing lab or Professional Engineer registered in the State in which the work is performed, to insure that the in place density of the backfill meets or exceeds the requirements of Section 10.2.2. Written certification of the tests shall be given to the Railroad immediately upon completion of the test.

11. BALLAST STONE

11.1 Material

Ballast shall consist of crushed stone with zero to fifteen percent passing a 1" screen, ninety to one hundred percent passing a 1.5" screen and one hundred percent passing a 2" screen.

11.2 Installation

The ballast stone shall be installed by Railroad forces according to Railroad Standards.

12. STEEL SLEEVE REQUIREMENTS FOR JACKING OPERATIONS

12.1 The outside diameter of the casing pipe shall be a minimum of thirty-six (36) inches (900 mm) with a minimum of six (6) inches (150 mm) greater than the largest outside diameter of the carrier pipe, joints or coupling.

12.2 The casing pipe shall be designed to withstand Coopers E-80 Railroad loading. Refer to the table below for nominal minimum thickness of steel sleeve required for a specific casing pipe diameter.

DIAMETER (inch)	DIAMETER (mm)	THICKNESS (inch)	THICKNESS (mm)
36	850 - 900	0.532	14
38 - 44	950 - 1100	0.569	15
46 - 50	1150- 1250	0.688	18
52 - 54	1300- 1350	0.813	21
60 - 66	1500- 1650	0.876	22
>66	>1676	investigate use of steel liner plate	

12.3 The casing pipe shall have a minimum yield strength of 35,000 psi (241325 kpa) and conform to the latest revisions of the requirements of A.W.A. Standards for fabricating electrically welded steel water pipes or its equivalent.

12.4 Method of Installation

12.4.1 The Owner or its Contractor shall submit to the Chief Engineering Officer, data and information demonstrating that he or his subcontractor has had successful previous experience in jacking in similar circumstances.

12.4.2 Before any work is begun within the limits of jacking the Owner or its Contractor shall have assembled all tools, materials and equipment which will be required. When the Owner or its Contractor has started the jacking operation, he will proceed in a continuous operation without stopping. This will minimize the tendency of the material to freeze around the pipe.

12.4.3 A jacking shield shall be used and jacked ahead of the casing pipe. The excavation within the jacking pipe should not advance beyond the head of the pipe shield. If the stability at the face needs to be maintained from raveling or running soil, suitable temporary bulkheads, struts and bracing shall be required. After completion of the sleeve installation the anular space around it shall be completely grouted with cement grout under pressure.

12.5 Method of Joining Casing Pipe Ends

The casing pipe shall be jacked without being welded through the use of a collar plate as shown on the sheet entitled, "Method of Jacking and Joining the Steel Sleeve Sections". Upon completion of the jacking operation either the continuous butt weld will be performed or a continuous interior collar plate is to be provided as shown.

Alternate Method:

Casing pipe ends shall be beveled with a single V-groove for field welding. Pipe joints shall be butt welded and shall be a full penetration on the outside circumference of the pipe. The single V-groove butt weld shall conform to the latest A.W.S. Welding Code. All joints of the casing pipe shall be butt welded, by a certified welder, prior to being subject to the jacking operation.

13. GROUND STABILIZATION

If required, it shall be done to the soil prior to the start of jacking. Stabilization shall be by either dewatering or grouting or combination of both to maintain the stability of the face of the heading.

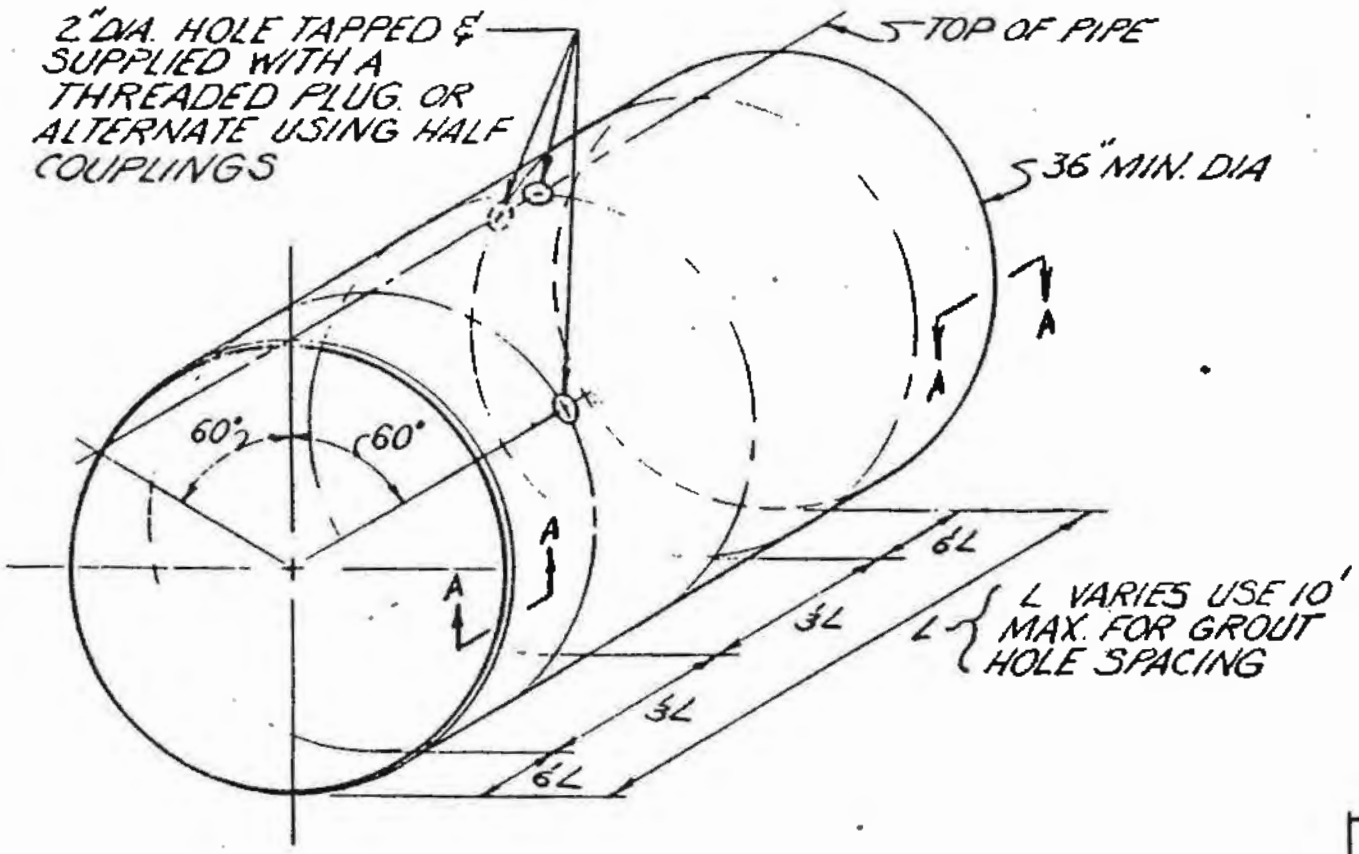
13.1 Dewatering

The Owner or its contractor shall lower and maintain the ground water level a minimum of 2 feet below the invert at all times during construction by well points, vacuum well points, or deep wells to prevent inflow of water or water and soil into the heading. Ground water observation wells shall be installed in the area to be dewatered to demonstrate that the dewatering requirements are being complied with.

13.2 Grouting

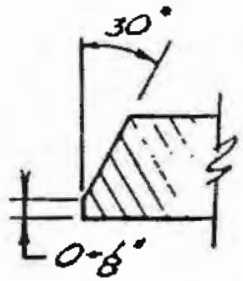
The grouting contractor shall be a specialist in the field with a minimum of five (5) continuous years of successfully grouting soils. All granular soils (silty sands, sand or sand and gravel) shall be stabilized by injection of a cement or chemical grout from the ground surface or from the pipe heading. The stabilization shall extend as far as necessary outside the periphery of the casing pipe in order to maintain a stable face at the heading.

13.3 Knowing that dewatering can cause settlement, it will be necessary that Railroad forces survey the crossing prior to, during and after construction. If it is found the tracks need to be aligned and surfaced by the Railroad forces because of the construction, the cost of this shall be borne by the Owner, or if so designated, by the Owner's Contractor.



STEEL SLEEVE

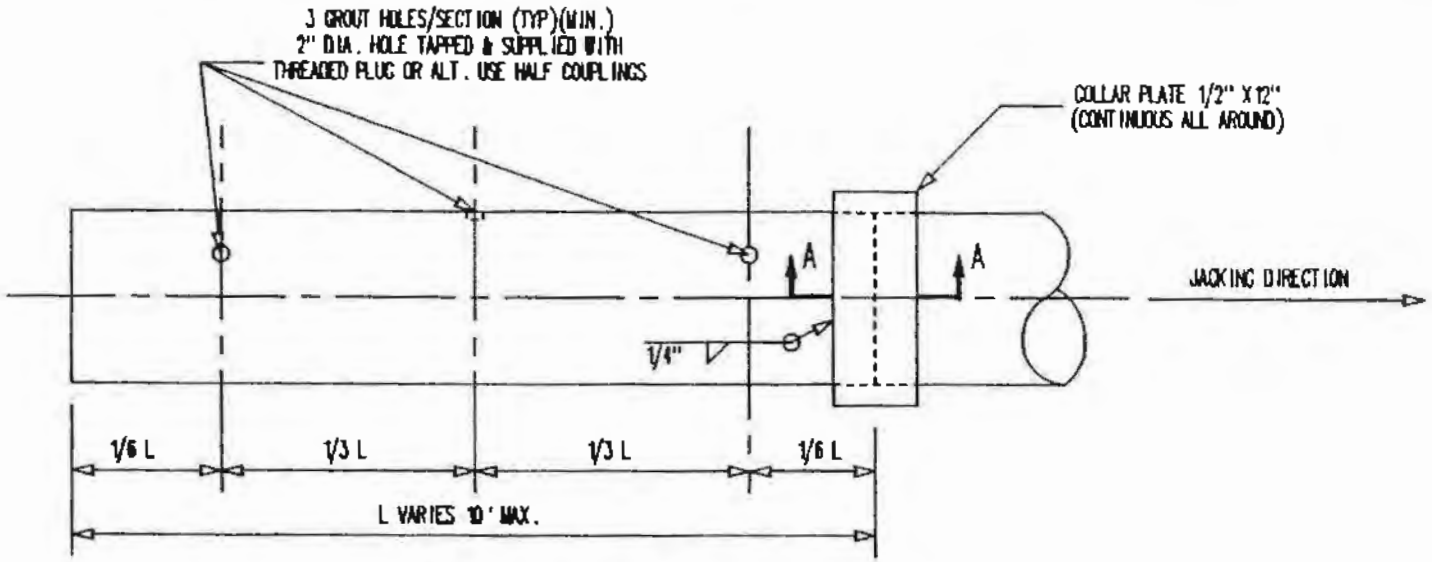
GROUT HOLES W/ THREADED PLUGS SHALL BE PROVIDED IN THE STEEL SLEEVE. A MINIMUM OF 3 GROUT HOLES WILL BE REQUIRED PER A 10 FOOT (MAX.) SECTION OF STEEL SLEEVE.



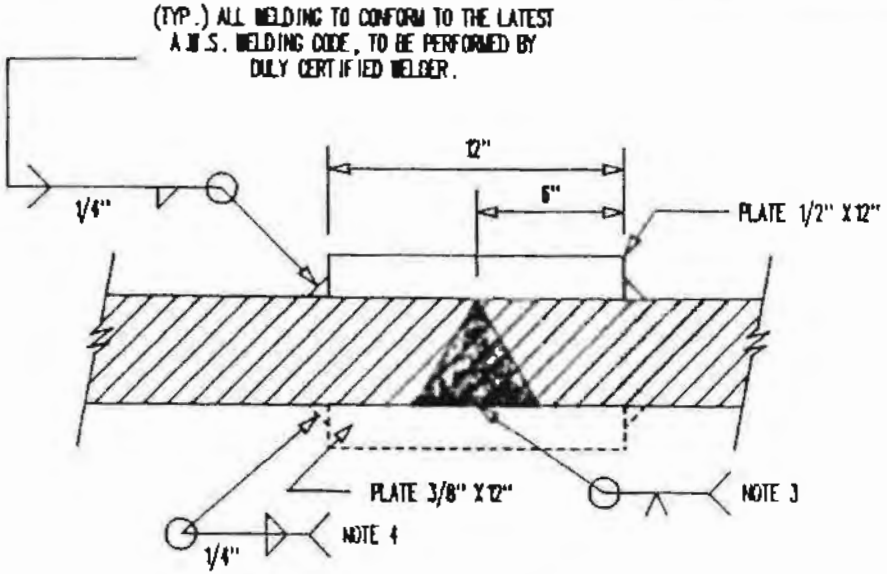
SECTION A-A

BY: D. IVANOV
DATE: 5-23-79

SHEET:



STEEL JACKING SLEEVE DETAIL



SECTION A-A

NOTES:

1. STEEL SLEEVE TO BE 36" MIN. DIA.
2. STEEL SLEEVE TO BE BEVELED ON THE INTERIOR OF THE PIPE.
3. THE CONTINUOUS BUTT WELD SHALL BE PERFORMED WHEN THE JACKING OPERATION IS FINISHED. (FOR ALTERNATE TO BUTT WELDING, SEE NOTE 4.)
4. AS AN ALTERNATE TO NOTE 3, PROVIDE A CONTINUOUS INTERIOR PLATE 3/8" X 12" WELDED ALL AROUND UPON COMPLETION OF THE JACKING OPERATION.

METHOD OF JACKING & JOINING
STEEL SLEEVE SECTIONS

BOSTON & MAINE CORP. DATE: 5/09/90 BY: DGR

APPENDIX 4

GROUNDWATER ANALYTICAL DATA

Eastern Analytical, Inc.
professional laboratory & drilling services

STANTEC CONSULTING

MAY 05 2014

5 DARTMOUTH DR., STE 101
AUBURN, NH 03032

ACCREDITED IN ACCORDANCE WITH nelac

Rene LaBranche
Stantec - Auburn
Wellington Business Park, 5 Dartmouth Drive, Suite
Auburn , NH 03032

Subject: Laboratory Report

Eastern Analytical, Inc. ID:	130656
Client Identification:	Brewster St. - Portsmouth
Date Received:	4/17/2014

Dear Mr. LaBranche :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw — Lorraine Olashaw, Lab Director

5.1.14 — Date

7 — # of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Temperature upon receipt (°C): 5

Received on ice or cold packs (Yes/No): Y

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
130656.01	B-5 Soil	4/17/14	4/17/14	soil	85.8	Adheres to Sample Acceptance Policy
130656.02	B-5 GW	4/17/14	4/17/14	aqueous		VOC vials had headspace
130656.03	B-6 Soil	4/17/14	4/17/14	soil	83.6	Adheres to Sample Acceptance Policy
130656.04	B-6 GW	4/17/14	4/17/14	aqueous		VOC vials had headspace
130656.05	Trip Blank - Soil	4/17/14	4/17/14	soil	100.0	Adheres to Sample Acceptance Policy
130656.06	Trip Blank - GW	4/17/14	4/6/14	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.

Immediate analyses, pH, Total Residual Chlorine, Dissolved Oxygen and Sulfite, performed at the laboratory were run outside of the recommended 15 minute hold time.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983

2) Standard Methods for Examination of Water and Wastewater,20th Edition, 1998 and 22nd Edition, 2012

3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB

4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Sample ID:	B-5 Soil	B-5 GW	B-6 Soil	B-6 GW	Trip Blank - Soil	Trip Blank - GW
Lab Sample ID:	130656.01	130656.02	130656.03	130656.04	130656.05	130656.06
Matrix:	soil	aqueous	soil	aqueous	soil	aqueous
Date Sampled:	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14	4/6/14
Date Received:	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14
Units:	mg/kg	ug/l	mg/kg	ug/l	mg/kg	ug/l
Date of Analysis:	4/21/14	4/18/14	4/21/14	4/18/14	4/22/14	4/18/14
Analyst:	KJP	KJP	KJP	KJP	BAM	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	1	1	1	1
Dichlorodifluoromethane	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Chloromethane	< 0.1	< 2	< 0.1	< 2	< 0.1	< 2
Vinyl chloride	< 0.1	< 2	< 0.1	< 2	< 0.1	< 2
Bromomethane	< 0.1	< 2	< 0.1	< 2	< 0.1	< 2
Chloroethane	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Trichlorofluoromethane	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Diethyl Ether	< 0.05	< 5	< 0.05	< 5	< 0.05	< 5
Acetone	< 2	< 10	< 2	< 10	< 2	< 10
1,1-Dichloroethene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
tert-Butyl Alcohol (TBA)	< 2	< 30	< 2	< 30	< 2	< 30
Methylene chloride	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Carbon disulfide	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Methyl-t-butyl ether(MTBE)	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Ethyl-t-butyl ether(ETBE)	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
Isopropyl ether(DIPE)	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
tert-amyl methyl ether(TAME)	< 0.1	< 5	< 0.1	< 5	< 0.1	< 5
trans-1,2-Dichloroethene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1-Dichloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
2,2-Dichloropropane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
cis-1,2-Dichloroethene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
2-Butanone(MEK)	< 0.5	< 10	< 0.5	< 10	< 0.5	< 10
Bromochloromethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Tetrahydrofuran(THF)	< 0.5	< 10	< 0.5	< 10	< 0.5	< 10
Chloroform	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1,1-Trichloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Carbon tetrachloride	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1-Dichloropropene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Benzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,2-Dichloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Trichloroethene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,2-Dichloropropane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Dibromomethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Bromodichloromethane	< 0.05	< 0.5	< 0.05	< 0.5	< 0.05	< 0.5
1,4-Dioxane	< 3	< 50	< 3	< 50	< 3	< 50
4-Methyl-2-pentanone(MIBK)	< 0.5	< 10	< 0.5	< 10	< 0.5	< 10
cis-1,3-Dichloropropene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Toluene	< 0.05	< 1	**0.05**	< 1	< 0.05	< 1
trans-1,3-Dichloropropene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1,2-Trichloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
2-Hexanone	< 0.1	< 10	< 0.1	< 10	< 0.1	< 10
Tetrachloroethene	< 0.05	< 2	**0.28**	< 2	< 0.05	< 2
1,3-Dichloropropane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Dibromochloromethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,2-Dibromoethane(EDB)	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Chlorobenzene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1,1,2-Tetrachloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
Ethylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1

LABORATORY REPORT

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Sample ID:	B-5 Soil	B-5 GW	B-6 Soil	B-6 GW	Trip Blank - Soil	Trip Blank - GW
Lab Sample ID:	130656.01	130656.02	130656.03	130656.04	130656.05	130656.06
Matrix:	soil	aqueous	soil	aqueous	soil	aqueous
Date Sampled:	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14	4/6/14
Date Received:	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14	4/17/14
Units:	mg/kg	ug/l	mg/kg	ug/l	mg/kg	ug/l
Date of Analysis:	4/21/14	4/18/14	4/21/14	4/18/14	4/22/14	4/18/14
Analyst:	KJP	KJP	KJP	KJP	BAM	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	1	1	1	1
mp-Xylene	< 0.05	< 1	**0.06**	< 1	< 0.05	< 1
o-Xylene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
Styrene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
Bromoform	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
IsoPropylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
Bromobenzene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,1,2,2-Tetrachloroethane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,2,3-Trichloropropane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
n-Propylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
2-Chlorotoluene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
4-Chlorotoluene	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,3,5-Trimethylbenzene	< 0.05	< 1	**0.16**	< 1	< 0.05	< 1
tert-Butylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,2,4-Trimethylbenzene	< 0.05	< 1	**0.22**	< 1	< 0.05	< 1
sec-Butylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,3-Dichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
p-Isopropyltoluene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,4-Dichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,2-Dichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
n-Butylbenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,2-Dibromo-3-chloropropane	< 0.05	< 2	< 0.05	< 2	< 0.05	< 2
1,3,5-Trichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
1,2,4-Trichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
Hexachlorobutadiene	< 0.05	< 0.5	< 0.05	< 0.5	< 0.05	< 0.5
Naphthalene	< 0.1	< 5	**2.5**	< 5	< 0.1	< 5
1,2,3-Trichlorobenzene	< 0.05	< 1	< 0.05	< 1	< 0.05	< 1
4-Bromofluorobenzene (surr)	**91 %R**	**90 %R**	**98 %R**	**90 %R**	**96 %R**	**89 %R**
1,2-Dichlorobenzene-d4 (surr)	**105 %R**	**107 %R**	**101 %R**	**106 %R**	**100 %R**	**106 %R**
Toluene-d8 (surr)	**100 %R**	**100 %R**	**101 %R**	**98 %R**	**98 %R**	**100 %R**

B5-GW, B6-BW: Due to the presence of significant headspace in the sample vials at the time of receipt, the values reported may not accurately reflect the analyte concentrations present in the sample.

LABORATORY REPORT

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Sample ID:	B-5 Soil	B-5 GW	B-6 Soil	B-6 GW
Lab Sample ID:	130656.01	130656.02	130656.03	130656.04
Matrix:	soil	aqueous	soil	aqueous
Date Sampled:	4/17/14	4/17/14	4/17/14	4/17/14
Date Received:	4/17/14	4/17/14	4/17/14	4/17/14
Units:	mg/kg	ug/l	mg/kg	ug/l
Date of Extraction/Prep:	4/22/14	4/18/14	4/22/14	4/18/14
Date of Analysis:	4/22/14	4/21/14	4/22/14	4/21/14
Analyst:	JMR	JMR	JMR	JMR
Method:	8270D	8270D	8270D	8270D
Dilution Factor:	1	1	1	1
Naphthalene	< 0.08	< 0.1	**0.22**	**1.4**
2-Methylnaphthalene	< 0.08	< 0.1	**0.32**	**0.89**
Acenaphthylene	< 0.08	< 0.1	< 0.08	**1.6**
Acenaphthene	< 0.08	< 0.1	< 0.08	**0.59**
Fluorene	< 0.08	< 0.1	**0.087**	**1.3**
Phenanthrene	< 0.08	< 0.1	**0.85**	**7.1**
Anthracene	< 0.08	< 0.1	**0.18**	**3.4**
Fluoranthene	< 0.08	< 0.1	**0.89**	**13**
Pyrene	< 0.08	< 0.1	**0.80**	**12**
Benzo[a]anthracene	< 0.08	< 0.1	**0.54**	**7.1**
Chrysene	< 0.08	< 0.1	**0.66**	**7.8**
Benzo[b]fluoranthene	< 0.08	< 0.1	**0.59**	**9.9**
Benzo[k]fluoranthene	< 0.08	< 0.1	**0.18**	**3.6**
Benzo[a]pyrene	< 0.08	< 0.1	**0.41**	**7.4**
Indeno[1,2,3-cd]pyrene	< 0.08	< 0.1	**0.27**	**5.7**
Dibenz[a,h]anthracene	< 0.08	< 0.1	**0.098**	**1.5**
Benzo[g,h,i]perylene	< 0.08	< 0.1	**0.30**	**5.1**
p-Terphenyl-D14 (surr)	**49 %R**	**53 %R**	**43 %R**	**33 %R**

LABORATORY REPORT

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Sample ID:	B-5 Soil	B-5 GW	B-6 Soil	B-6 GW
Lab Sample ID:	130656.01	130656.02	130656.03	130656.04
Matrix:	soil	aqueous	soil	aqueous
Date Sampled:	4/17/14	4/17/14	4/17/14	4/17/14
Date Received:	4/17/14	4/17/14	4/17/14	4/17/14
Units:	mg/kg	ug/l	mg/kg	ug/l
Date of Extraction/Prep:	4/21/14	4/18/14	4/21/14	4/18/14
Date of Analysis:	4/22/14	4/18/14	4/22/14	4/18/14
Analyst:	JCS	JCS	JCS	JCS
Method:	8082	8082	8082	8082
Dilution Factor:	1	1	1	1
PCB-1016	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1221	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1232	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1242	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1248	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1254	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1260	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1262	< 0.02	< 0.2	< 0.02	< 0.2
PCB-1268	< 0.02	< 0.2	< 0.02	< 0.2
TMX (surr)	**98 %R**	**101 %R**	**81 %R**	**69 %R**
DCB (surr)	**96 %R**	**30 %R**	**81 %R**	**52 %R**

Acid clean-up was performed on the samples and associated batch QC.

LABORATORY REPORT

EAI ID#: **130656**

Client: **Stantec - Auburn**

Client Designation: **Brewster St. - Portsmouth**

Sample ID:	B-5 Soil	B-6 Soil					
Lab Sample ID:	130656.01	130656.03					
Matrix:	soil	soil					
Date Sampled:	4/17/14	4/17/14					
Date Received:	4/17/14	4/17/14	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Arsenic	**14**	**14**	SolTotDry	mg/kg	4/21/14	6020	DS
Barium	**71**	**130**	SolTotDry	mg/kg	4/21/14	6020	DS
Cadmium	< 0.5	< 0.5	SolTotDry	mg/kg	4/21/14	6020	DS
Chromium	**28**	**36**	SolTotDry	mg/kg	4/21/14	6020	DS
Lead	**150**	**130**	SolTotDry	mg/kg	4/21/14	6020	DS
Mercury	< 0.1	**0.3**	SolTotDry	mg/kg	4/21/14	6020	DS
Selenium	< 0.5	**1.3**	SolTotDry	mg/kg	4/21/14	6020	DS
Silver	< 0.5	< 0.5	SolTotDry	mg/kg	4/21/14	6020	DS

Sample ID:	B-5 GW	B-6 GW					
Lab Sample ID:	130656.02	130656.04					
Matrix:	aqueous	aqueous					
Date Sampled:	4/17/14	4/17/14	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	4/17/14	4/17/14					
Arsenic	**0.042**	**0.013**	AqDis	mg/L	4/23/14	200.8	DS
Barium	**0.047**	**0.045**	AqDis	mg/L	4/23/14	200.8	DS
Cadmium	< 0.001	< 0.001	AqDis	mg/L	4/23/14	200.8	DS
Chromium	< 0.001	< 0.001	AqDis	mg/L	4/23/14	200.8	DS
Lead	< 0.001	**0.002**	AqDis	mg/L	4/23/14	200.8	DS
Mercury	< 0.0001	< 0.0001	AqDis	mg/L	4/23/14	200.8	DS
Selenium	**0.028**	**0.002**	AqDis	mg/L	4/23/14	200.8	DS
Silver	< 0.001	< 0.001	AqDis	mg/L	4/23/14	200.8	DS

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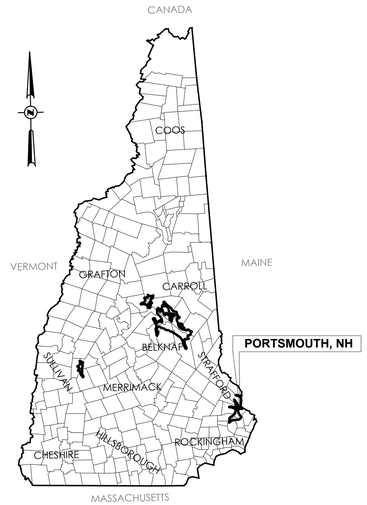
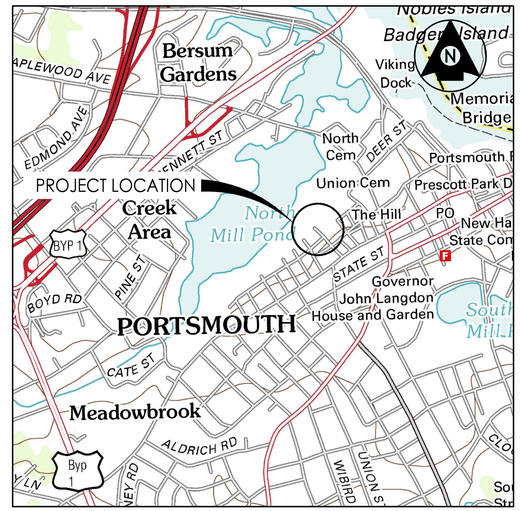
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS
BREWSTER STREET DRAINAGE IMPROVEMENTS

JANUARY 2015

Project Number: 195112923



LOCATION MAP



VICINITY MAP
NOT TO SCALE

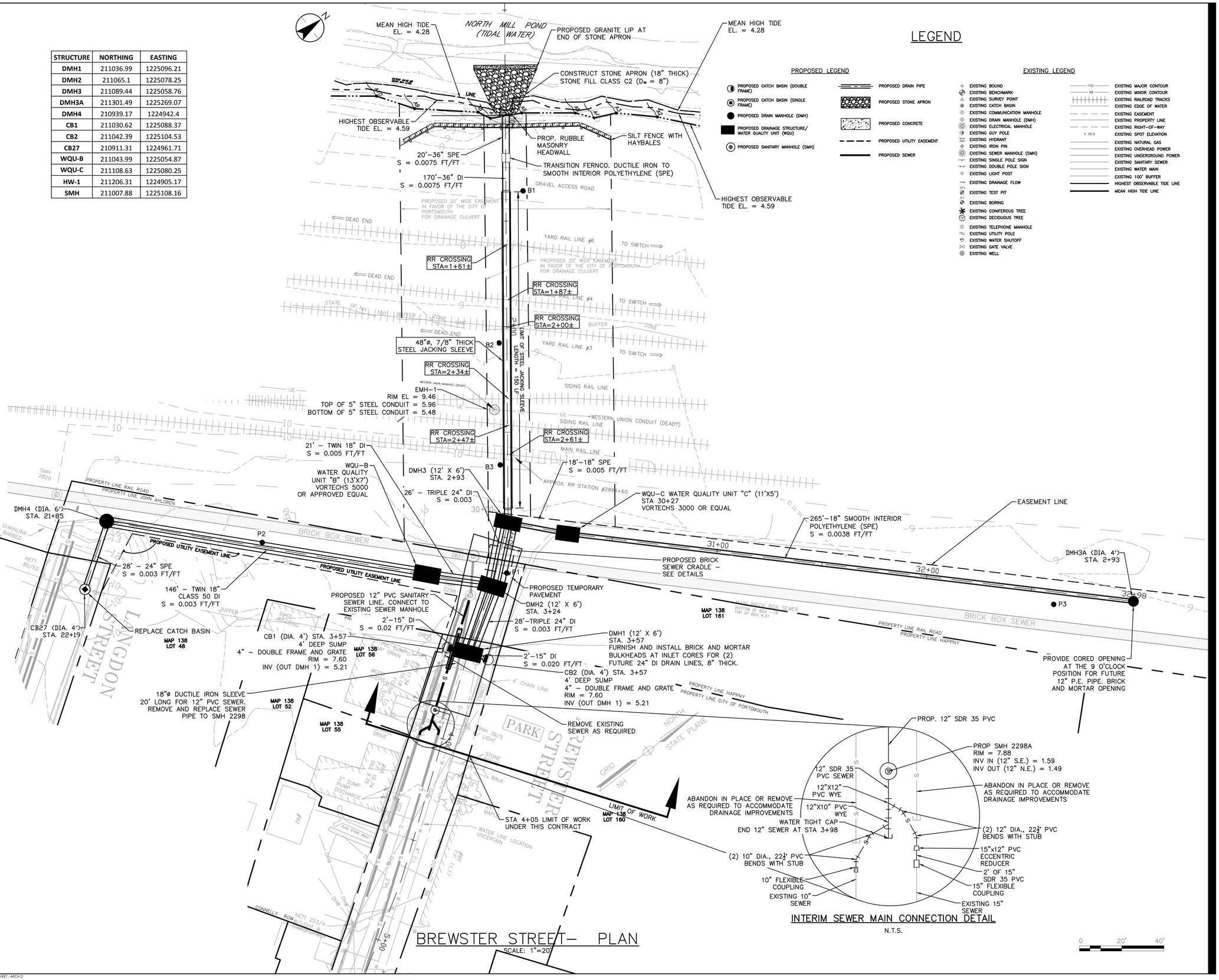
INDEX OF SHEETS

SHEET NO.	TITLE
	COVER SHEET
2	GENERAL PLANS
3	STORM DRAINAGE PROFILE
4	WETLAND MITIGATION PLAN
5 -9	CONSTRUCTION DETAILS

Set No.

ORIGINAL SHEET - ARCH D

STRUCTURE	NORTHING	EASTING
DMH1	211036.99	1225096.21
DMH2	211065.1	1225078.25
DMH3	211089.44	1225058.76
DMH3A	211301.49	1225269.07
DMH4	210939.17	1224942.4
CB1	211030.62	1225088.37
CB2	211042.39	1225104.53
CB27	210911.31	1224961.71
WQU-B	211043.99	1225054.87
WQU-C	211108.63	1225080.25
HW-1	211206.31	1224905.17
SMH	211007.88	1225108.16



LEGEND

PROPOSED LEGEND

- PROPOSED CATCH BASIN (DOUBLE FRAME)
- PROPOSED CATCH BASIN (SINGLE FRAME)
- PROPOSED DRAIN MANHOLE (DMH)
- PROPOSED DRAINAGE STRUCTURE/ WATER QUALITY UNIT (WQU)
- PROPOSED SANITARY MANHOLE (SMH)
- PROPOSED DRAIN PIPE
- PROPOSED STONE APRON
- PROPOSED CONCRETE
- PROPOSED UTILITY EASEMENT
- PROPOSED SEWER

EXISTING LEGEND

- EXISTING BOUND
- EXISTING BENCHMARK
- EXISTING SURVEY POINT
- EXISTING CATCH BASIN
- EXISTING COMMUNICATION MANHOLE
- EXISTING DRAIN MANHOLE (DMH)
- EXISTING ELECTRICAL MANHOLE
- EXISTING GUY POLE
- EXISTING HYDRANT
- EXISTING IRON PIN
- EXISTING SEWER MANHOLE (SMH)
- EXISTING SINGLE POLE SIGN
- EXISTING DOUBLE POLE SIGN
- EXISTING LIGHT POST
- EXISTING DRAINAGE FLOW
- EXISTING TEST PIT
- EXISTING BORING
- EXISTING CONIFEROUS TREE
- EXISTING DECIDUOUS TREE
- EXISTING TELEPHONE MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER SHUTOFF
- EXISTING GATE VALVE
- EXISTING WELL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING RAILROAD TRACKS
- EXISTING EDGE OF WATER
- EXISTING EASEMENT
- EXISTING PROPERTY LINE
- EXISTING RIGHT-OF-WAY
- EXISTING SPOT ELEVATION
- EXISTING NATURAL GAS
- EXISTING OVERHEAD POWER
- EXISTING UNDERGROUND POWER
- EXISTING SANITARY SEWER
- EXISTING WATER MAIN
- EXISTING 100' BUFFER
- HIGHEST OBSERVABLE TIDE LINE
- MEAN HIGH TIDE LINE

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File Name: 12923-C-103 PDR.dwg — Dwn. — Chkd. — Dsgn. — YY.MM.DD

Permit-Seal

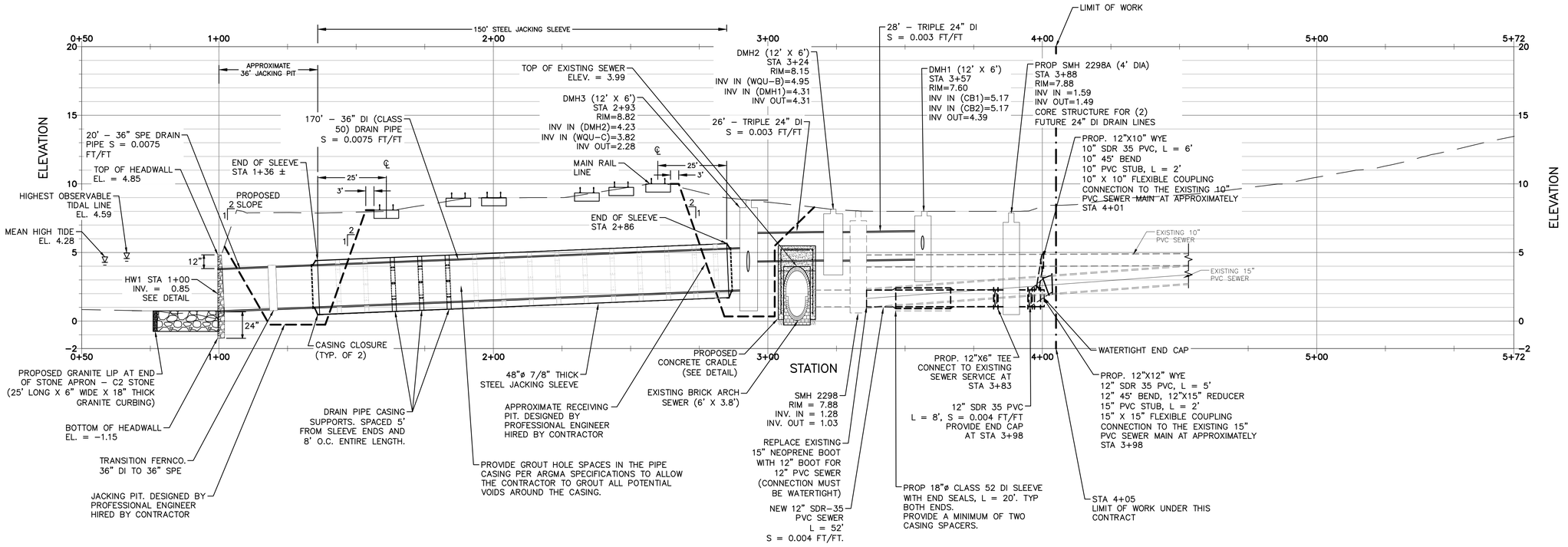
Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
BREWSTER STREET DRAINAGE PLAN

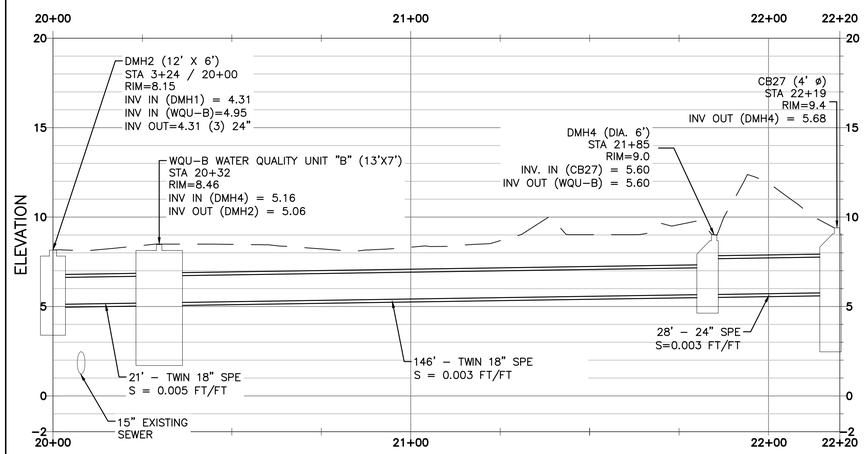
Project No.	Scale	
195112923	AS NOTED	
Drawing No.	**Sheet**	**Revision**
C-101	2 of 9	0

ORIGINAL SHEET - ARCH D



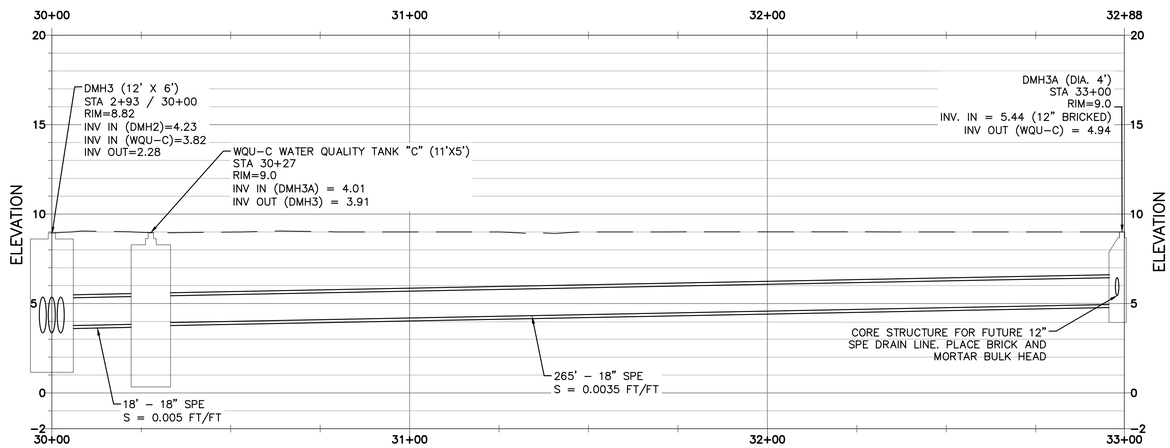
DRAINAGE PROFILE – BREWSTER ST

SCALE: HORZ. 1" = 20'
VERT. 1" = 4'



DRAINAGE PROFILE – WESTERLY REACH

SCALE: HORZ. 1" = 20'
VERT. 1" = 4'



DRAINAGE PROFILE – EASTERLY REACH

SCALE: HORZ. 1" = 20'
VERT. 1" = 4'

0 20' 40'

ORIGINAL SHEET - ARCH D

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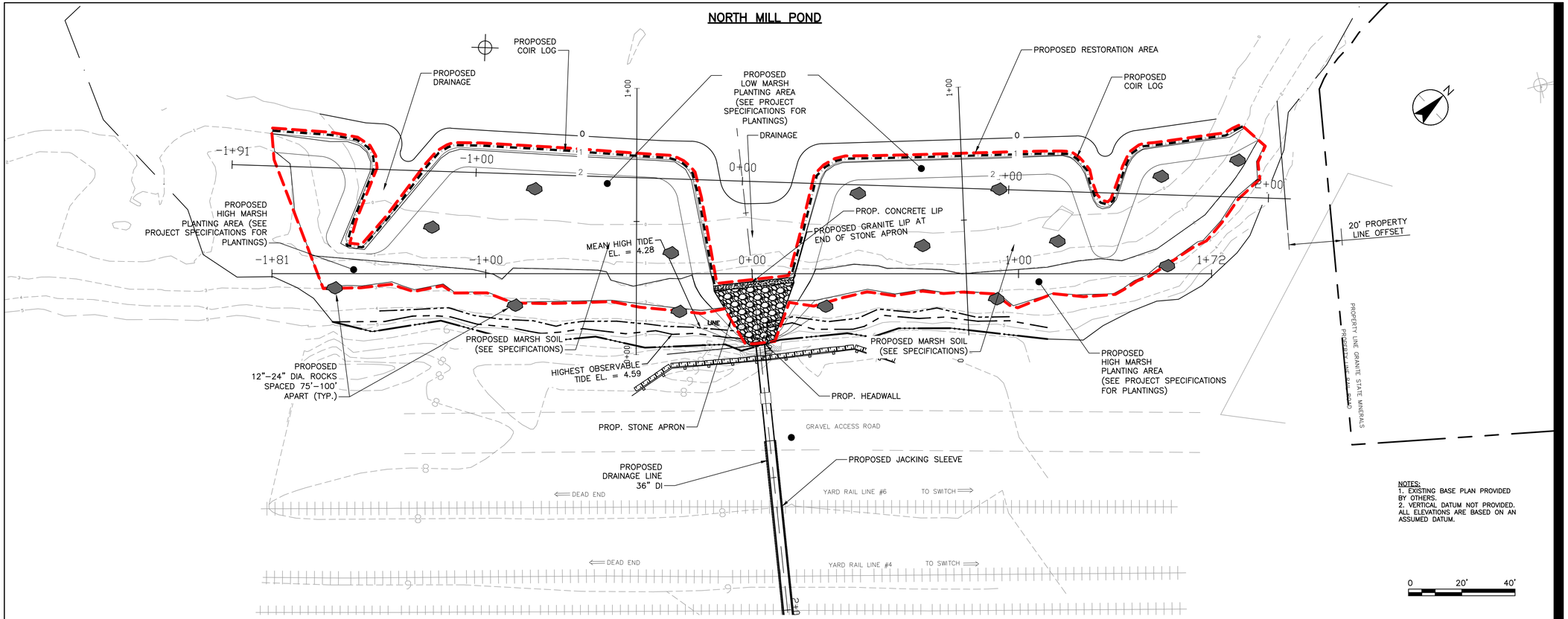
Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
BREWSTER STREET DRAINAGE PROFILE

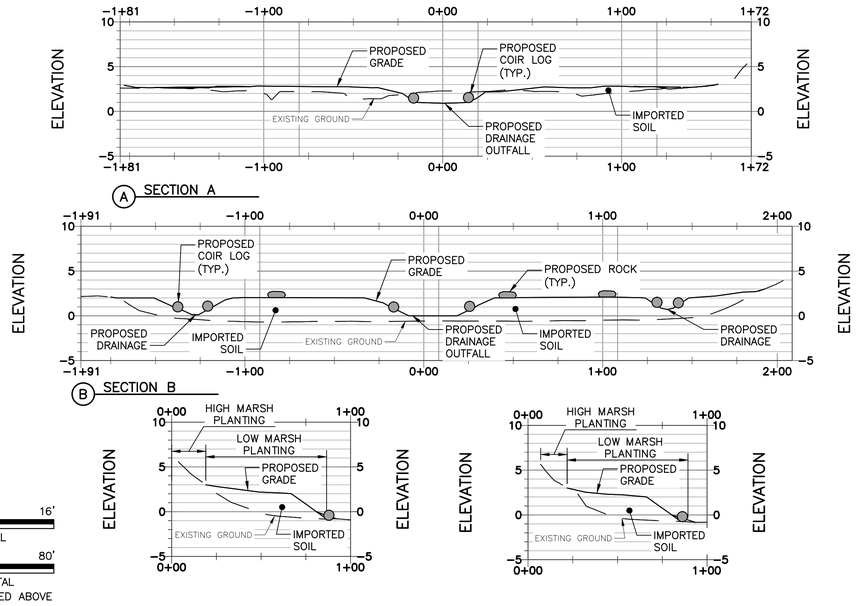
Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
P-101	3 of 9	0

NORTH MILL POND



NOTES:
1. EXISTING BASE PLAN PROVIDED BY OTHERS.
2. VERTICAL DATUM NOT PROVIDED. ALL ELEVATIONS ARE BASED ON AN ASSUMED DATUM.

TIDAL MITIGATION PLAN
SCALE: 1 = 20'



TIDAL MITIGATION CROSS SECTIONS
SCALE: 1 = 40'

ORIGINAL SHEET - ARCH D

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Notes

No.	Revision	By	Appd.	YY.MM.DD
1	ADD PROPERTY LINE/SETBACK PER NHDES COMMENTS	MEL	RL	14.09.26

Issued

	By	Appd.	YY.MM.DD

File Name: 12923-C-106-WETLAND MITIGATION.dwg

Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CITY OF PORTSMOUTH
680 PEVERLY HILL ROAD

BREWSTER STREET DRAINAGE UPGRADE
Portsmouth, New Hampshire

Title
WETLAND MITIGATION PLAN

Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
C-102	4 of 9	0

GENERAL NOTES AND SPECIFICATIONS FOR EROSION CONTROL

1. The contractor is responsible for water control during all phases of construction. No work shall be permitted in flowing water. Streams shall be temporarily dammed by use of sand bags or other suitable means. The diversion shall be accomplished by temporary culverts or by pumping. All diverted water shall be discharged to stone fill or other suitable energy dissipater surrounded by silt fence.

2. This plan is to be used as a guideline only. Additional silt fence, stone check dams, or other measures may be dictated by field conditions.

3. The Contractor is responsible for complying with all local, state, and federal regulations.

4. Temporary Stabilization:

All disturbed areas shall have temporary or permanent stabilization within 14 days of initial disturbance. After this time any disturbance shall be stabilized by the end of the day, with the following exceptions:

(1) Stabilization is not required if work is to continue in the area in the next 24 hours and there is no precipitation forecast for the next 24 hours.

(2) Stabilization is not required if the work is in a self–contained excavation with a depth of 2 feet or more.

Temporary Stabilization Measures:

(1) Hay or straw mulch with a thickness of at least 2 inches.

(2) Soil tracking with tracked equipment. Should be limited to small areas with slopes less than 100 feet long (less than 50 feet with slopes steeper than 3:1)

(3) A combination of the above.

(4) Erosion Control matting.

5. Materials

A. Mulch material: Select mulch material for erosion control that will best meet the site conditions from the following.

(1) Hay or straw – Shall be dry, free of mold and weed seeds. Hay or straw can be used on disturbed areas that will not be reworked for 7 to 30 days.

(2) Wood Chips – Shall be dry, free of soil and other foreign material.

(3) Rolled Erosion Control Products (RECP) – Shall be dry, and shall be made of straw or hay, coconut and related fibers, wood excelsior, jute, polypropylene, nylon, or an approved combination of different materials.

B. Mulch Anchoring: When mulch must be held in place, the following mulch anchoring material shall be used:

(1) Mulch Netting (Paper, twine, plastic, or plastic and wood fiber).

C. Fertilizer: Complete fertilizer 10–20–20 (Standard Product) – Class A
10–10–10 (Standard Product) – Class B

D. Lime: Ground limestone containing not less than 95% total carbonates (calcium or magnesium).

E. Temporary Seed Mixture: When it is impractical to establish permanent protective vegetation on disturbed earth by October 15, use "Conservation Mix" or the following seed mixture. Disturbed areas that will not be reworked for 30 days or more shall also receive temporary seed and mulch.

Kind of Seed:	% By Weight
Annual Ryegrass	50
Perennial Ryegrass	50

Apply seed mixture at 50 pounds per acre.

F. Permanent Seed Mixture: (Not for Wetland Restoration):

(1) For Class A (Lawn) restoration of growth: Shall normally be used on loam areas. This seed shall conform to the following and shall be furnished on a pure live seed (PLS) basis.

Class A

Kind of Seed:	PLS Per Acre, LBS
Red Fescue (Creeping)	21
Kentucky Bluegrass	21
	21
	21
Perrenial Ryegrass (Manhattann)	Total 84

(2) For Class B (Field) restoration of growth: Shall normally be used for all slope work. This seed shall conform to the table below unless amended by the engineer to suit special local conditions encountered. This seed shall be furnished on a pure live seed (PLS) basis.

Class B

Kind of Seed:	PLS Per Acre, LBS
Tall Fescue (ALTA or K–31)	20
Perennial Ryegrass (Manhattan)	15
Red Fescue (Creeping)	5
Red Clover	5
Birdsfoot Trefoil (Empire variety Preferred)	5
Total	50

6. Seeding and Mulching:

A. All areas shall be seeded and mulched within 48 hours of final grading.

B. Soil samples may be sent to the county extension service for analysis to determine the proper seed mixture and fertilizer requirements.

C. The following procedures shall be followed for temporary seeding:

(1) Apply lime at a rate of 75 to 100 pounds per 1000 square feet. Incorporate into top two inches of soil.

(2) Apply fertilizer at a rate of 30 pounds per 1000 square feet. Mix thoroughly into the top two inches of soil.

(3) Apply seed mixture at a rate of 50 pounds per acre and additional 3–4 lbs. per 1000 square feet for sloped areas of 45% and greater evenly in two intersecting directions. Rake lightly.

(4) Apply mulch material within 24 hours after seeding in accordance with the following:

(A) Hay or Straw: Application rate – 75 to 100 pounds per 1000 square feet. Spread by hand or with machine. Anchor on slopes and where subject to blowing or slipping.

(B) Wood Chips – Application rate – Two to six inches deep. Use for tree and shrub planting.

(5) Anchor mulch on all slopes exceeding 5% and other areas as required using the following method:

(A) Mulch Netting: Spread over loose mulch and pin to the soil in accordance with the manufacturer's instructions.

D. When temporary seeding cannot be accomplished to have established or visible growth by October 15, the disturbed areas shall be covered with 6 inches of mulch and anchored or erosion control blankets for the duration of the winter.

7. Maintenance of Erosion Control Structures:

A. Stone check dams shall be replaced when they become clogged with soil particles or as directed by the owner/representative.

B. When the sediment accumulation reaches a depth of 12 inches behind the silt fence, it shall be disposed of.

C. Repair all damages caused by soil erosion or construction equipment at or before the end of each working day.

D. Stone stabilized construction entrances shall be inspected to ensure tracking of sediments onto public right–of–ways or streets is not occurring. Maintenance may include periodic top dressing with additional aggregate to ensure a minimum thickness of eight inches.

E. All measures shall be removed within 30 days of stabilization.

8. Wetland Restoration

A. Replace wetland soil from stock pile to a minimum depth of 8 inches or equal to original depth.

B. Grade areas to match preconstruction grades

C. Apply "New England Wetmix" seed or equal in accordance with the manufacturers application rates.

9. Winter Erosion Control

A. All erosion control features such as silt fence must be in place prior to the ground freezing.

B. All disturbed areas of the site shall be seeded and mulched from October 15 to May 1 regardless of whether final grading has been finished. Work may continue through this period if the following winter erosion controls are implemented.

(1) Oat seeds shall be substituted for any other temporary annual grass seeds.

(2) All exposed earth shall be mulched with 6 inches of hay or straw. Slopes over 5% shall have an additional covering of staked jute mat or its equivalent.

C. The following maintenance items should be performed specifically for the various erosion control devices:

(1) Diversion Dike:

(A) Minimum inspection frequency – Weekly.

(B) Remove any flow blockage caused by ice or sediment.

(2) Mulch:

(A) Minimum inspection frequency – Daily.

(B) Replace mulch on any area where original mulch cover has been lost.

(3) Silt Fence:

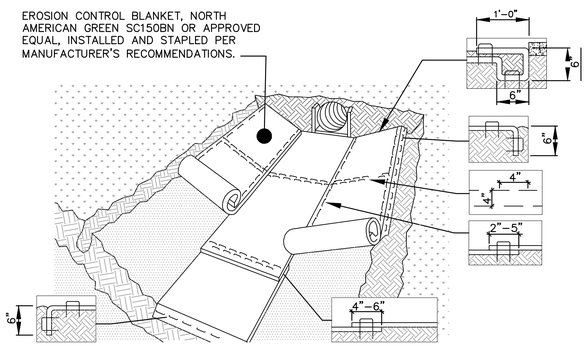
(A) Minimum inspection frequency – Weekly.

(B) Clean and remove any collected sediment before predicted thaws or rainy periods.

(4) Stone Check Dam:

(A) Minimum inspection frequency – Weekly.

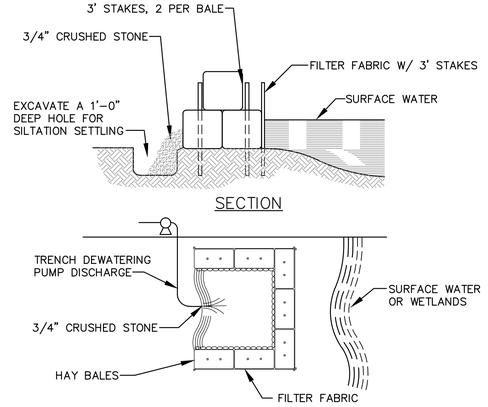
(B) Remove and replace clogged stone.



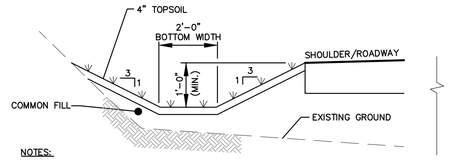
NOTES:

1. TO BE USED ON SLOPES 3 HORIZONTAL TO 1 VERTICAL OR STEEPER.
2. PREPARE SOIL INCLUDING APPLICATION OF LIME, FERTILIZER AND SEED PRIOR TO INSTALLING BLANKET

1 EROSION CONTROL BLANKET DETAIL
NOT TO SCALE



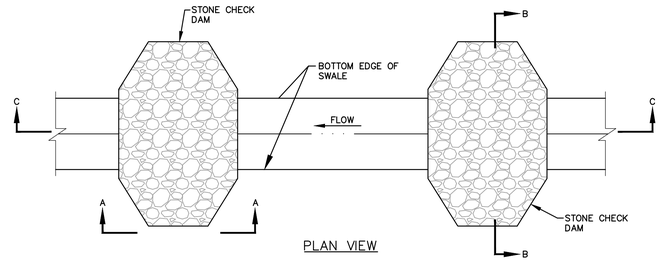
DEWATERING BASIN DETAIL
NOT TO SCALE

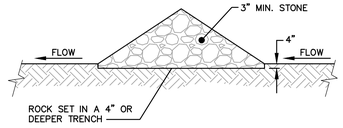


NOTES:

1. GRASS LINED SWALES ARE TO BE USED EVERYWHERE UNLESS INDICATED OTHERWISE.
2. IF LONGITUTINAL SLOPE IS GREATER THAN 2% , TEMPORARY STONE CHECK DAMS ARE NEEDED TO REDUCE STORMWATER VELOCITY AND PREVENT SOIL EROSION WITHIN THE SWALE.
3. SWALE TO BE SEEDED WITH A GRASS SPECIES NATIVE TO THE AREA THAT TOLERATES WET/DRY CONDITIONS.

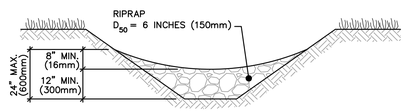
3 GRASS SWALE DETAIL
NOT TO SCALE

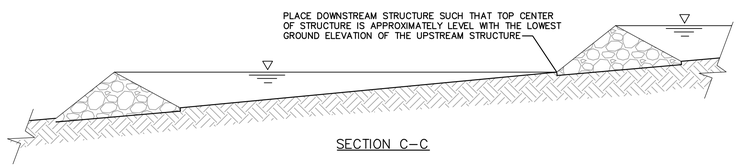




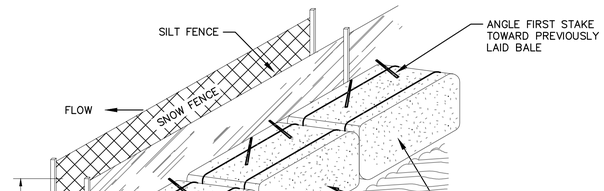
DITCH GRADE (G)	CHECK DAM SPACING(S)
0.02 FT/FT (M/M)	67 FT (20.5 M)
0.03 FT/FT (M/M)	44.5 FT (13.6 M)
0.04 FT/FT (M/M)	33.4 FT (10.2 M)
0.05 FT/FT (M/M)	26.7 FT (8.2 M)
0.06 FT/FT (M/M)	22.3 FT (6.8 M)

DO NOT USE CHECK DAMS BELOW 2% OR ABOVE 6% DITCH GRADES

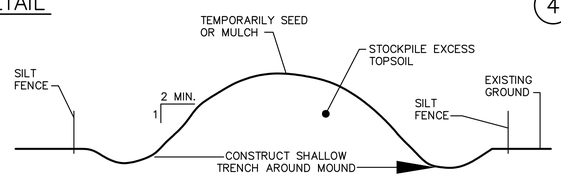




2 STONE CHECK DAM DETAIL
NOT TO SCALE



4 SILT FENCE & BALE DETAIL
NOT TO SCALE



TYPICAL TOPSOIL STOCKPILE MOUND DETAIL
NOT TO SCALE

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Permit-Seal

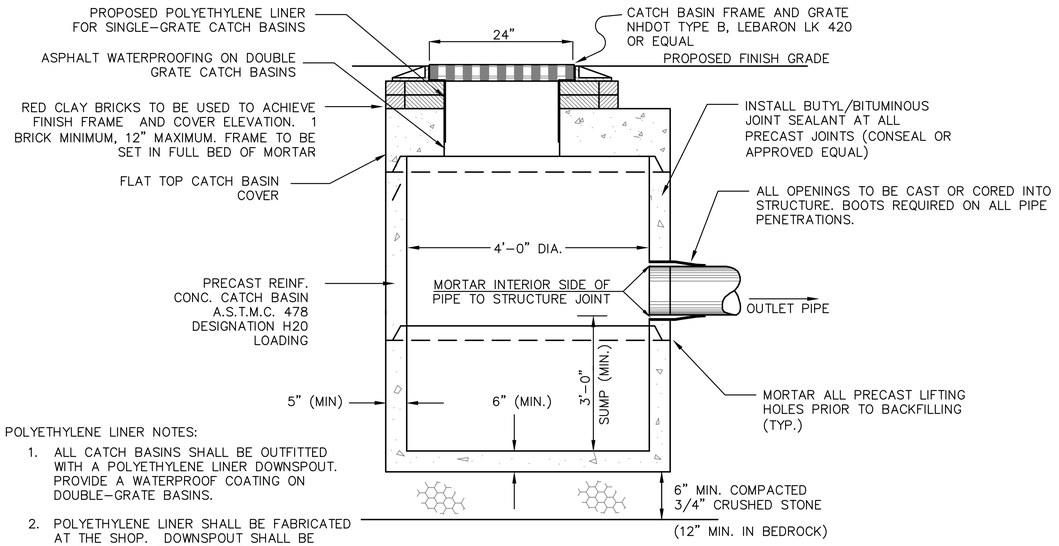
Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
DET1	5 of 9	0

ORIGINAL SHEET - ARCH D



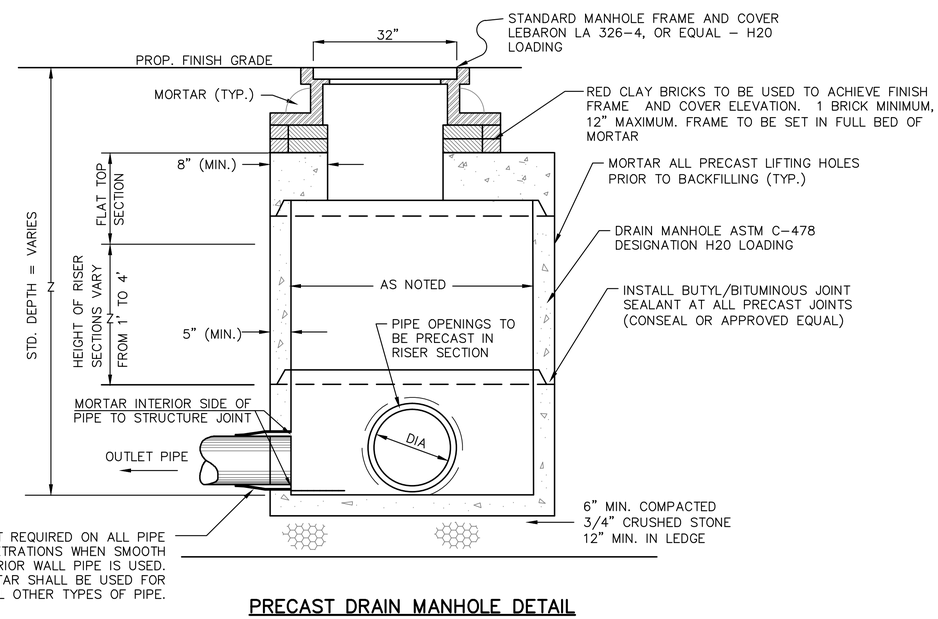
POLYETHYLENE LINER NOTES:

1. ALL CATCH BASINS SHALL BE OUTFITTED WITH A POLYETHYLENE LINER DOWNSPOUT. PROVIDE A WATERPROOF COATING ON DOUBLE-GRATE BASINS.
2. POLYETHYLENE LINER SHALL BE FABRICATED AT THE SHOP. DOWNSPOUT SHALL BE EXTRUSION FILLET WELDED TO THE POLYETHYLENE SHEET.
3. PLACE A CONTINUOUS BEAD OF AN APPROVED SILICONE SEALANT BETWEEN FRAME AND POLYETHYLENE SHEET.
4. PLACE CLASS AA CONCRETE TO 2" BELOW THE TOP OF GRATE ELEVATION (SUBSIDIARY TO DRAINAGE STRUCTURE).
5. TRIM POLYETHYLENE SHEET A MAXIMUM OF 4" OUTSIDE THE FLANGE ON THE FRAME FOR THE CATCH BASIN BEFORE PLACING CONCRETE (EXCEPT AS SHOWN WHEN USED WITH CURB).

CATCH BASIN DETAIL (CB1 AND CB2)

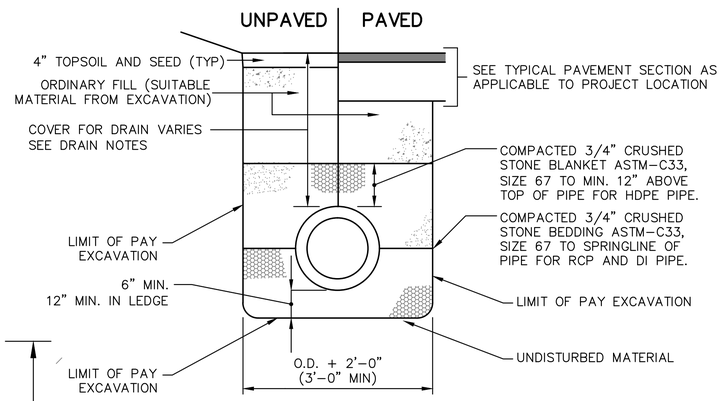
NOT TO SCALE

NOTE: CONE SECTIONS SHALL BE ECCENTRIC. WHERE PIPE CORE WOULD OTHERWISE ENTER INTO THE CONE SECTION OR A JOINT A FLAT TOP ECCENTRIC LID MAY BE USED.



PRECAST DRAIN MANHOLE DETAIL

NOT TO SCALE

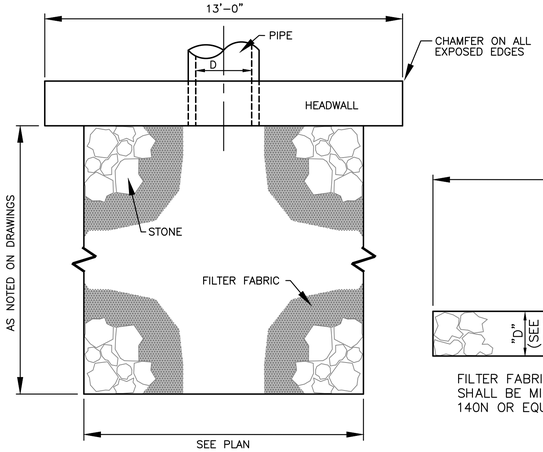


TYPICAL DRAIN PIPE TRENCH

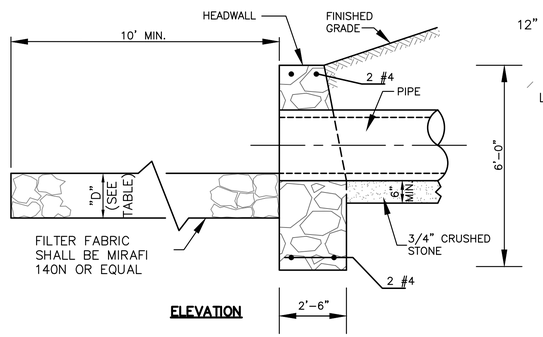
NOT TO SCALE

PIPE TRENCH NOTES:

1. SUITABLE MATERIAL: IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL AND ALL ROCKS OVER SIX INCHES IN THE LARGEST DIMENSION, OR ANY MATERIAL WHICH, AS DETERMINED BY THE TOWN OF WOLFEBORO ENGINEERING DEPARTMENT, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. SUITABLE MATERIAL SHALL BE PLACED IN 12" LIFTS AND THOROUGHLY COMPACTED USING WALK BEHIND HAND OPERATED PLATE COMPACTORS. THE USE OF MACHINE MOUNTED PLATE COMPACTORS IS NOT ALLOWED UNDER THIS PROJECT.
2. BACKFILL OF THE TRENCHES SHALL BE COMPACTED TO TO 95% MAX. DRY DENSITY UNDER ALL PAVED AREAS AND 92% MAX. DRY DENSITY ELSEWHERE. (SEE PROJECT SPECIFICATIONS)
3. SMOOTH INTERIOR POLYETHYLENE PIPE (SPE) SHALL BE ADS N-12 (CORRUGATED EXTERIOR/SMOOTH INTERIOR) OR EQUAL MEETING AASHTO M-252 AND H-20 LOADING.
4. DI DRAIN PIPE SHALL BE CL. 50 DUCTILE IRON. UNLESS OTHERWISE NOTED



PLAN



ELEVATION

NOTE: STONE SHALL CONFORM TO NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2006, SECTION 585, STONE FILL WITH THE FOLLOWING REQUIREMENTS:

HEADWALL WITH STONE APRON

NOT TO SCALE

% OF PASSING BY WEIGHT	STONE SIZES C1 C2 C3 D = BLANKET THICKNESS 12"	18"	24"
100%	8"	12"	18"
85%	7"	11"	16"
50%	5"	8"	12"
15%	2"	3"	4"

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Client/Project
CITY OF PORTSMOUTH
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

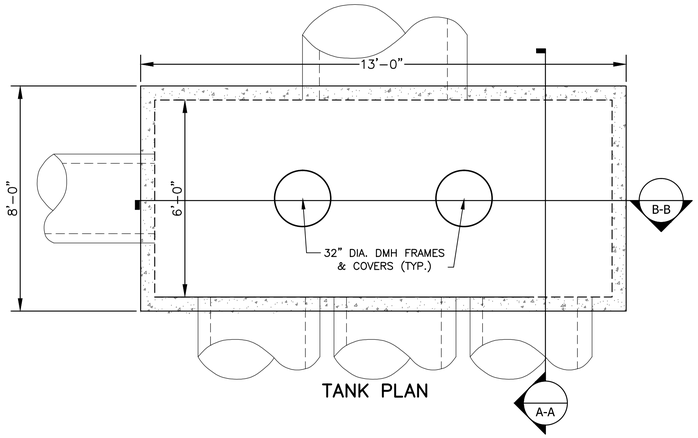
Project No. 195112923 | Scale AS NOTED

Drawing No. DET2 | Sheet 6 of 9 | Revision 0

ORIGINAL SHEET - ARCH D

SPECIAL DRAIN MANHOLE NOTES:

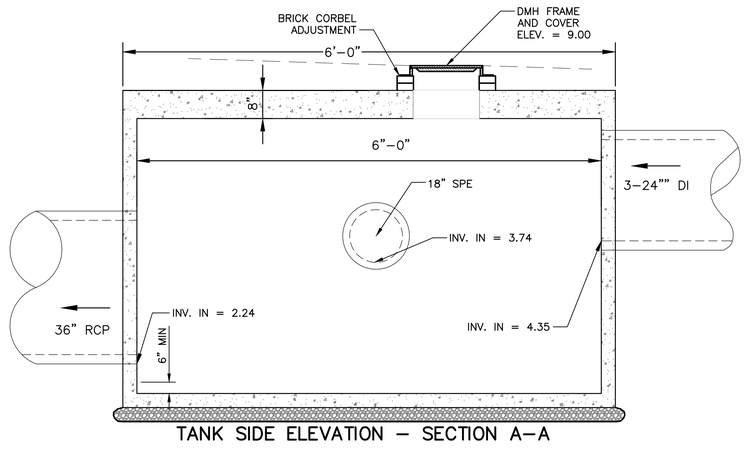
CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MANHOLES AND WATER QUALITY STRUCTURES.



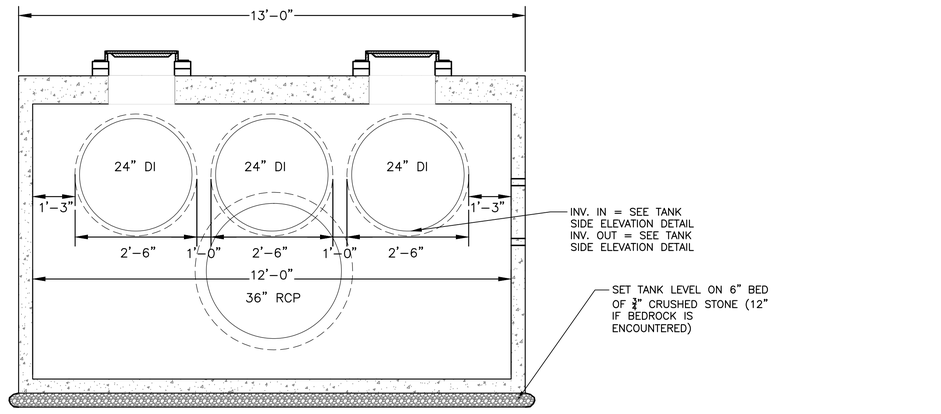
TANK PLAN

NOTES:

1. TANKS SHALL BE PRECAST REINFORCED CONCRETE WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 P.S.I. @ 28 DAYS.
2. STEEL REINFORCEMENT: ASTM A–615 GR. 60 WITH MINIMUM 1" COVER.
3. TANKS AND COVERS SHALL BE DESIGNED TO MEET ACI 318 WITH AASHTO HS20–44 LOADING.
4. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OF PROPOSED TANKS PRIOR TO CASTING. ALL SHOP DRAWINGS SHALL BE STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN NEW HAMPSHIRE.
5. OPENINGS FOR DRAIN PIPES AND OTHER APPURTENANCES SHALL BE CAST INTO STRUCTURE DURING FABRICATION BY MANUFACTURER AND SHALL NOT BE FIELD CUT OR CORED.
6. TONGUE AND GROOVE JOINTS ARE TO BE SEALED WITH A 6" STRIP OF ASPHALTIC BUTYL RUBBER. CONSTRUCTION JOINTS ARE TO BE SEALED WITH 1" DIA. BUTYL RUBBER, OR APPROVED EQUAL. ALL JOINTS SHALL BE SUBJECT TO WATER TIGHTNESS TESTING.
7. ALL PIPE TO PRECAST CONNECTIONS SHALL BE NEOPRENE BOOTS WITH STAINLESS STEEL BANDS.



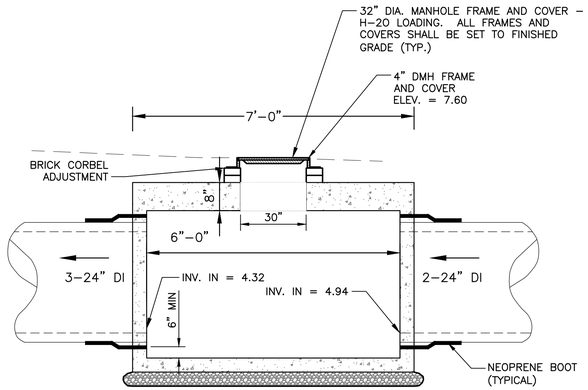
TANK SIDE ELEVATION – SECTION A–A



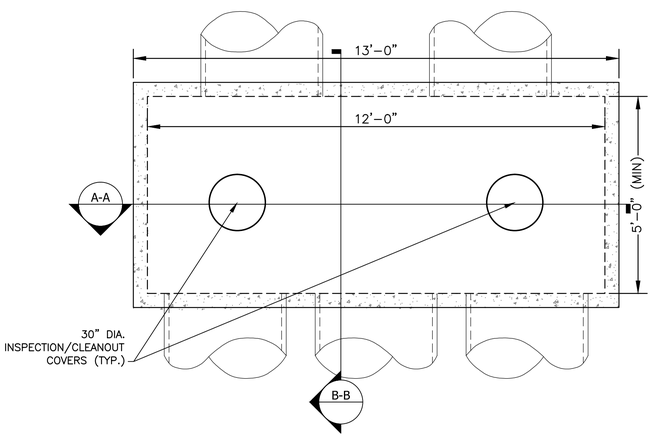
TANK END ELEVATION SECTION B–B

SPECIAL DRAIN MANHOLE 3 DETAIL (12'X6' STRUCTURE)

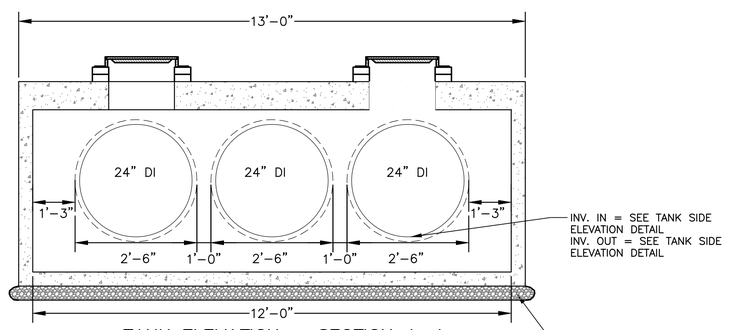
NOT TO SCALE



TANK ELEVATION – SECTION B–B



TANK PLAN



TANK ELEVATION – SECTION A–A

SPECIAL DRAIN MANHOLE 2 DETAIL (13X6' STRUCTURE)

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Client/Project
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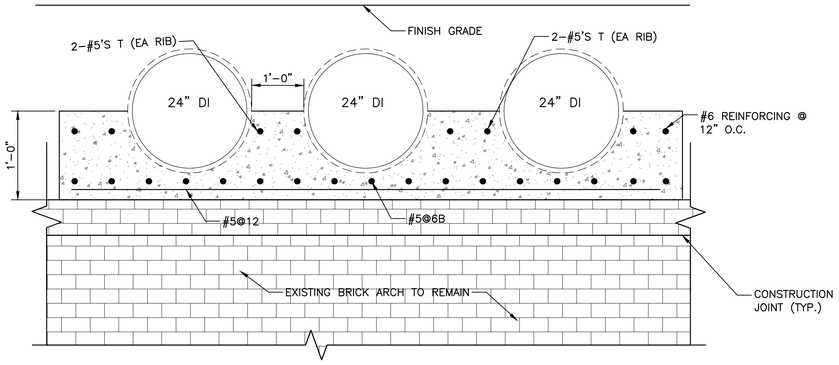
DEPARTMENT OF PUBLIC WORKS

BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

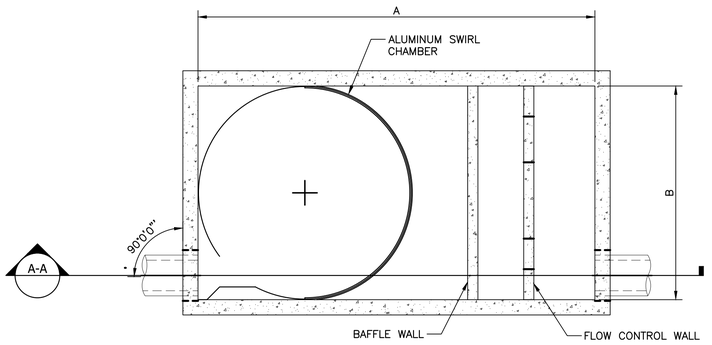
Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
	7 of 9	0

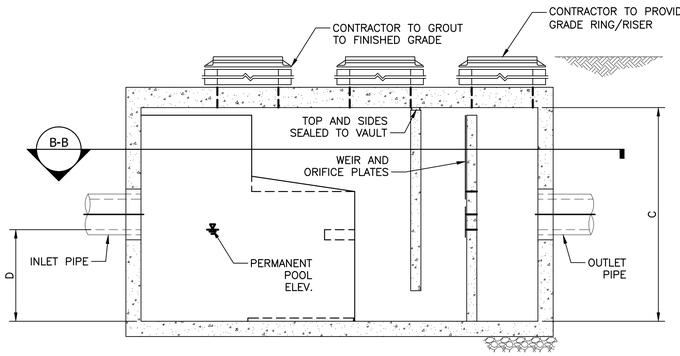
ORIGINAL SHEET - ARCH D



BRICK ARCH SEWER CONCRETE CRADLE SECTION A

NOT TO SCALE





VORTECHS MODELS 3000 AND 5000 DETAIL OR APPROVED EQUAL

NOT TO SCALE

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.contechES.com
4. VORTECHS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET AASHTO M306 LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. INLET PIPE(S) MUST BE PERPEDICULAR TO THE VAULT AND AT THE CORNER TO INTRODUCE THE FLOW TANGENTIALLY TO THE SWIRL CHAMBER. DUAL INLETS NOT TO HAVE OPPOSING TANGENTIAL FLOW DIRECTIONS.
7. OUTLET PIPE(S) MUST BE DOWN STREAM OF THE FLOW CONTROL BAFFLE AND MAY BE LOCATED ON THE SIDE OR END OF THE VAULT. THE FLOW CONTROL WALL MAY BE TURNED TO ACCOMODATE OUTLET PIPE KNOCKOUTS ON THE SIDE OF THE VAULT.

INSTALLATION NOTES
A. ANY SUB–BASE, BACKFILL DEPTH, AND/OR ANTI–FLOTATION PROVISIONS ARE SITE–SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE VORTECHS STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

SITE SPECIFIC DATA REQUIREMENTS VORTECHS MODEL 3000

DIMENSION A	11'–0"
DIMENSION B	5'–0"
DIMENSION C	7'–0"
DIMENSION D	3'–0"
STRUCTURE ID	WQV–C
WATER QUALITY FLOW RATE (CFS)	3.0
PEAK FLOW RATE (CFS)	8.4
RETURN PERIOD OF PEAK FLOW (YRS)	10

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	4.01	SPE	18"
INLET PIPE 2	---	---	---
OUTLET PIPE	3.91	SPE	18
RIM ELEVATION			9.0

ANTI–FLOTATION BALLAST	WIDTH	HEIGHT
	---	---

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

SITE SPECIFIC DATA REQUIREMENTS VORTECHS MODEL 5000

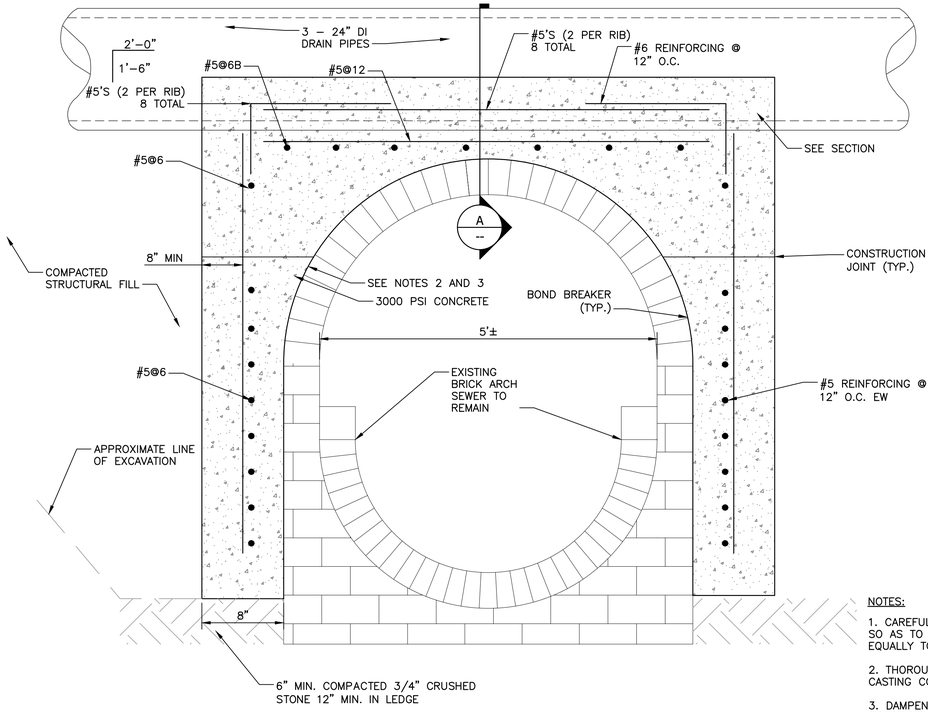
DIMENSION A	13'–0"
DIMENSION B	7'–0"
DIMENSION C	7'–0"
DIMENSION D	3'–0"
STRUCTURE ID	WQV–B
WATER QUALITY FLOW RATE (CFS)	4.0
PEAK FLOW RATE (CFS)	10.9
RETURN PERIOD OF PEAK FLOW (YRS)	10

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	5.16	DI	18
INLET PIPE 2	5.16	DI	18
OUTLET PIPE	5.06	DI	18
RIM ELEVATION			8.46

ANTI–FLOTATION BALLAST	WIDTH	HEIGHT
	---	---

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD



BRICK ARCH SEWER CONCRETE CRADLE

NOT TO SCALE

NOTES:

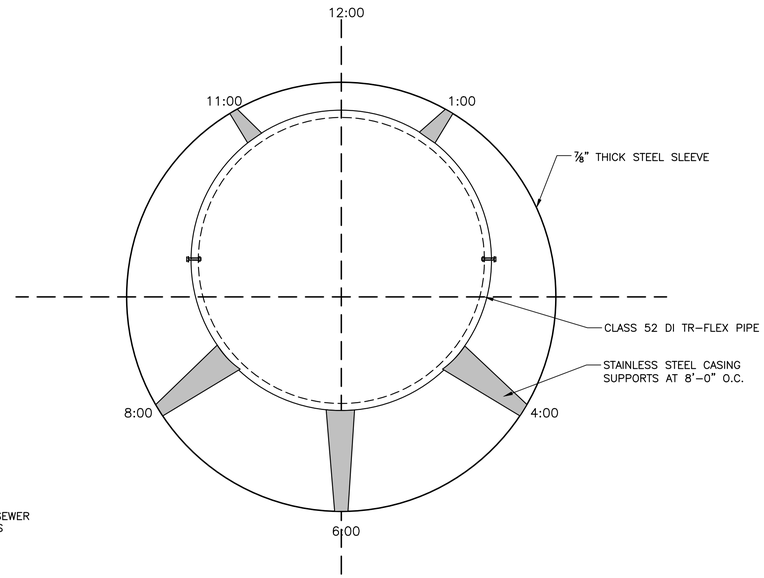
1. CAREFULLY EXCAVATE AROUND EXISTING BRICK SEWER SO AS TO PREVENT DAMAGE. EXCAVATE BOTH SIDES EQUALLY TO LIMIT UNBALANCED SOIL PRESSURES.

2. THOROUGHLY CLEAN EXISTING BRICK PRIOR TO CASTING CONCRETE ENCASEMENT.

3. DAMPEN EXISTING BRICK PRIOR TO CASTING OF CONCRETE.

4. SEE SPECIFICATIONS FOR BACKFILLING REQUIREMENTS.

4. CAP SLAB MUST BE IN PLACE A MINIMUM OF 14 DAYS PRIOR TO THE COMMENCEMENT OF BACKFILLING OPERATIONS.



STEEL CASING / CARRIER PIPE DETAIL

NOT TO SCALE

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DEPARTMENT OF PUBLIC WORKS

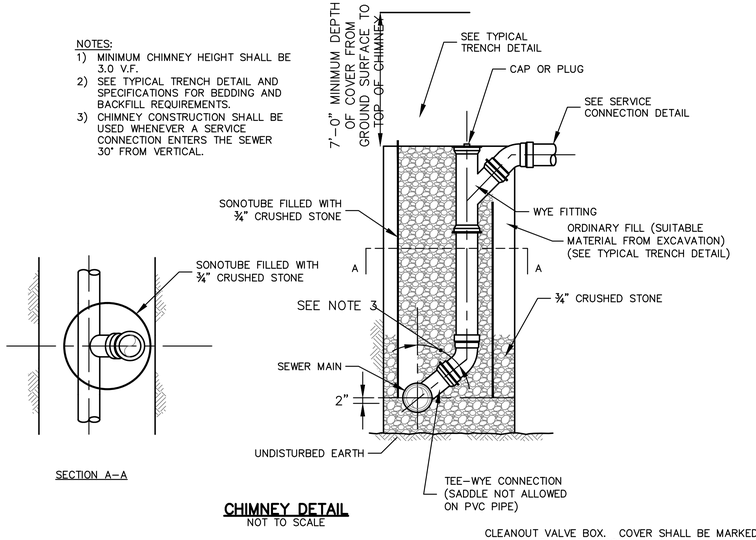
BREWSTER STREET
DRAINAGE IMPROVEMENTS
PORTSMOUTH, NH

Title
CONSTRUCTION DETAILS

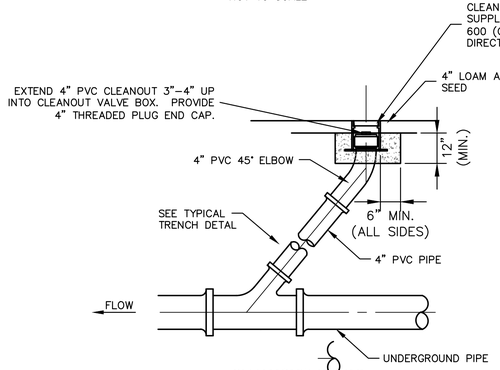
Project No.	Scale	
195112923	AS NOTED	
Drawing No.	Sheet	Revision
DET4	8 of 9	0

ORIGINAL SHEET - ARCH D

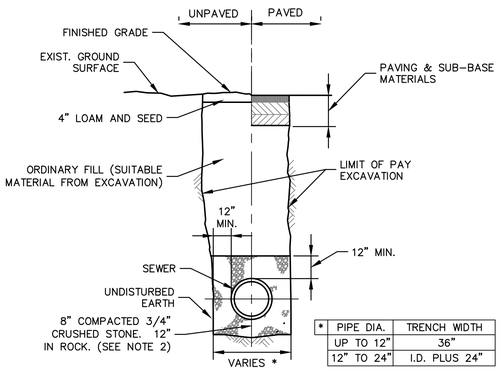
NOTES:
1) MINIMUM CHIMNEY HEIGHT SHALL BE 3.0 V.F.
2) SEE TYPICAL TRENCH DETAIL AND SPECIFICATIONS FOR BEDDING AND BACKFILL REQUIREMENTS.
3) CHIMNEY CONSTRUCTION SHALL BE USED WHENEVER A SERVICE CONNECTION ENTERS THE SEWER 30° FROM VERTICAL.



CHIMNEY DETAIL
NOT TO SCALE



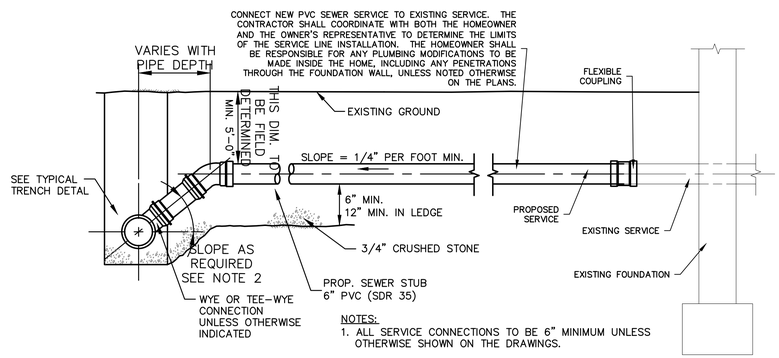
CLEANOUT DETAIL
NOT TO SCALE



*	PIPE DIA.	TRENCH WIDTH
	UP TO 12"	36"
	12" TO 24"	I.D. PLUS 24"

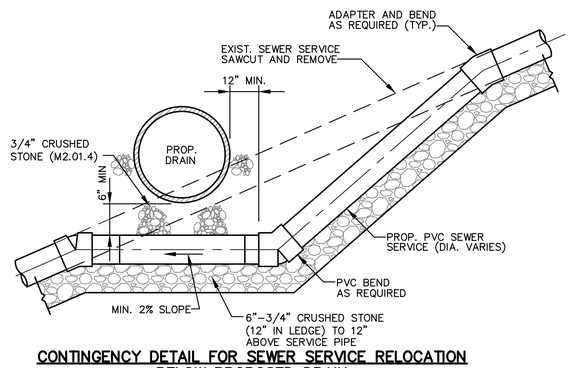
TYPICAL TRENCH DETAIL FOR SEWER PIPE
NOT TO SCALE

NOTES
1. SHORING AND STABILIZING OF TRENCH SIDEWALLS DURING EXCAVATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR ANY TRENCH EXCAVATION BEYOND THE LIMITS OF PAY EXCAVATION INDICATED INCLUDING ROCK EXCAVATION.
2. FOR TRENCH EXCAVATION IN ROCK AS DETERMINED BY THE ENGINEER, ALLOWABLE PAY LIMIT SHALL BE AS DEFINED IN TABLE ABOVE.
3. FOR CONSTRUCTION RELATIVE TO UNSUITABLE MATERIALS ENCOUNTERED DURING EXCAVATION, THE ENGINEER SHALL BE CONTACTED IMMEDIATELY UPON ENCOUNTERING UNSUITABLE MATERIAL PRIOR TO EXCAVATION TO VERIFY THE WORK. THE CONTRACTOR SHALL EXCAVATE THE UNSUITABLE MATERIAL AND REPLACE WITH SELECT FILL AS DIRECTED BY THE ENGINEER.

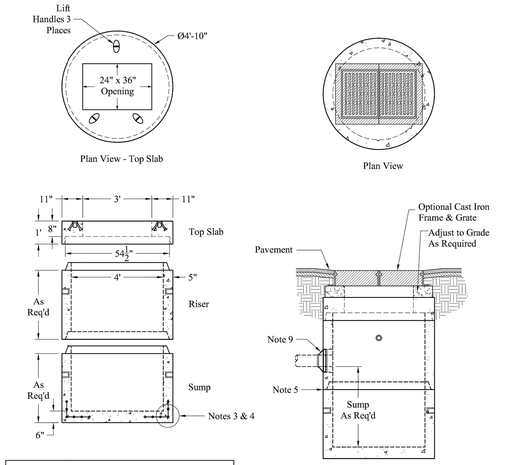


NOTES:
1. ALL SERVICE CONNECTIONS TO BE 6" MINIMUM UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
2. USE CHIMNEY DETAIL WHERE SERVICE CONNECTION ENTERS SEWER AT GREATER THAN 60° TO THE HORIZONTAL.

DETAIL FOR SEWER SERVICE CONNECTION
NOT TO SCALE



CONTINGENCY DETAIL FOR SEWER SERVICE RELOCATION BELOW PROPOSED DRAIN
NOT TO SCALE

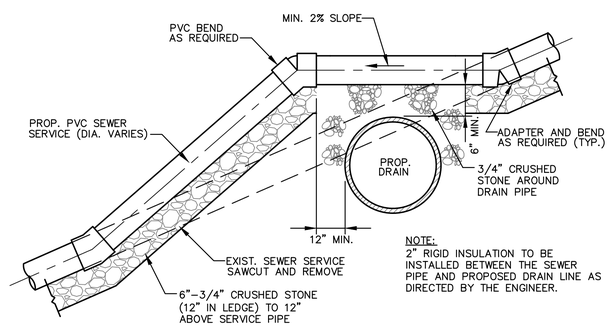


General Notes
1. Concrete: fc = 4,000 psi @ 28 Days Minimum, Type III Cement
2. HS-20 Design Loading Conforms to Latest Specifications ASTM C478, AASHTO M199 Precast Reinforced Concrete Manhole Sections
3. One Pour Monolithic Base Section
4. Steel Reinforcement Conforms to Latest ASTM Specification: ASTM A-615, Grade 60 Black Deformed Bars ASTM A-185 Welded Wire Fabric 0.12 Sq. In./Lineal Ft. And 0.12 Sq. In.(Both Ways) Base Bottom
5. Butyl Rubber Joint Sealant Provided Conforms to ASTM C-990 And Federal Spec SS-S-210A
6. 94 Gallons/VF
7. Holes & Elevations TBD
8. Sections Available in Increments of 6"
9. Booted Pipe Connections (If Used) Conform to ASTM C-923. Maximum Booted Connection Pipe Size is 24"
10. Maximum Pipe OD is 32" (24" RCP)
11. Plastic Manhole Steps (If Required) are Steel Reinforced Conforming to ASTM C-478

Est Weights:

Top Slab:	1,340 Lbs
Wt/VF:	864 Lbs
Floor:	931 Lbs

STANDARD DETAIL FOR DOUBLE-GRATE CB
NOT TO SCALE



NOTE:
2" RIGID INSULATION TO BE INSTALLED BETWEEN THE SEWER PIPE AND PROPOSED DRAIN LINE AS DIRECTED BY THE ENGINEER.

CONTINGENCY DETAIL FOR SEWER SERVICE RELOCATION ABOVE PROPOSED DRAIN
NOT TO SCALE

ORIGINAL SHEET - ARCH D

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